Introduction to the Special Issue: Highlighting the Best Papers from the OTL SIG AERA 2019

Karen Swan
University of Illinois Springfield

Jennifer Richardson and Tadd Farmer
Purdue University

The American Educational Research Association (AERA) was founded in 1916 to improve education through the design, implementation, and dissemination of research on a variety of educational topics. AERA's more than 25,000 members from 96 countries are faculty, researchers, graduate students, and other distinguished professionals with rich and diverse expertise in education research. They work in a range of settings from universities and other academic institutions to research institutes, federal and state agencies, school systems, testing companies, and nonprofit organizations. Based on their research, they produce and disseminate knowledge, refine methods and measures, and stimulate translation and practical application of research results.

Each year the AERA annual meeting attracts thousands of students, teachers, and researchers to its annual conference to understand how to improve education through the design, implementation, and dissemination of rigorous educational research. The 2019 annual meeting was held in Toronto under the theme of "Leveraging Education Research in a 'Post-Truth' Era". AERA has 12 disciplinary divisions and supports 154 special interest groups (SIGs). All of the former and most of the latter are represented at their annual meetings. One of the larger SIGs is the Online Teaching and Learning (OTL) SIG.

The Online Teaching and Learning Special Interest Group (OTL SIG) provides a forum within AERA for discussion and reporting on issues and research related to teaching and learning in online environments. The OTL SIG addresses all types of teaching and learning in all kinds of online environments including k-12 and higher education, and the development and implementation of ICT tools for teaching and learning online. For more information about the OTL SIG see: http://www.aeraotl.com/

At the 2019 annual meeting, the OTL SIG received 145 proposals from which 66 were selected to present. The articles in this special issue report on the research findings stemming from those proposals. It includes several articles concerned with quality in a variety of settings and from both instructor and student perspectives. Instructor perceptions of the development of community and faculty mentoring are also explored, and one paper examines what the instructors of award-winning courses believe makes them award winning. There are also several articles concerned with Massive Open Online Courses (MOOCs). We are also pleased to have the 2019 best paper recipient among the articles collected here.

Peter Shea and Temi Bidierano's article on the "Effects of Online Course Load on Degree Completion, Transfer, and Dropout Among Community College Students of the State University of New York" was the winner the 2019 OTL SIG best paper award. It explored the issue of whether or not community college students taking online courses are at greater academic risk than their peers who only take courses face-to-face. Previous research by the authors suggested that community college students taking up to 40% of their courses online were more likely to succeed while students taking more than 40% of their courses online were less likely to succeed. In this statewide study using data from the 30 community colleges in the State of New York system, they controlled for successful course completion to investigate the odds of successful degree completion. They found that students who attempted the majority of their semester courses online *but failed to accrue* credit for them were the most at risk. However, when controlling for successful course completion, the odds of degree completion increased for each additional unit of successful online study. The study concluded that when controlling for covariates known to impact degree completion community college students who successfully completed online courses, on average, nearly doubled their chances of earning a degree or transferring to a 4-year college.

The next two articles in this special issue looked at factors that predict success in online courses and a self-paced orientation designed to help students succeed online. Yu-Chen Yeh, Oi-Man Kwok, Hsiang-Yu Chien, Noelle Wall Sweany, Eunkyeng Baek, and William McIntosh report on findings from research on the structural relationships among achievement goal orientations, self-regulated learning strategies (SRL), supportive online learning behaviors, and expected academic outcome in various online courses in "How College Students' Achievement Goal Orientations Predict Their Expected Online Learning Outcome: The Mediation Roles of Self-Regulated Learning Strategies and Supportive Online Learning Behaviors." The results showed that two of the achievement goal orientations, mastery-approach goals (MAP) and mastery-avoidance goals (MAV), predicted the adoption of the self-regulated learning strategies and supportive online learning behaviors, which, in turn, predicted students' expected academic outcome for their online course. Specifically, students with higher mastery-approach goals were more likely to adopt different types of self-regulated learning strategies and supportive online learning behaviors to facilitate their learning experience. By contrast, students with higher mastery-avoidance goals were less likely to adopt self-regulated learning strategies and supportive online learning behaviors, which, in turn, led to lower grade expectations.

In "Evaluating Online Learning Orientation Design with a Readiness Scale," Juhong Christie Liu reports on research which studied the effects of a self-paced orientation course on student online learning readiness (SOLR) using a multi-year design-based research approach. There were three key findings. First, the self-paced asynchronous orientation improved students' online learning readiness in social, technical, and communication domains. Secondly, student perceptions of needing peer interaction on the pre-test merged with student-instructor interaction on the post-test; that is, students found that interacting with the instructor in the orientation satisfied their communication needs. Thirdly, the SOLR instrument (Yu & Richardson, 2015; Yu, 2018) served as an effective evaluative instrument for the design of the online orientation.

Four of the articles in this issue are concerned with MOOCs (Massive Open Online Courses : two explore tools for characterizing MOOC pedagogies, the Expanded Assessing MOOC Pedagogies instrument and the Course Scan rubric. Another investigates instructor perceptions of student learning in MOOCs and the last article investigates instructor and technology support for the development of students' self-monitoring skills for self-directed learning.

Rebecca Quintana and Yuanru Tan investigated tools and methodologies for describing MOOC pedagogies in “Characterizing MOOC Pedagogies: Exploring Tools and Methods for Learning Designers and Researchers.” To begin with, the researchers iteratively refined an existing instrument, the Assessing MOOC Pedagogies (AMP) tool to produce an Expanded AMP tool which they used to describe the pedagogies of 20 MOOCs. They then used cluster analysis to identify pedagogically similar courses and identified three factors that seemed to distinguish among clusters outside of the Expanded AMP characterization. Interestingly, initial analysis revealed that courses created by the same instructional design team, courses produced within the same time frame, and courses created as part of a single specialization were most likely to be grouped together.

“Instructional Quality of Business MOOCs: Indicators and Initial Findings” by Marc Egloffstein, Kristina Koegler, and Dirk Ifenthaler similarly focuses on MOOC pedagogies, but focuses on quality as assessed by Margaryan, Bianco, and Littlejohn’s (2015) Course Scan instrument. A pilot study of 101 business MOOCs revealed rather low overall instructional quality. While most aspects of structuredness and clarity were rated high across the MOOCs studied, but the implementation of instructional design principles within them generally fell notably behind. The implications from this study point towards a learner-oriented notion of instructional quality and individualized learning and increased learner support in business MOOCs. The results suggest that there is ample room for improvement in MOOC design, in particular in the direction of individualized learning and increased learner support. The authors also argue for the development of specific measures that embody a learner-oriented notion of instructional quality,

Meina Zhu and Curt Bonk’s article, “Designing MOOCs to Facilitate Participant Self-Monitoring for Self-Directed Learning,” investigated how instructors design and deliver their courses to develop students’ self-monitoring skills for self-directed learning as well as technologies used to support the same. It reports that to foster student self-monitoring, instructors helped students learn to use cognitive and metacognitive processes to produce internal feedback. To facilitate cognitive processes, MOOC instructors provided quizzes, tutorials, learning strategies, learning aids, and progress bars. For metacognition, they provided reflection questions and attempted to create learning communities. In addition, MOOC instructors, teaching assistants, and peers provided external feedback for students’ self-monitoring. Across these findings, technology played a central role in supporting students’ self-monitoring. MOOC instructors mentioned that a variety of technologies were used to facilitate students’ self-monitoring, including synchronous communication technologies, asynchronous communication technologies, and feedback tools.

Another way of assessing MOOC quality is to consider the quality of student learning within them. This is the approach taken by Jacob Askeroth and Jennifer C. Richardson in “Instructor Perceptions of Quality Learning in MOOCs they Teach.” In this case study, the authors completed semi-structured interviews with three MOOC instructors to explore their perceptions of the quality of learning in the courses they teach. Course and document reviews were implemented to observe concrete examples of those perceptions in practice. The findings suggest that instructors do believe that quality learning can take place within a MOOC, which they generally see as being accomplished through social constructivism (manifest in discussions dialogues, negotiations and collaborations) and self-regulated learning (evidenced as learners accomplish their intended goals).

Indeed, instructor perspectives provided the data for three additional studies included in this special issue, and student perceptions provided the data for another two. Swapna Kumar, Florence Martin, Kiran Budhrani, and Albert Ritzhaupt's article "Award-winning faculty online teaching practice: Elements of award-winning courses," reports on the perspectives of eight award-winning online faculty on what made their courses superior and the differences between expert and novice online instructors. The five main areas that emerged from interviews were: authentic and relevant course materials connected to practice, the use of multimedia resources, student creation of digital content individually and collaboratively, student reflections on learning, and the instructor's explanation of the purpose of activities, technologies and assessments in the online course. Award-winning faculty also emphasized the importance of using data and evaluation practices and reflecting on course offerings. Faculty described expert online instructors as being experienced and comfortable in the online environment, using a wide range of strategies, being willing to learn, using data and analytics, and engaged in continuous improvement.

Sharla Berry likewise focuses on faculty perspectives in "Faculty Perspectives on Online Learning: The Instructors' Role in Creating Community". This qualitative case study builds on a previous study of students' perspectives on community in an online program. The findings suggest that while online students' sense of community was influenced by their interactions in class, in study groups, and at in-person social events, online faculty saw their role in cultivating community as limited to the classroom. Professional and personal obligations as well as the academic reward structure limited faculty engagement in the online community. The findings have interesting implications for developing distance programs that support both student and faculty needs.

In "The Impact of the Cooperative Mentorship Model on Faculty Preparedness to Develop Online Courses," Larisa Olesova and Susan Campbell explore the efficacy of a cooperative mentorship model from the perspectives of the faculty being mentored. A purposive sample of eleven faculty were interviewed concerning their perceptions of the program and the factors influencing successful cooperation between themselves and the instructional designers. Results indicated that faculty perceived their relationships with instructional designers to be effective because they were able to align resources and instructional strategies with learning outcomes, they used time efficiently, and they were also able to apply acquired skills to the development of online courses. The major factors they believed affected the success of these relationships were motivation, open-mindedness, and a focus on work. The study also found evidence that cooperative mentorship relations between university faculty and instructional designers can lead to the development high quality online courses.

Student perceptions are the focus in Ayesha Sadaf, Florence Martin, and Lynn Ahlgrim-Delzell's article, "Student Perceptions of the Impact of Quality Matters–Certified Online Courses on Their Learning and Engagement". Quality Matters (QM) is one of the most widely adopted sets of standards for best practices in online courses to promote student learning. In their study, fifty online graduate students completed a survey developed based on the 43 rubrics in the QM instrument. Among the eight categories into which the rubrics are clustered, students rated Course Activities and Learner Interaction as having the highest impact on both student learning and engagement. "Clear expectations" loaded as the highest factor for both learning and engagement. These results will help instructional designers and online instructors understand the impact of individual QM design standards from students' point of view to design online courses that effectively contribute to their learning and engagement.

We would like to extend our special thanks to OLJ editor-in-chief Peter Shea, OLJ managing editor Sturdy Knight, OTL SIG chair AnaPaula Correia, OTL SIG program chair Mary Rice, and all our authors for their help in bringing you this special issue. We hope you enjoy the articles as much as we did and find them useful.

- Karen Swan, Stukel Professor of Educational Leadership, University of Illinois Springfield; kswan4@uis.edu
- Jennifer C. Richardson, Professor, Learning Design and Technology program, Curriculum and Instruction Department, Purdue University; jennrich@purdue.edu
- Tadd Farmer, Doctoral Student, Learning Design and Technology program, Curriculum and Instruction Department, Purdue University; farmer32@purdue.edu

Effects of Online Course Load on Degree Completion, Transfer, and Dropout Among Community College Students of the State University of New York

Peter Shea
University at Albany, State University of New York

Temi Bidjerano
Furman University

Abstract
Past research suggests that some students are at risk of lower levels of academic performance when studying online compared to students who take coursework only in the classroom. Community college students appear to be among those that struggle in online settings. In this paper, we hypothesize that online course load may influence outcomes for such students, especially those at risk for lower levels of degree attainment. To examine this, we conducted a statewide study using data from the 30 community colleges (*n* = 45,557) of the State University of New York (SUNY) to understand online course-load effects on degree completion, transfer, and dropout. We conclude that when controlling for covariates known to impact degree completion, on average, community college students who successfully complete online courses nearly double their chances (odds ratio = 1.72) of earning a degree or transferring to a 4-year college. However, racial minority students had reduced outcomes, and additional research is warranted.

Keywords: online learning, community college, retention, dropout, degree completion higher education

Shea, P., & Bidjerano, T. (2019). Effects of online course load on degree completion, transfer, and dropout among community college students. *Online Learning, 23*(4), 6-22. doi:10.24059/olj.v23i4.1364

Effects of Online Course Load on Degree Completion, Transfer, and Dropout Among SUNY Community College Students

Postsecondary completion is a significant predictor of a host of individual and societal benefits. People with college degrees earn more, pay more taxes, and are more likely to have a job. "College education increases the chance that adults will move up the socioeconomic ladder and reduces the chance that adults will rely on public assistance" is how one study characterized the relationship (Ma, Pender, & Welch, 2016, p. 4). Online education has increased access to valuable postsecondary credentials for millions of people (Seaman, Allen, & Seaman, 2018). Community colleges democratize opportunities to participate in higher education through open enrollment (Mullin, 2012) and also enroll a higher proportion of online students than other institution types

(National Center for Education Statistics [NCES], 2017). However, concerns have been voiced about outcomes for community college students who take online coursework, especially the effect of online course load on student success measures. The next section summarizes relevant literature reflecting those concerns.

Review of Related Research

Community colleges enroll a large proportion of the higher education population and also a higher percentage of students with characteristics that indicate an increased risk for dropout and other negative outcomes (Mullin, 2012). These characteristics include delayed enrollment, part-time enrollment, living in poverty, working 20 or more hours per week while in school, not having a high school diploma, having dependents, and being a single parent (NCES, 2011).

The demographics of community college students present challenges for their college completion in classrooms and may create additional challenges when they are studying in online environments. Foundational empirical research in this area by Jaggars and Xu (2010) and Xu and Jaggars (2011, 2013) found that community college students in Virginia and Washington state had higher course dropout rates and lower grades in online courses compared to classmates enrolled in face-to-face courses. These negative findings, based on comprehensive statewide data, were worse with certain subgroups: male students, younger students, Black students, and students with lower GPAs.

Aspects of this research were extended by Johnson, Cuellar Mejia, and Cook (2015) in the California Community College System. Using a sample representative of the approximately two million students in the system and similar methods, these authors also found lower course grades, higher course withdrawal, and worsening achievement gaps between majority and minority students. Furthermore, research in a large private for-profit institution supports findings related to amplification of racial achievement gaps among online community college learners (Bettinger, Fox, Loeb, & Taylor, 2017).

In addition to course-level performance, program-level outcomes for online college students were also concerning in some large-scale investigations. Virginia and Washington state community college students who took at least one online course in their first semester were 4 to 5 percentage points less likely to return for the following semester (Jaggars & Xu, 2010). Students who took a higher ratio of credits online were also less likely to earn a degree or transfer to a 4-year institution than students who took a lower proportion of online credits (Xu & Jaggars, 2011). These findings suggest that online learning reduces the upward trajectory of community college students to 4-year college settings.

On the other hand, other large-scale research suggests that students who take online courses attain degrees at higher rates than classroom-only students, despite their lower course-level performance. In both state-level (Johnson, Cuellar Mejia, & Cook, 2015) and national studies (Shea & Bidjerano, 2014), researchers concluded that students who took at least some online courses earned an associate's degree or transferred to a 4-year institution at higher rates than those who didn't, net of other predictors. Further, Shea and Bidjerano (2017), investigating the 30 community colleges of the SUNY system, did not replicate the finding that online study worsens achievement gaps between minority and majority students. While all students taking online courses had slightly lower grades in four of seven semesters compared to classroom courses they had taken, racial achievement gaps in online courses were equivalent to what they were in classroom settings. At the national level, students with some online coursework were not more likely to drop out compared to classroom-only peers (Shea & Bidjerano, 2016).

While a variety of inconsistent findings exist regarding specific results, taken together these large-scale studies clearly identify community college students to be at risk of significantly worse outcomes online than in face-to-face settings. One consistent finding is that increasing online course load has a negative influence on academic performance. For example, in both Virginia and Washington, students who took a higher proportion of credits online were less likely to obtain a degree or transfer to a 4-year institution than students who took lower proportions of online credits (Jaggars, Edgecombe, & Stacey, 2013). Further, among the institutions studied in the PAR framework (James, Swan, & Daston, 2016) odds ratio analysis indicated that students mixing online and face-to-face courses or taking only face-to-face courses had up to 1.6 times greater odds of being retained than fully online students. Shea and Bidjerano (2017) found similar results for students in New York state. The odds of degree completion were about 1.5 times greater for SUNY students with a combination of online and traditional courses compared to students with classroom courses only. However, the odds of degree attainment were about 2 to 3 times *lower* for fully online students relative to students with a mix of online and classroom courses. Taking online courses appears to result in diminishing returns regarding the attainment of a college degree, indicating a curvilinear relationship between online course load and degree completion/transfer (Shea & Bidjerano, 2018). Shea and Bidjerano found that on average a mix of 40% online courses to 60% classroom courses was the upper threshold for optimizing degree completion. Higher online course loads than that were associated with reduced degree completion. However, prior research has not included methodology that might account for this curvilinear relationship indicative of diminishing returns for increased online course loads. Specifically, previous research has not looked at the effects of course completion rates in online and classroom settings using survival analysis. In the next section, we discuss research questions and the analytic approach employed to address these.

Purpose and Research Questions

This current study seeks to re-investigate, using different analytic approaches, the “tipping point” at which the proportion of online course enrollment leads to impaired degree completion. Specifically this paper investigates the research questions below:

- RQ1: Using survival analysis methods, is it possible to determine a threshold for online course enrollment intensity that jeopardizes one’s prospects for successful completion of a college degree and increases risk of dropout when controlling for course completion rates?
- RQ2: Does the intensity of online coursework modify the effect of traditional predictors of degree completion, such as enrollment status, remedial education, GPA, and minority status, when controlling for course completion rates?

The purpose of the study was to examine the effect of intensity of online coursework at a community college level on the probability of experiencing one of three outcomes: degree completion, transfer to a 4-year institution, and dropout. We have reasons to believe that the relationship between online education and indicators of college success is far more complex than can be adequately captured by conventional linear statistical models (Shea & Bidjerano, 2018). Previously, we concluded that participation in online coursework has a nonlinear effect on the odds of degree, transfer, and dropout at any time of a student career. We asked also what specific factors explain the intricate relationships between online coursework and prospects for attaining any of the three outcomes. To extend our prior investigation, in this study we used competing-risk discrete time-event history analysis, also known as survival analysis. This method offers several advantages over traditional regression analysis. A unique feature of survival analysis is its capacity to model both the likelihood of an outcome and the timing of the outcome (Singer & Willett, 2003) by accounting for cases for which the outcome is missing or unknown (also called censoring), thus allowing precise estimates of not only when an outcome occurs but also how it comes about. It is a flexible longitudinal method showing how processes may unfold contingent upon characteristics that remain constant and/or may change with time; that is, the method allows the incorporation of predictors of outcomes with fixed values as well as of variables that change values over time. In the context of a competing-risk discrete model, time is conceived as discrete (as opposed to continuous), and the propensity for multiple mutually exclusive outcomes is studied simultaneously. In essence, modeling revolves around estimating (a) the probability of each outcome occurring at a given time (known as risk or hazard) provided that the alternative outcomes have not occurred at a previous time and (b) the change in the risk for the outcome as a function of one or more predictors.

Method

Sample

The study used institutional data on first-time community college students enrolled in a degree program in one of the 30 community colleges that are part of the SUNY system. The data set contained archival program and course enrollment records of all students who were enrolled in a 2-year degree granting institution from fall 2012 to fall 2017. The sample used in this study (n = 45,744) was delimited to students who had begun in an associate's degree program in fall 2012. The vast majority of the students in the sample (91.52%) were between 16 and 25 years old, with less than 3% being older than 45. The sample was about evenly split in terms of gender (49.5% female). The second largest ethnic/racial group was African American (14.6%), closely followed by Hispanic/Latino (13.9%). More than half of the students (58.5%) qualified for remedial coursework during their first semester, and about 62% were recipients of state or federal financial aid. The majority (91.1%) were full-time students at the time of their first enrollment.

Measures

Time and outcome variables. We considered three competing risks: departure from a 2-year institution for academic or other reasons (dropout); attainment of an educational credential; and transfer to a 4-year institution. Transfer and degree attainment were combined in one outcome variable due to some methodological considerations. In the context of competing risk survival analysis, an individual is at risk for multiple events at any given time but can experience only one of the series of events. One event cancels the risk for another event. A sizable portion of sample members had completed a degree and immediately transferred to a 4-year institution or earned their 2-year degree during their transfer semester. Had we coded these students as "degree completers" as opposed to "transfers," we would have had underestimated the hazard (probability) of transfer. Another reason for combining the two outcomes is that students are unlikely to be at risk for a degree in the first two semesters of college because associate's degrees normally take two years of full-time coursework. Had we treated degree completion as a separate outcome, we would have been unable to estimate its probability in the first two semesters.

The available data encompassed the enrollment histories of the sample members over the course of 21 consecutive semesters, including major (spring and fall) and interim (winter and summer) terms. The last four semesters of data were used in a limited way—only as a means of identifying the subset of students who dropped out or departed (described below). The remaining 17 semesters were collapsed in the following manner:

- Time 1: fall 2012 and winter 2013;
- Time 2: spring 2013 and summer 2013;
- Time 3: fall 2013 and winter 2014;
- Time 4: spring 2014 and summer 2014;
- Time 5: fall 2014 and winter 2015;
- Time 6: spring 2015 and summer 2015;
- Time 7: fall 2015 and winter 2016;
- Time 8: spring 2016 and summer 2016; and
- Time 9: fall 2016 and winter 2017.

This resulted in nine discrete time intervals, each comprised of two consecutive semesters. This scheme was deemed unlikely to result in loss of precision, because outcomes tend to occur at the end of major terms (spring and fall), and all discrete time intervals contained a major term.

In each observation period, a student faced two distinct outcomes: the desirable outcome of graduation from their 2-year institution or transfer to a 4-year one or the negative outcome of departure or dropout from a 2-year institution. Dropout/departure functions as a competing risk to graduation or transfer and vice versa. The combined outcome *degree or transfer* was defined as (1) completion of a degree without evidence of subsequent return or (2) transfer to a 4-year baccalaureate program, whichever occurred first. The outcome *dropout or departure* was strictly defined as applicable to students who had discontinued enrollment and had never returned by the end of 2017. If the student was not enrolled in any 2017 terms and ceased enrollment in any of the semesters prior to winter 2017, they were assigned the outcome of dropout for the semester when last enrolled. If a student stopped out at any time but returned in 2017 in any capacity to a 2-year institution after one or more semesters of interrupted enrollment they were considered lost to follow-up, or "censored," as opposed to having dropped out. Thus, one censoring mechanism was gap in enrollment. Students with enrollment gaps were considered lost to follow-up because none of the events can be experienced while not being enrolled. Table 1 presents the number of censored cases by time interval.

Independent variable and covariates. The majority of students in these community colleges mixed online and classroom study. The focal variable of interest was exposure to online coursework, operationalized as online course load or the proportion of online credits attempted relative to all credits attempted in a given time interval.

We controlled for both time-dependent and time-independent covariates. These included a set of conventional predictors of college success, such as age, gender, race/ethnicity indicators (Caucasian, Asian, African American, Hispanic, and other race), international student status, level of academic preparation (whether the student qualified for remedial coursework at time of entry), student determination (whether the student had a goal to complete a degree or transfer to a 4-year institution), and type of program (humanities, STEM, or other) at exit. Age was defined as the age at baseline (fall 2012). Except for age, all time-independent variables were categorical.

In the case of time-dependent covariates, the value of the variable changes from one period to the next, and the hazard of an event at a given time depends on the value of the covariate at that time. Time-varying covariates were selected based on both theoretical and empirical grounds; the set included number of credits earned as recorded at the end of each time interval, student status (whether the student was full-time in both terms in a time interval), end-of time-interval grade point average (GPA), and financial aid status indicators (whether a student was a federal Pell Grant recipient or a New York State Grant [TAP] recipient at a time). Student GPA and credits earned were treated as continuous variables.

Data Analytic Approach

The hazard probabilities of the two outcomes were estimated with a multinomial logistic regression as recommended in the literature (Scott & Kennedy, 2005). Since students belonged to different programs and institutions at one time or another, and the observations were hardly ever independent of other hierarchies, our analyses accounted for the multilevel structure of the data. The clustering of students in programs and institutions at the time of exit was accounted for by specifying three-level multinomial regression models. That is, the multilevel models rested on a three-level data structure and incorporated two sources of clustering: students nested within the program they attended last, which in turn were uniquely associated with the institution where the student was last enrolled. There were 38 units at the highest level of institution and 1,491 units at the second-highest level of programs. All analyses were conducted through the GSEM routine in Stata 15.1, which provides corrections for the clustering within the highest level of hierarchy. The multilevel models were three-level random-intercept multinomial logit, in which the variances of Level 2 and Level 3 constrained to equality across outcomes.

Results

Different specifications of time were considered in the definition of the baseline hazard function. The polynomial specifications were found inadequate by virtue of statistical criteria; therefore, the more flexible general specification of time with a separate intercept for each time interval was chosen. Regression analysis was conducted sequentially.

Baseline Hazard Probabilities

The baseline hazard probabilities were obtained by fitting a multinomial logistic model including only the intercepts for the time intervals without other predictors. The baseline hazard probability of each event is given in Table 1 and illustrated in Figure 1.

Table 1

Degree, Transfer, Departure, and Dropout Rates by Time Interval

Time	Start time total	Degree transfer	Depart drop	Event total	Censored	Cum. hazard function	*Model 1*: Baseline hazard Deg./trans.	Depart/drop
1	45,774	213	7,539	7,752	877	.17	.01	.17
2	37,145	671	7,976	8,647	1,247	.36	.02	.22
3	27,251	506	3,247	3,753	709	.45	.02	.12
4	22,789	5,396	3,584	8,980	814	.67	.28	.21
5	12,995	2,574	1,437	4,011	394	.77	.22	.14
6	8,590	3,279	1,318	4,597	375	.89	.45	.25
7	3,618	352	894	1,246	163	.93	.13	.27
8	2,209	867	312	1,179	134	.97	.46	.23
9	896	62	240	302	594	.98	.09	.29

Note. Baseline hazard probabilities are significant at $\alpha = .001$.

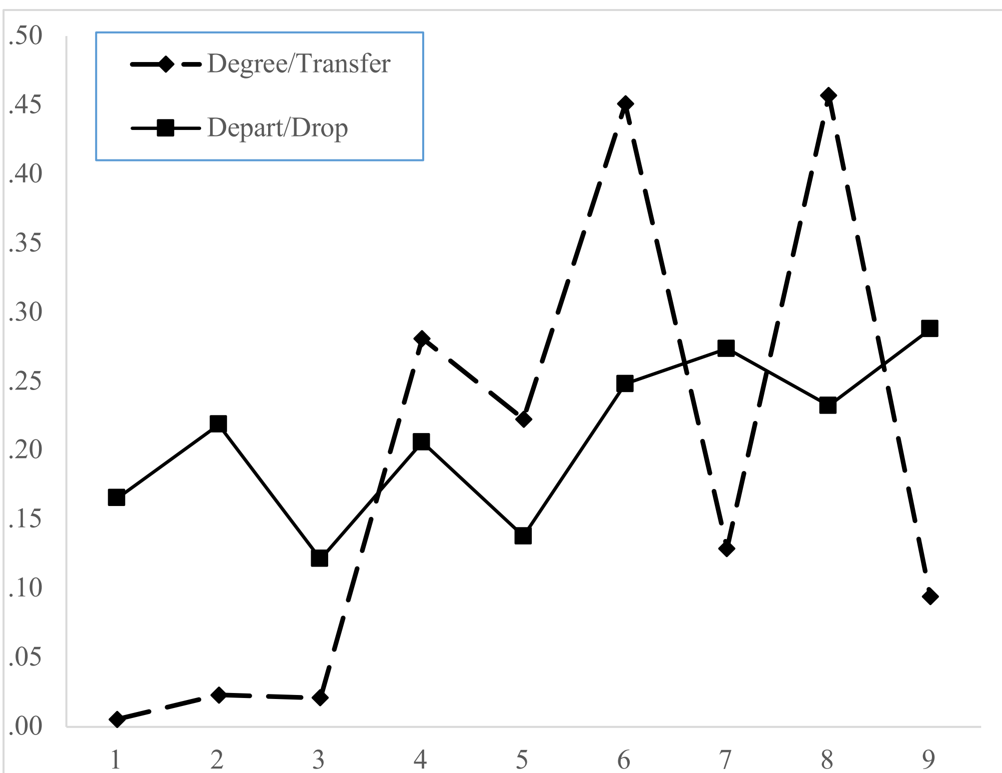

Figure 1. Hazard probability by time interval.

The unique risk (probability) associated with an outcome is also the proportion of students who experienced that particular outcome at a given time. As shown in Table 1 and Figure 1, the hazard probability for a degree and/or transfer was low at first, and then it peaked initially during the fourth time interval. The hazard for dropout remained relatively constant across time. The plots suggest also that events (of any kind) tended to occur mostly in the spring and summer terms. The corresponding cumulative functions are profiled in Figure 2.

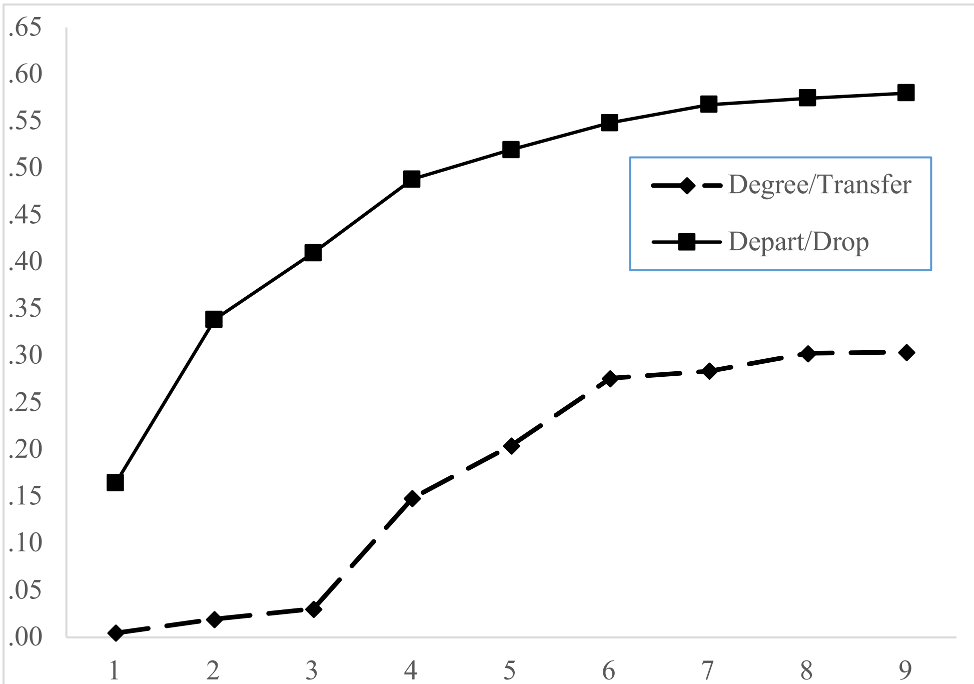

Figure 2. Cumulative hazard probability by time interval.

The cumulative hazard represents event rates or the cumulative proportions of students with an event up to a particular time interval. The cumulative hazard probability of degree/transfer increased slowly in the first terms when the hazard was low, and then it increased steadily. With respect to departure/dropout, the probability increased more rapidly in the first 2 years of college. In both cases, there was little change in the cumulative hazard probabilities after the third year in college. The median time to transfer or degree was 3 years, whereas the median time-to-dropout or departure was found to be 2 years. Overall, by the end of the second year of college, 50% of the sample members had experienced one outcome or another.

The Effect of Semester Online Course Load

The addition of course load, with its square term as a predictor, resulted in substantial improvement in model fit, as evidenced by a drop in the deviance statistics. The effect of load varied depending upon outcome. Students who opted for more online courses at any given time had a higher conditional probability of degree or transfer, but benefits wore off at higher levels of online course intensity (see Figure 3).

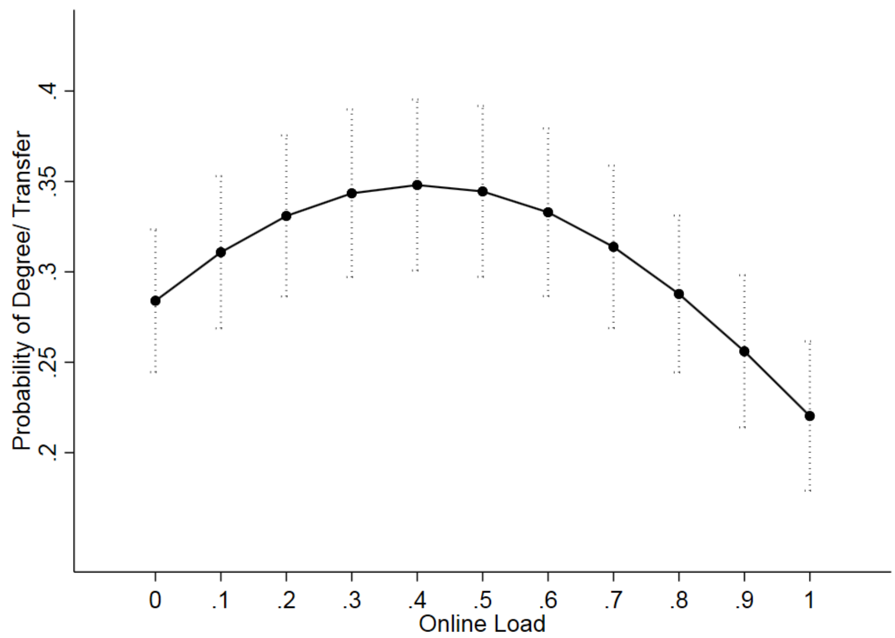

Figure 3. Probability of degree/transfer at Time 4 by online load.

Conversely, increasing levels of online load at first decreased the hazard of dropping out in any given term, but this trend eventually reversed, and at a certain point each additional credit began to increase risk of dropping out (see Figure 4).

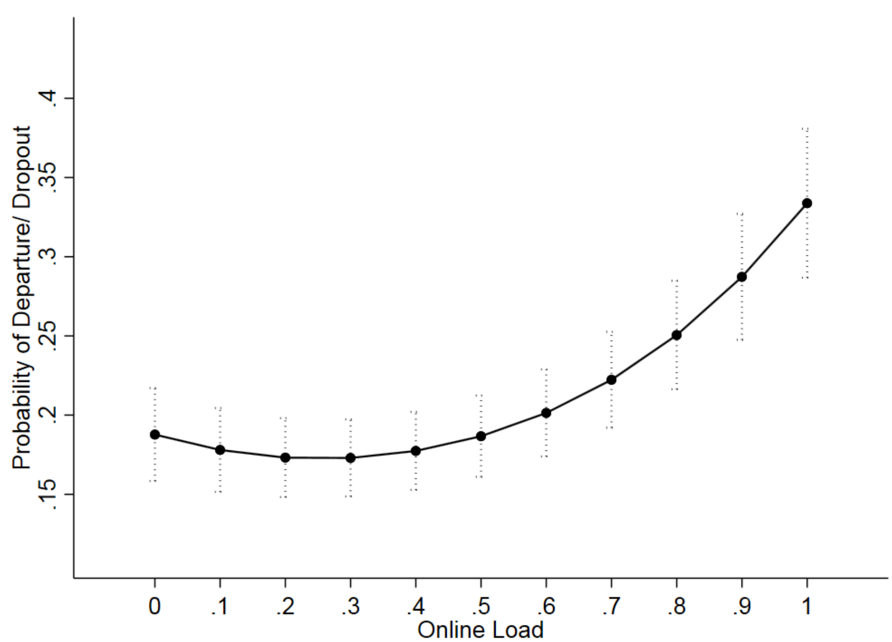

Figure 4. Probability of departure/dropout at Time 4 by online load.

The hazard associated with online course load was found to be invariant across time intervals. Contrary to previous research, our results suggest that effect of the intensity of the effect of online coursework on probability of dropping out is not linear in nature.

Covariate Effects and the Relationship Between Online Load and Outcomes

With the last set of models shown in Table 2, we addressed the question of whether the effect of online load changed in the presence of other well-known predictors of college success. Our analysis indicated that effect of online load remained notable after controlling for a host of traditional indicators of degree completion, transfer, and dropout. Conventional demographic predictors of college success behaved in predicable fashion when the time-varying predictors of semester GPA and online coursework were not considered (see Model 3 in Table 2).

Table 2

Results From Multilevel Multinomial Logistic Regression: Time to Degree/Transfer and Time to Departure/Dropout

Predictors	Model 2				Model 3				Model 4				Model 5			
	Deg/Tr		Depart		Deg/Tr		Depart		Deg/Tr		Depart		Deg/Tr		Depart	
	Est	OR	Est	OR	Est	OR	Est	OR	Est	OR	Est	OR	Est	OR	Est	OR
On	1.44***	4.20	-.86***	.42	1.08***	2.95	-.53***	.59	1.35***	3.85	-.47***	.63	.54**	1.72	.00	1.00
On2	-1.65***	.19	1.65***	5.2	-1.25***	.29	1.27***	3.56	-1.35***	.26	.71***	2.04	-.23	.79	.06	1.06
Age					-.10***	.91	.09***	1.09	-.15***	.86	.15***	1.16	-.15***	.86	.11***	1.12
Age2					.00***	1.00	-.00***	1.00	.00***	1.00	.00***	1.00	.00***	1.00	.00***	1.00
Female					.07***	1.07	-.27***	.76	-.05*	.95	-.08***	.92	-.05	.95	-.10***	.90
Asian					-.14**	.87	-.28***	.75	-.15	.86	-.30***	.74	-.18	.84	-.31***	.74
Black					-.27***	.77	.34***	1.40	-.08	.92	.01	1.01	-.10*	.91	.01	1.01
Hisp					-.28***	.76	.17***	1.19	-.25***	.78	.02	1.02	-.22***	.80	-.01	.99
Rc_oth					-.24**	.79	.53***	1.70	-.24*	.79	.28***	1.33	-.23*	.79	.26***	1.29
Rc_mi					-.56***	.57	.45***	1.57	-.60***	.55	.35***	1.42	-.55***	.58	.34***	1.40
Rem					-.97***	.38	.17***	1.19	-.81***	.45	-.12***	.89	-.84***	.43	-.24***	.79
Goal					.04	1.04	-.04	.96	.08	1.08	-.03	.97	.05	1.05	-.01	.99
Intern					.76***	2.13	-.39***	.68	.64***	1.90	.15	1.17	.41**	1.50	.37*	1.44
Sta					.41***	1.51	-.13***	.87	.48***	1.62	-.14***	.87	.29***	1.34	.11***	1.12
Pell					-.13***	.87	.32***	1.38	-.09	.91	.19***	1.21	-.05	.95	.17***	1.18
TAP					.14***	1.15	-.59***	.56	.10***	1.11	-.41***	.66	-.04	.96	-.30***	.74
Hum					.23***	1.25	.24***	1.27	.25***	1.28	.21***	1.23	.33***	1.38	.17***	1.18
STEM					-.08	.93	.02	1.02	-.09	.91	-.03	.97	-.10	.90	-.02	.98
GPA									.81***	2.24	-.89***	.41	.70***	2.02	-.48***	.62
Cred													.11***	1.11	-.14***	.87
Var Camp	11***				.12***				.08***				.11***			
Var Prog	12***				.11***				.08***				.10***			
LL	-102,004.2				-98,417.27				-85,676.00				-82,269.46			
AIC	204,056.40				196,910.50				171,427.90				164,612.90			
BIC	204,296.20				197,290.20				171,797.60				164,982.60			

Note. $^{***}p < .001$, $^{**}p < .05$, $^{*}p < .01$. Coefficients (Est) represent the change in the baseline logit hazard (log odds) for a unit increase in the predictor's value. The odds ratios (OR) are also given for ease of interpretation. Time intercepts are omitted. The baseline outcome category is "no-event." On = online load, On2 = online load squared, Age = age as of fall 2012, Age2 = age squared, Female = female (male = reference), Asian = race Asian, Black = race African American, Hisp = race Hispanic/ Latino, Rc_oth = race other, Rc_mi = race unknown, Rem = remedial, Goal = student goal: transfer or degree, Intern = international student, Sta = full-time status, Pell = Pell Grant recipient, TAP = recipient of New York State TAP grant, Hum = last program in the humanities, STEM = last program in a STEM field, GPA = GPA in time period, Cred = credits earned in time period.

Students who were older, male, economically disadvantaged, or from certain ethnic/racial backgrounds were more prone to departure or dropout at any given time, regardless of other factors. Inclusion of semester GPA altered the risk associated with certain demographic predictors in the opposite direction, suggesting a complex dynamic interplay between demographic and academic factors. However, as expected, an upward shift in semester GPA increased the hazard (likelihood) of positive outcomes and decreased the hazard of negative outcomes (see Model 4 in Table 2). In terms of the study's central question, it appears that the curvilinear effect of online course load on dropout/departure can be fully attributed to course completion rates. Interestingly, course completion rates acted as a partial mediator in the relationship between online load and degree completion/transfer. In terms of degree/transfer, when course completion rates were accounted for, an increasing online load was *linearly* associated with *increased* likelihood of degree completion/transfer (see Model 5 in Table 2). For a one-unit increase in online load, there was a roughly 72% increase in the odds of degree or transfer, holding the remaining predictors constant ($b_{On} = .54$, OR = 1.72, $p = .008$). Holding other predictors at a fixed value, a unit increase in GPA translated into twofold increase ($b_{GPA} = .70$, OR = 2.02, $p < .001$), and a unit increase in credits earned about an 11% increase ($b_{Cred} = .11$, OR = 1.11, $p < .001$) in the odds of degree/transfer.

When it comes to departure or dropout, with credits earned entered as a predictor, the constant effect of online load on prospects of departure/dropout was virtually zero ($b_{\text{On}} = 0.00$, $p = .567$, $b_{\text{On2}} = .06$, $p = .091$). Compared to male students and Caucasian students, female students were 10% and Asian students were 26% less likely to dropout, respectively. However, the odds for minority students were up to 29% lower than the odds for Caucasian students.

As expected, the effect of GPA and credits earned on the odds of departure was negative, with a unit increase in both predictors lowering the odds of a negative outcome by 38% ($b_{GPA} = -.48$, OR = .62, $p < .001$) and 23% ($b_{Cred} = -.14$, OR = .87, $p < .001$), respectively. The coefficient for remedial status at Time 1 was negative ($b = -.24$, OR = .79, $p < .001$), suggesting a 21% lower risk for departure/dropout for remedial students. While counterintuitive, this result is not surprising; if the mission of a community college is to provide a venue for students to compensate for prior academic deficiencies, students in need of remediation should be expected to remain longer in the pipeline. Interestingly, the effect of characteristics such as being an international student, continuously enrolled full-time status, or in a program in the humanities all had a significant positive effect on the two outcomes, a finding implying that outcomes for students with these characteristics tended to occur sooner rather than later.

To qualify our findings further, we sought to examine whether the effect of online load depended on demographic and academic factors. Therefore, as a follow-up, we probed all two-way and three-way interactions between online load and time-invariant and time-varying covariates in the context of multilevel logistic regressions. That is, the outcomes degree/transfer and departure/dropout were examined one at a time. The outcome variable was recoded in two separate dummy variables as recommended in the literature on competing-risk event-history analysis. Models with interaction terms included were compared using the AIC and BIC test statistics. Table 3 shows the final best-fitting models resulting from these analyses.

Table 3

Two- and Three-Way Interaction Models

Predictor	Degree/Transfer			Departure/Dropout		
	Est	SE	OR	Est	SE	OR
On	1.27***	.24	3.54	-.34***	.08	.71
Age	-.14***	.01	.87	.10***	.01	1.11
Age2	.00***	.00	1.00	-.00***	.00	1.00
Female	-.06*	.03	.94	-.11***	.02	.90
White	.17***	.03	1.19	.06	.06	1.06
Rem	-.87***	.03	.42	-.24***	.04	.79
Goal	.13*	.05	1.14	-.05	.03	.96
Intern	.40**	.13	1.49	.34*	.15	1.40
Sta	-.50***	.15	.61	.11**	.04	1.12
Pell	-.06	.05	.94	.18***	.03	1.20
TAP	-.07	.04	.94	-.29***	.04	.75
Hum	.35***	.03	1.43	.14***	.03	1.15
STEM	-.14*	.06	.87	-.07	.05	.93
GPA	.59***	.04	1.80	-.48***	.06	.62
Cred	.11***	.00	1.12	-.14***	.01	.87
On x GPA	-.35***	.08	.71	.35***	.04	1.42
On x Sta	-.92**	.34	.40			
Sta x GPA	.27***	.05	1.31			
On x GPA x Sta	.42***	.11	1.52			
On x White				.04	.08	.96
GPA x White				-.04	.02	.97
On x GPA x On				-.09**	.03	.91
Var Camp	.13***	.03		.08***	.03	
Var Prog	.14***	.02		.09***	.01	
LL	-26,478.77			-54,048.90		
AIC	53,017.53			108,157.80		
BIC	53,311.86			108,454.80		

Note. $^{***}p < .001$, $^{**}p < .05$, $^{*}p < .01$. Based on results from a multinomial logistic regression with a dichotomous indicator for race and linear specification for online load. Coefficients of time indicators are omitted. On = online load, Age = age as of fall 2012, Age2 = age squared, Female = female (male = reference), White = race Caucasian (minority or other = reference), Rem = remedial, Goal = student goal: transfer or degree, Intern = international student, Sta = full-time status, Pell = Pell Grant recipient, TAP = recipient of New York State TAP grant, Hum = last program in the humanities, STEM = last program in a STEM field, GPA= GPA in time period, Cred = credits earned in time period.

The model specifying a three-way interaction of status, online load, and GPA on degree/transfer and the model with a three-way interaction of online load, GPA, and race on departure/dropout resulted in better model fit by virtue of AIC and BIC criteria. The moderated effects of online load are illustrated in Figures 5 and 6. As seen in Figure 5, the relationship between online load and likelihood of a degree was strongest for the subpopulation of students who maintained full-time status continuously and earned higher grades.

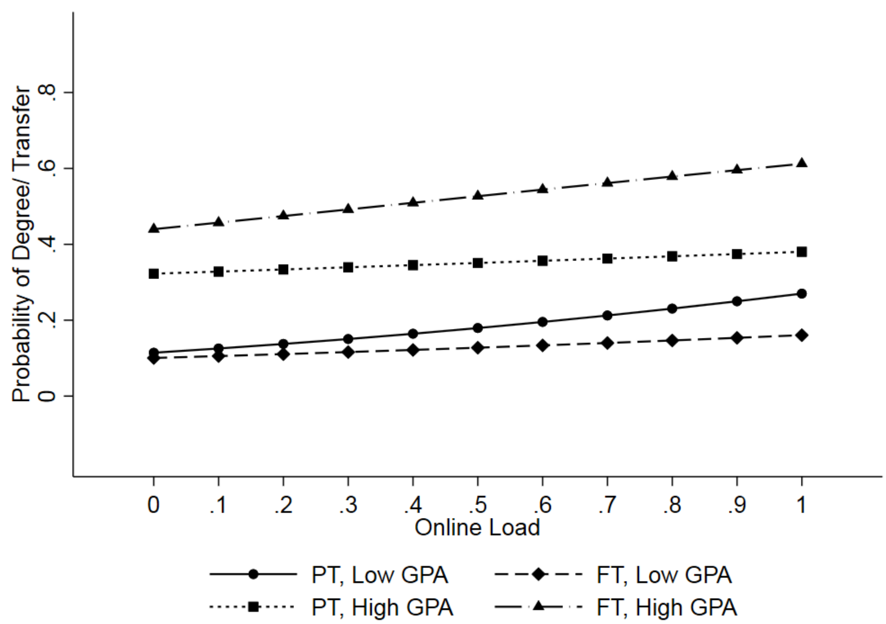

Figure 5. Probability of degree/transfer as a function of online load, GPA, and full-time vs. part-time status. Predicted probabilities for Time 4 at covariate levels: Age = 20.31, Gender = Male, Race = White, Rem = No, Goal = No, Intern = No, Program = Humanities, Pell = No, TAP = No, Cred = 9.69.

With respect to the outcome of departure/dropout, the effect of online load was contingent upon GPA in any given time period and race (Caucasian vs. other). As indicated in Figure 6, it appears that online course intensity adversely affected the subpopulation of minority students who were academically stronger; these students were significantly more likely to depart/dropout when the majority of their courses were fully online.

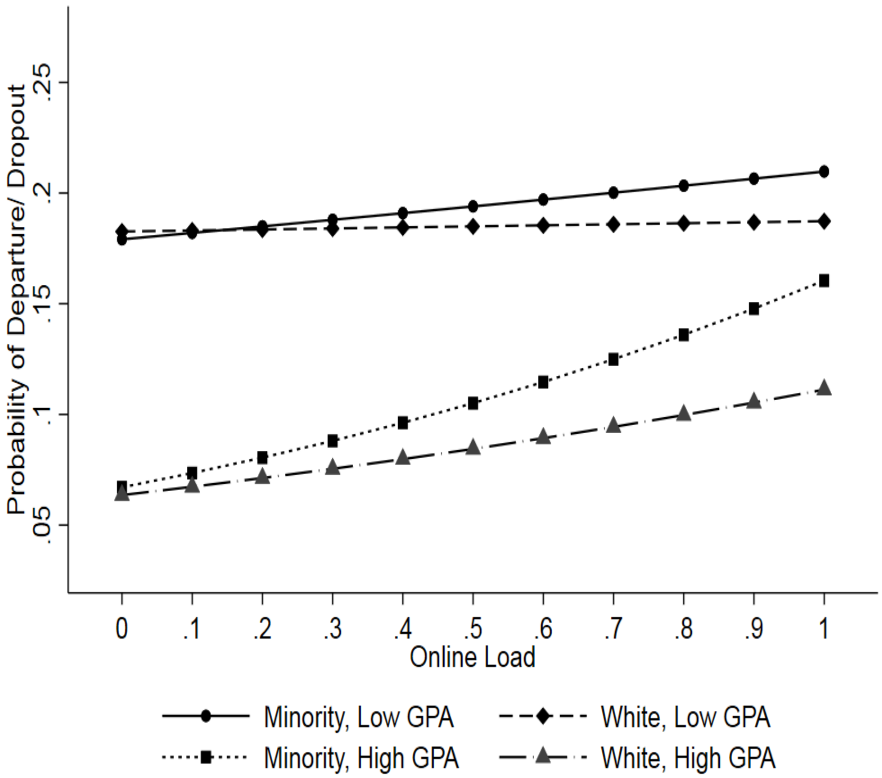

Figure 6. Probability of departure/dropout as a function of online load, GPA, and race. Predicted probabilities for Time 1 at covariate levels: Age = 20.31, Gender = Male, Status = Part-time, Rem = No, Goal = No, Intern = No, Program = Humanities, Pell = No, TAP = No, Cred = 9.69.

Additional analyses confirmed that in all models the covariates operated in the same manner across time intervals. All analysis suggested, however, an unexplained variation in the hazard for degree completion/transfer and dropout at both program and campus level; variation remained unaccounted for by predictors included in the final model.

Conclusion

This study attempted to shed light on the potential dynamic links between semester online course intensity and other predictors of college success. We modeled the probability for degree completion, transfer, or departure given both academic and nonacademic factors, including semester online course load. We found that the intensity of online coursework at any given academic term was related to the probability of the concurrent occurrence of transfer, degree completion, and dropout—all in the context of controlling for salient predictors of college success. Adverse outcomes were likely to manifest when students attempted the majority of their semester courses online *but failed to accrue* credit through these same online courses. However, when controlling for successful course completion, the odds of degree completion increased for each additional unit of successful online study.

Prior research, including our own, has concluded that online learners in community college settings may be at risk for reduced academic outcomes relative to students who only study in the classroom. These reduced outcomes in prior literature include lower course grades, higher failure rates, increased dropout, and an amplification of known achievement gaps. Our own prior research indicated that under certain conditions (online course loads up to 40%), online students had better chances of completing a degree. Beyond that tipping point, the enhanced degree-completion rate began to decline rapidly.

The current study provides new insight through an analysis of prior variables while simultaneously considering course completion rates. It appears that online course completion significantly improves the odds of earning a degree. Unlike in previous research (e.g., Shea & Bidjerano, 2018), in the present study, where course completion rates were accounted for, an increasing online load was *linearly* associated with *increased* likelihood of degree completion/transfer. For each additional unit of successful online study, the odds of degree completion increased by 1.72, holding other predictors constant.

While this is good news for the average online student, as with other research in this area, certain subpopulations were at risk relative to the average. Minority students with higher online loads were more likely to dropout than nonminority students. Of particular concern are minority students who were academically stronger; these students were significantly more likely than nonminority students to drop out when the majority of their courses were fully online. More research is needed using methods that will help us understand why this was the case. Additional student support may be an answer, but first we need to better understand the cause of higher dropout among African American students who were otherwise academically stronger.

A somewhat surprising result can be seen in the interactions between GPA and full-time/part-time status. The relationship between online load and probability of a degree/transfer was strongest for the subpopulation of students who maintained full-time status continuously and earned higher grades. However, for part-time students with lower GPAs, online course taking improved the upward transfer/degree completion trend relative to their full-time counterparts with low GPAs. This unexpected finding also deserves additional research.

References

Seaman, J. E., Allen, I. E., & Seaman, J. (2018). *Grade increase: Tracking distance education in the United States*. Retrieved from https://onlinelearningsurvey.com/reports/gradeincrease.pdf

Bettinger, E., Fox, L., Loeb, S., & Taylor, E. (2017). Changing distributions: How online college classes alter student and professor performance. *American Economic Review*, 107(9), 2855–2875.

Jaggars, S. S., Edgecombe, N., & Stacey, G. W. (2013). What we know about online course outcomes: Research overview. New York: Columbia University, Community College Research Center. Retrieved from http://ccrc.tc.columbia.edu/media/k2/attachments/What-We-Know-About-Online-Course-Outcomes.pdf

Jaggars, S. S., & Xu, D. (2010). *Online learning in the Virginia Community College system.* New York, NY: Columbia University, Teachers College, Community College Research Center.

James, S., Swan, K., & Daston, C. (2015). Retention, progression and the taking of online courses. *Online Learning*, *20*(2). http://dx.doi.org/10.24059/olj.v20i2.780

Johnson, H., Cuellar Mejia, M., & Cook, K. (2015). Successful online courses in California's community colleges. San Francisco, CA: Public Policy Institute of California.

Ma, J., Pender, M., & Welch, M. (2016). *Education pays 2016: The benefits of higher education for individuals and society*. New York: College Board.

McFarland, J., Hussar, B., de Brey, C., Snyder, T., Wang, X., Wilkinson-Flicker, S., … Hinz, S. (2017). *The condition of education 2017* (NCES 2017-144). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved from https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2017144

Mullin, C. M. (2012). *Why access matters: The community college student body* (Policy Brief 2012-01PBL). Washington, DC: American Association of Community Colleges.

National Center for Education Statistics. (2011). *2007–08 national postsecondary student aid study* (NPSAS: 08). Washington, DC: U.S. Department of Education, Institute for Education Sciences. Retrieved from http://nces.ed.gov/surveys/npsas/

National Center for Educational Statistics. (2017). *Number and percentage of students enrolled in degree-granting postsecondary institutions, by distance education participation, location of student, level of enrollment, and control and level of institution: Fall 2014 and fall 2015*. Retrieved from https://nces.ed.gov/programs/digest/d16/tables/dt16_311.15.asp

Scott, M., & Kennedy, B. (2005). Pitfalls in pathways: Some perspectives on competing risks event history analysis in educational research. *Journal of Educational and Behavioral statistics, 30*(4), 413–442.

Shea, P., & Bidjerano, T. (2014). Does online learning impede degree completion? A national study of community college students. *Computers & Education*, *75*, 103–111.

Shea, P., & Bidjerano, T. (2016). A national study of differences between distance and non-distance community college students in time to first associate degree attainment, transfer, and dropout. *Online Learning, 20*(3), 7–19.

Shea, P., & Bidjerano, T. (2017). Online learning in the 30 community colleges of the State University of New York: Differences in outcomes between classroom and online coursework. In J. Johnston (Ed.), *Proceedings of EdMedia: World conference on educational media and technology 2017* (pp. 1192–1198). Waynesville, NC: Association for the Advancement of Computing in Education (AACE).

Shea, P., & Bidjerano, T. (2018). Online course enrollment in community college and degree completion: The tipping point. *The International Review of Research in Open and Distributed Learning, 19*(2). http://dx.doi.org/10.19173/irrodl.v19i2.3460

Singer, J. D., & Willett, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence.* New York, NY: Oxford University Press.

Wladis, C., Conway, K., & Hachey, A. (2016). Assessing readiness for online education—research models for identifying students at risk. *Online Learning, 20*(3). http://dx.doi.org/10.24059/olj.v20i3.980

Xu, D., & Jaggars, S. S. (2011). *Online and hybrid course enrollment and performance in Washington State community and technical colleges* (CCRC Working Paper No. 31). New York, NY: Columbia University, Teachers College, Community College Research Center.

Xu, D., & Jaggars, S. S. (2013). *Adaptability to online learning: Differences across types of students and academic subject areas* (CCRC Working Paper No. 54). New York, NY: Columbia University, Teachers College, Community College Research Center.

How College Students' Achievement Goal Orientations Predict Their Expected Online Learning Outcome: The Mediation Roles of Self-Regulated Learning Strategies and Supportive Online Learning Behaviors

Yu-Chen Yeh, Oi-Man Kwok, Hsiang-Yu Chien, Noelle Wall Sweany,
Eunkyeng Baek, and William Alex McIntosh
Texas A&M University

Abstract

The purpose of this study was to examine the underlying mechanism between goal orientations and academic expectation for online learners. We simultaneously studied the structural relationships among 2×2 achievement goal orientations, self-regulated learning (SRL) strategies, supportive online learning behaviors, and expected academic outcome in various online courses with 93 respondents (70 undergraduate and 23 graduate students). Specifically, we tested the mediation effects of both SRL strategies and supportive online learning behaviors on the relationship between achievement goal orientations and students' academic expectations. The results showed that two of the achievement goal orientations—mastery-approach (MAP) goals and mastery-avoidance (MAV) goals—predicted the adoption of SRL strategies and supportive online learning behaviors, which, in turn, predicted students' expected academic outcome for their online course. Specifically, students with higher MAP goals were more likely to adopt different types of SRL strategies and supportive online learning behaviors to facilitate their learning experience, which further enhanced their expectation for their academic outcome. By contrast, students with higher MAV goals were less likely to adopt SRL strategies and supportive online learning behaviors, which, in turn, led to lower grade expectations.

Keywords: 2×2 achievement goal orientations, self-regulated learning strategies, supportive online learning behaviors, expected academic outcome

Yeh, Y.-C., Kwok, O.-M., Chien, H.-Y., Sweany, N.W., Baek, E., & McIntosh, W.A. (2019). How college students' achievement goal orientations predict their expected online learning outcome: The mediation roles of self-regulated learning strategies and supportive online learning behaviors. Online Learning, 23(4), 23-41. doi:10.24059/olj.v23i4.2076

How College Students' Achievement Goal Orientations Predict Their Expected Online Learning Outcome: The Mediation Roles of Self-Regulated Learning Strategies and Supportive Online Learning Behaviors

Online learning has become a popular option for completing course requirements and pursuing a college degree. According to the 2018 report by the Babson Survey Research Group, U.S. higher education enrollment in online courses increased for the 14th straight year, reaching over 6.3 million students who had taken at least one online course in fall 2016, a 5.6% increase from the previous year (Seaman, Allen, & Seaman, 2018). However, the increasing trend of online learning is not without its challenges. For instance, online courses generally lead to lower completion rates (Patterson & McFadden, 2009). That is, compared with traditional face-to-face courses, online courses require students to control and be responsible for their own learning processes because these courses provide more flexible learning environments. Not surprisingly, Liu, Gomez, and Yen (2009) pointed out that without a good understanding of online learning competencies, some students encounter difficulties in preparing themselves to take online courses and are at risk in this learning environment. Therefore, to help ensure student success in online learning environments, it is important to explore students' online learning readiness and motivational factors so that they remain engaged with the material.

Achievement goal theory has been the dominant research interest for the past three decades in terms of exploring students' motivation in academic settings (Nicholls, 1984; Pintrich, 2000a). Achievement goal theory specifies the kinds of goals that direct achievement-related behaviors (Maehr & Zusho, 2009). As such, achievement goals examine the standards used by students to evaluate their opinions about achievement outcome (Dweck & Leggett, 1988). Achievement goal theory seeks to understand why some people are motivated to overcome obstacles, while others give up easily or avoid trying altogether (Dweck, 1999). As online learning continues to expand in higher education, the effects of pursuing multiple goals simultaneously on learners' perceptions, use of strategies and behaviors, and achievement expectations in the online learning setting should be investigated.

Previous research has shown that achievement goals are associated with important manifestations of self-regulated learning (SRL; Adesope, Zhou, & Nesbit, 2015; Zhou, 2013). Students' SRL involves the capacity to organize behavior guided by their goals and motivations (Lemos, 1999; Zimmerman, 2002). Individuals' motivation plays an important role in their adaptive engagement in the phases of SRL strategies, which in turn influences outcomes (Adesope et al., 2015; Kaplan, Lichtinger, & Gorodetsky, 2009). SRL is a significant factor for success in online learning environments because learners need to set goals and manage their time effectively when participating in online courses (Broadbent & Poon, 2015; Lynch & Dembo, 2004).

In addition to using SRL, students must be more proactive to be successful in an online learning environment. Thus, Beaudoln, Kurtz, and Eden (2009) concluded that the key competencies for online learning success emanate from the learner's traits and behaviors, rather than from any factors inherent in the course. Similarly, Shea and Bidjerano (2010) suggested that an analysis of the active roles of online learners will contribute to our knowledge of learning in technology-mediated environments. Along the same lines, Steinkamp (2018) noted that because of a lack of organization, prioritization, and self-monitoring skills, many students struggle and fall behind or give up on their online studies.

To make up for these shortcomings, Watkins (2015) suggested that the development of effective study skills is very important for online learners' achievement and retention. Further, some studies have employed open-ended surveys to identify which online learning techniques respondents found useful, or the researchers have summarized successful online behaviors/tips by interviewing successful online students or course instructors (Howland & Moore, 2002; Roper, 2007). However, relatively few studies have examined the relationship between supportive online behaviors and academic expectations using a quantitative framework.

In sum, few studies have thoroughly examined how students learn online. Further, existing studies have included only some of the essential online learning factors and, therefore, have been limited in their examination of the underlying relationships among these factors. To fill this gap in the research, the present study focused on the motivational factors (e.g., the 2×2 achievement goal orientation), the actual actions that the students take during their learning (e.g., SRL strategies and supportive online behaviors), and their expected academic outcome in an online learning environment. As such, the study aims to provide a more comprehensive picture of how these crucial factors relate to each other and predict academic outcomes in an online learning environment. To that end, we proposed a three-path mediation model to examine how online learners' achievement goal orientations affect their academic expectations. Specifically, we tested SRL strategies and supportive online learning behaviors as two mediating mechanisms through which achievement goal orientations influence academic expectations in an online learning environment. We will review each of these essential online learning components in more detail below.

2×2 Achievement Goal Orientation and Online Learning

Achievement goals are viewed in terms of the purpose or cognitive-dynamic focus of competence-relevant behavior (Elliot & Church, 1997; Elliot & McGregor, 2001). Compared to other learning motivation theories, achievement goal orientation more directly links learners' objective goal setting with their learning. For example, Elliot and McGregor (2001) developed a framework known as the 2×2 achievement goal framework. One dimension of this framework is *definition*—that is, when learners define their learning goal compared with themselves or others. If learners define their goal by comparing themselves to themselves, it is called a *mastery goal*. If learners define their goal by comparing themselves to their peers, it is called a *performance goal*. Another dimension of the 2×2 achievement goal framework is *valence*, which interprets competence as either positive or negative. Positive valence corresponds to an *approaching success* motivational orientation. Negative valence corresponds to an *avoiding failure* orientation.

These two dimensions lead to a 2×2 framework consisting of the following four achievement goal categories: mastery-approach (MAP), performance-approach (PAP), mastery-avoidance (MAV), and performance-avoidance (PAV) goals. MAP goals highlight the need to gain as much knowledge and skill as possible for the purpose of mastering a task and developing higher self-competence. The PAP goals focus on demonstrating one's skills in comparison to other students. MAV goals involve students tending to avoid situations where they might not be able to learn the material or master the tasks. Finally, PAV goals focus on demonstrating one's skills to avoid unfavorable judgments about one's competence.

Achievement goal theory asks what goals individuals want to reach at the end of their learning. Therefore, achievement goal theory is closely connected with learners' learning strategies and behaviors and learning outcomes. For example, important learning skills, such as self-regulation and metacognitive ability, are associated with MAP goals (Pintrich, 2000b). Unlike MAP goals, the relationship between PAP goals and SRL is relatively unclear. For example, Kaplan and Midgley (1997) showed that they have a positive relationship, whereas Wolters, Yu, and Pintrich (1996) showed the opposite. PAV goals have a negative correlation with SRL and a positive correlation with self-handicap (Urdan & Midgley, 2001). MAV goals are correlated with fear of failure and low self-determination (Elliot & McGregor, 2001).

Though the relationship between achievement goal structures and learning strategies or learning outcomes have been found in traditional learning environments, these relationships are also expected to exist in online learning environments. For example, Xie and Huang (2014) noted that students with mastery goals demonstrated frequent participation in both posting and nonposting online discussion activities and reported that they had learned a great deal from the online learning activities. However, PAV goals negatively predicted students' nonposting behavior and perceived learning in online courses. Im and Kang (2019) concluded that only avoidance goals were negatively related to online participation, satisfaction, and achievement.

Based on these previous findings under different online learning scenarios, three of the four achievement goal orientations—MAP, PAP, and PAV—have been the major focus and most frequently studied, whereas the MAV goals have received the least attention to date. The present study included all four achievement goal subtypes and simultaneously investigated the effects of these goals on learners' perceptions, use of strategies, and learning expectations in the online learning environment.

Self-Regulated Learning Strategies and Online Learning

Self-regulated learning (SRL) refers to how students become "masters of their own learning processes" by employing learning strategies to help them reach their desired goals (Zimmerman, 1990). Self-regulation is the ability of learners to effectively engage in their own learning processes—metacognitively, motivationally, and behaviorally—typically resulting in higher levels of achievement (Zimmerman & Schunk, 1989). According to Schunk (2005), "self-regulated learning is seen as a mechanism to help explain achievement differences among students and as a means to improve achievement" (p. 85).

SRL becomes particularly crucial for online learners who are likely to regulate their own learning frequently (e.g., more self-directed involvement, independently structuring the time on their own learning processes). Previous studies have found that self-regulated learners are more academically successful within an online learning environment (Yukselturk & Bulut, 2007; Shea & Bidjerano, 2010; Bradley, Browne, & Kelley, 2017). Hence, the importance of examining the effect of SRL on improving online learning outcomes cannot be overstated. In this study, we focus on five SRL strategies—metacognitive skills, time management, environmental structuring, persistence, and help-seeking—that have been identified as important skills in online learning (Jansen, van Leeuwen, Janssen, Kester, & Kalz, 2017).

Metacognition, defined as "thinking about thinking," refers to higher order mental processes involved in learning, such as self-checking and evaluating the cognitive process after the performance (Flavell, 1979; O'Neil & Abedi, 1996). Since metacognitive skill highlights the importance of the subjective judgment of confidence in completing cognitive tasks as well as coping strategies while performing the tasks, it is a strong predictor of academic success (Bjork, Dunlosky, & Kornell, 2013; Kruger & Dunning, 1999). Metacognition has also been recognized as a valuable skill that can improve students' learning in online environments (Murphy, 2008; Tsai, 2009).

Time management is a self-management skill with a focus on arranging, organizing, scheduling, and budgeting one's time as a means of generating more work effectiveness and productivity (Aduke, 2015). Claessens, Eerde, Rutte, and Roe (2007) viewed time management as behaviors that aim to achieve effective use of time while performing certain goal-directed activities. Students who are able to manage their time effectively tend to have higher levels of achievement are less likely to drop out of an online course (Miertschin, Goodson, & Stewart, 2015; Roblyer, 1999).

Structuring the environment relates to the ability of learners to arrange their physical setting to reduce disturbances during the learning process (Gagné, 1985). Structuring online learners' physical learning environment is crucial to avoiding distractions (e.g., finding a comfortable and regular place to study) since online learners are not required to be present in a traditional classroom at a particular time (Barnard, Paton, & Lan, 2008; Du, 2016).

Help-seeking is a mechanism that includes behaviors such as understanding solutions and searching for academic support from others to prevent educational failure. Help-seeking behaviors benefit learners by addressing their academic challenges, improving their learning skills, and overcoming challenges (Golestaneh & Askari, 2013). Due to a lack of physical proximity to online instructors and classmates, the use of appropriate help-seeking strategies is related to increased student engagement in online learning environments (Barnard et al., 2008; Hara & Kling, 2000).

Finally, persistence, which refers to continuous effort despite the presence of obstacles or difficulties, has been shown to be related to the successful completion of online courses (Ayres, Cooley, & Dunn, 1990).

Supportive Online Learning Behaviors and Online Learning

Since online learners can participate in courses at any place and time they wish, they should not only be able to plan, manage, and assess their learning processes but also independently develop their skills or behaviors to achieve their academic goals (Dabbagh & Kitsantas, 2009). Some researchers have proposed that high-achieving students employ various behavioral strategies that may also play an important role in achieving good grades and getting the most out of an online course. For example, Roper (2007) surveyed a group of graduates from online credit-granting graduate-level degree programs with a 3.50 cumulative GPA or better. He identified seven practical tips from these students: "develop a time-management strategy," "make the most of online discussions," "use it or lose it," "make questions useful to your learning," "stay motivated," "communicate the instruction techniques that work," and "make connections with fellow students." Annamalai (2018) found that connecting with instructors is an important tip for a positive online learning outcome because not only does it make students produce knowledge rather than consume it, but seeking the instructor's help also provides scaffolding for the students. Further, according to Grabinger and Dunlap (2000), online learners need well-developed learning skills and strategies, such as goal setting, action planning, resource selection and evaluation, reflective learning, and time management. Similarly, Beaudoln et al. (2009) listed several critical elements of successful online learning, such as "self-motivation," "time management," "capacity to learn with limited support," "ability to cope with unstructured settings," and "relationships with other online learners." Morrison (2012) summarized a set of behaviors (e.g., "read the syllabus," "plan weekly study times," "ask questions," and "make connections with fellow students") that college students have identified as crucial to their success in completing their online courses for credit. In a similar vein, Sloan (2013) pointed out that behaviors like "having a dedicated workspace," "knowing and using resources," and "building relationships" are important for success in an online learning environment. Lytle (2013) added behaviors such as "connect with instructors early," "create a schedule," and "have a consistent workspace" as also being crucial for online learners. Finally, Mock (2015) suggested several tips for remaining successful in an online course, such as "establish a good workspace," "know your resources," "meet your peers and instructor," "manage time wisely," and "seek help when needed."

As mentioned above, these successful online behaviors were mostly derived from qualitative interviews. To date, the use of a quantitative approach to examine the same issue is sparse. To fill this gap in the literature, the present study employed a quantitative approach to examine how supportive online learning behaviors that have been frequently mentioned in the previous research ("communicate effectively with faculty and classmates," "create a schedule," "have a dedicated study space," "know your resources," and "manage your time") play a role in online learners' learning expectations.

As mentioned, the main purpose of this study was to examine the underlying learning mechanism of online learners. Specifically, we focus on how motivational factors (e.g., different types of goal orientations) and their actual online learning activities and behaviors (e.g., the adoption of different self-regulated learning strategies and supportive online learning behaviors) relate to learning outcome (e.g., expected grade). The ultimate goal is to provide a more complete understanding of how these essential online learning factors relate to each other and offer further useful information and insights not only for online learners but also for course instructors, designers, and administrators with the goal of eventually improving students' online learning experiences and outcomes.

Methods

Participants and Procedure

Participants were recruited from a large public university in Texas. Data were collected during the spring semester of 2018. Students who had registered for at least one online course were invited to participate through a recruitment email listing the online survey link created using Qualtrics. An information sheet was presented as the first page of the survey, and participants signed an online consent form to declare whether they would participate or not. Participants were informed that their decision would not affect their rights and final grades in the course. Students were also told that it would take approximately 30 minutes to complete the online survey and that those who completed the survey would receive a $5 Amazon eGift card as compensation for their effort.

A total of 93 students made up the sample (83 female [89.2%], 10 male [10.8%]). Of these, 64 were White/Caucasian (68.8% of the total sample), and 29 were non-White/Caucasian (31.2% of the total sample). Seventy were undergraduate students (75.3% of the total sample) and 23 were graduate students (24.7%). For six students (6.5% of the total sample), this was the first time they had taken an online course; 87 students (93.5%) had taken an online course before they participated in the current study. In addition, 78 students (83.9% of the total sample) studied within the College of Education and Human Development (CEHD), whereas 15 students (16.1% of the total sample) studied in other various departments outside of CEHD.

Instruments

Achievement Goal Questionnaire. The 12 items of Elliot and McGregor's (2001) Achievement Goal Questionnaire (AGQ) were adopted to assess the following four types of achievement goals among participants: mastery-approach (MAP), performance-approach (PAP), mastery-avoidance (MAV), and performance-avoidance (PAV) goals. A sample item for measuring the MAP goal was, "I want to learn as much as possible from this online class"; for the PAP goal, "It is important for me to do well compared to others in this online class"; for the MAV goal, "I worry that I may not learn all that I possibly could in this online class;" and for the PAV goal, "My goal in this online class is to avoid performing poorly." Answers were given using a 7-point Likert scale ranging from 1 (not at all true of me) to 7 (extremely true of me). Reliability coefficients (Cronbach's alpha) for the present data for the four subscales were .88, .95, .83, and .75, respectively.

Self-Regulated Online Learning Questionnaire. The 36-item Self-Regulated Online Learning Questionnaire (SOL-Q; Jansen et al., 2017) was used to measure SRL for fully online courses, with a focus on individual learning strategies, including the following five subscales: (1) metacognitive skills (e.g., "I think about what I have learned after I finish working on this online course"); (2) time management (e.g., "I find it hard to stick to a study schedule for this online course"); (3) environmental structuring (e.g., "I know where I can study most efficiently for this online course"); (4) persistence (e.g., "Even when materials in this online course are dull and uninteresting, I manage to keep working until I finish"); and (5) help-seeking (e.g., "When I do not fully understand something, I ask other course members in this online course for ideas"). Answers were given along a 7-point scale ranging from 1 (not at all true for me) to 7 (very true for me). Reliability coefficients for the five self-regulated online learning subscales were .92, .63, .78, .80, and .87, respectively.

Supportive online learning behaviors. Students' supportive online behaviors were measured by the following five behaviors (Roper, 2007; Morrison, 2012; Sloan, 2013; Lytle, 2013; Mock, 2015): (1) communicate effectively with faculty and classmates (e.g., making use of email, chats, forums, and other formats to communicate with fellow students and professors if they have any questions and need any clarification when taking online course); (2) create a schedule (e.g., making a to-do list of the tasks and sticking to their study plan for completing weekly online course requirement); (3) have a dedicated study space (e.g., finding a quiet place with a good Internet connection, access to power, no distractions, and availability at any time when taking online course); (4) know your resources (e.g., ensuring their computer is working well, installing any needed software, and verifying their browser is up-to-date, enabling them to focus their attention on online course materials and not be distracted by technology problems); and (5) manage your time (e.g., arranging time—and enough of it—regularly in their personal calendar to take the online course each week). Students were asked whether they had adopted each of these behaviors in their current online learning experience with two response options (yes or no). The internal consistency of these five online behaviors was evaluated using the Kuder-Richardson 20 (KR-20) coefficient because the questions were scored dichotomously. The KR-20 coefficient of these five online behaviors was .54.

Expected academic outcome/expected grade. Students' expected grade (A or non-A) was regarded as their expected academic outcome for the online course they were taking.

Results

Descriptive Statistics and Correlations Among the Variables

As illustrated in Table 1, the means of the four achievement goal orientation subscales ranged from 4.02 to 5.67, and the means of the SRL subscales ranged from 4.17 to 5.65. Correlation results indicated statistically significant and positive associations between MAP goals and all SRL strategies, except for time management. In contrast, MAV goals were only negatively associated with persistence ($r = -.23$, $p < .05$). PAP and PAV goals were uncorrelated with any of SRL strategies.

Further, the data indicated a positive association between MAP goals and communicating effectively with faculty and classmates ($r = .31$, $p < .001$). Having a dedicated study space was also statistically and positively correlated with PAP goals ($r = .21$, $p < .05$) but negatively correlated with MAV goals ($r = -.26$, $p < .05$).

Metacognitive skills ($r = .28$, $p < .001$), time management ($r = .21$, $p < .05$), environmental structuring ($r = .52$, $p < .001$), and persistence ($r = .29$, $p < .001$) were all significantly and positively correlated with having a dedicated study space. Time management was significantly and positively correlated with the items of knowing your resources ($r = .27$, $p < .001$) and managing your time ($r = .30$, $p < .001$). Persistence was positively related to all supportive online learning behaviors, except for creating a schedule. Finally, help-seeking had a significant and positive association with communicating effectively with faculty and classmates ($r = .32$, $p < .001$).

Expected grade was positively related to time management strategy ($r = .23$, $p < .05$) and knowing your resources ($r = .32$, $p < .001$). On the other hand, expected grade was negatively related to MAV goals ($r = -.27$, $p < .001$).

Table 1

Correlation Coefficients and Descriptive Statistics (N = 93)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. MAP	--														
2. PAP	.25*	--													
3. MAV	.11	.17	--												
4. PAV	.05	.42**	.51**	--											
5. MS	.48**	.03	-.04	-.01	--										
6. TM	.18	.01	-.14	-.05	.14	--									
7. ES	.36**	.10	-.16	-.01	.54**	.27**	--								
8. PER	.47**	.05	-.23*	-.18	.58**	.20	.46**	--							
9. HS	.30**	.10	-.03	-.08	.48**	-.02	.41**	.41**	--						
10. CEWF&C	.31**	.09	.08	-.13	.19	.10	.06	.29**	.32**	--					
11. CAS	.03	-.08	.00	.13	.10	.18	.09	.17	.06	-.01	--				
12. HDSP	.14	.21*	-.26*	-.10	.28**	.21*	.52**	.29**	.09	.13	.17	--			
13. KYR	.14	.17	-.17	-.01	.10	.27**	.10	.22*	-.01	.16	.01	.25*	--		
14. MYT	.11	.06	-.12	.04	.16	.30**	.14	.25*	.11	.08	.43**	.21*	.43**	--	
15. EG	.03	.15	-.27**	-.17	-.15	.23*	.15	.11	.07	.08	-.05	.13	.32**	.20	--
Mean	5.67	4.02	4.30	5.06	4.98	4.90	5.65	5.22	4.17						
SD	1.26	2.24	1.76	1.58	1.08	1.35	1.14	1.10	1.64						

Note. MAP = mastery-approach goals; PAP = performance-approach goals; MAV = mastery-avoidance goals; PAV = performance-avoidance goals; MS = metacognitive skills; TM = time management; ES = environmental structuring; PER = persistence; HS = help-seeking; CEWF&C = communicate effectively with faculty and classmates; CAS = create a schedule; HDSP = have a dedicated study space; KYR = know your resources; MYT = manage your time; EG = expected grade.
* $p < .05$. ** $p < .01$.

Testing the Hypothesized Mediational Model

Prior to testing the three-path mediation model, the measurement models of achievement goal orientation, SRL, and supportive online learning behaviors were tested. Models were analyzed by using M*plus* (Version 8; Muthén & Muthén, 1998–2018) with the weighted least square mean and standard deviation (WLSMV) estimation method. The altogether measurement model fit adequately to the data, χ^2 (194, N = 93) = 227.136 (p = .052), RMSEA = .04, and WRMR = .75. Furthermore, the overall three-path mediation model chi-square test and the model fit indices were χ^2 (220, N = 93) = 256.694 (p = .045), RMSEA = .04, and WRMR = .81, respectively, indicating that the model fit the data adequately. As shown in Figure 1, MAP goals had a positive impact on SRL strategies (β = .61, p < .001), whereas MAV goals had a negative impact on SRL strategies (β = -.30, p < .05). Furthermore, SRL strategies had a strong and positive effect on supportive online learning behaviors (β = .72, p < .001). A positive and statistically significant effect was also found between supportive online learning behaviors and students' expected grade (β = .40, p < .05).

In addition, we examined all the mediated effects in the model by using both the Sobel test (1982) and the bootstrap method (Cheung, 2007). As shown in Figure 1, all the simple mediated effect estimates, $\widehat{\alpha_1\beta}$ $\widehat{\alpha_2\beta}$ and $\widehat{\beta\gamma}$, were significant using the Sobel test ($\widehat{\alpha_1\beta}$ = .22, p < .001, $\widehat{\alpha_2\beta}$ = -.11, p < .05, $\widehat{\beta\gamma}$ = .39, p < .05, respectively).

The overall mediated effects, $\widehat{\alpha_1\beta\gamma}$ and $\widehat{\alpha_2\beta\gamma}$, were then examined by using the bootstrap method with a 95% confidence interval (CI). The CIs of the mediated effects ranged from .004 to .339 for $\widehat{\alpha_1\beta\gamma}$ and from -0.244 to -0.001 for $\widehat{\alpha_2\beta\gamma}$. Neither of these CIs included zero, thus indicating that the overall mediated effects were statistically significant. In other words, both SRL strategies and supportive online learning behaviors were significant mediators: SRL strategies mediated the positive effect of MAP goals on the adoption of supportive online learning behaviors while the supportive online learning behaviors mediated the effect of SRL strategies on expected grade. In addition, SRL strategies mediated the negative effect of MAV goals on the use of supportive online learning behaviors, which, in turn, predicted expected grade.

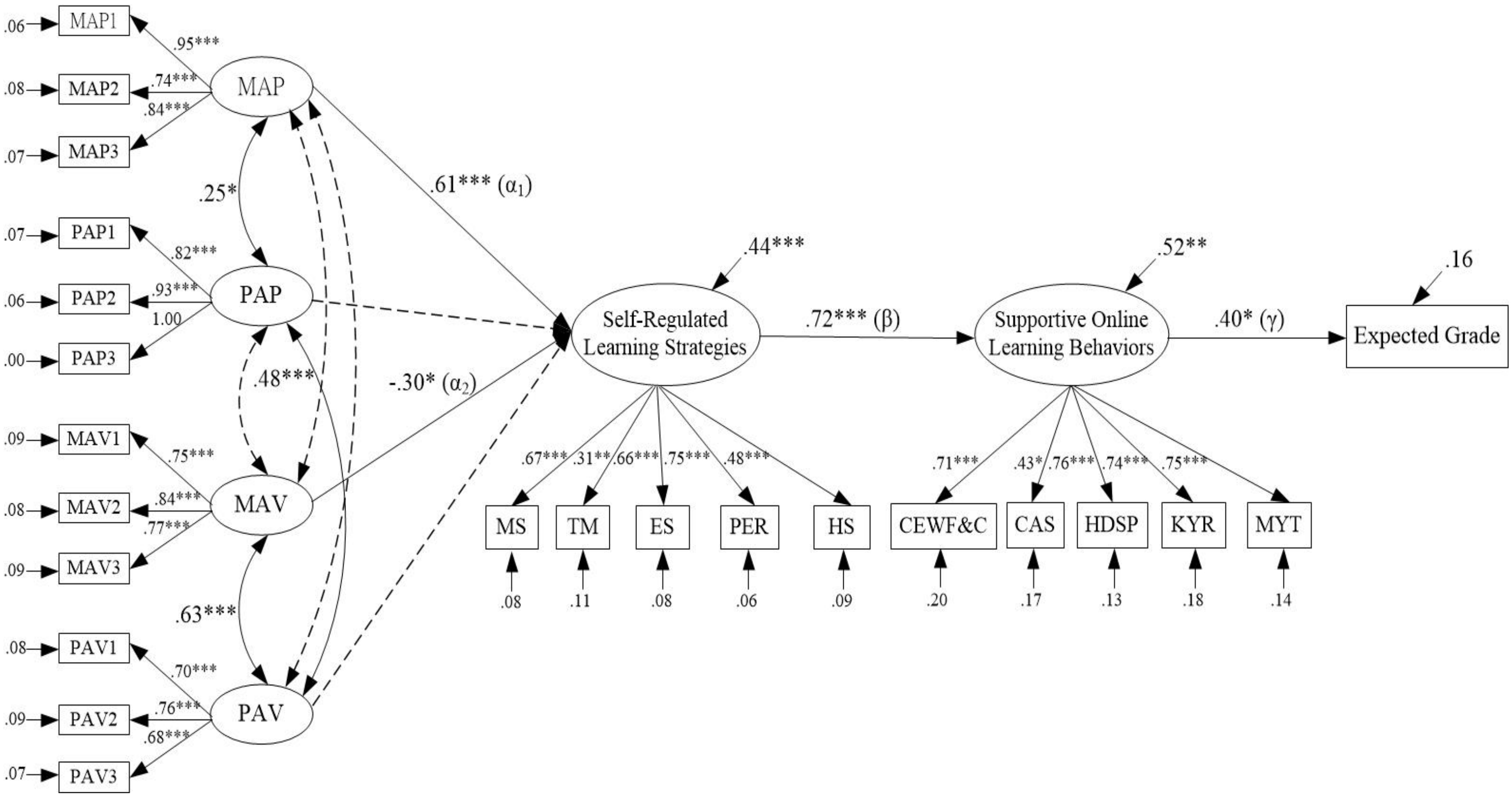

Figure 1. Three-path mediation model.

Note. All the coefficients are standardized coefficients. Dashed lines represent no significant association.
MAP = mastery-approach goals; PAP = performance-approach goals; MAV = mastery-avoidance goals; PAV = performance-avoidance goals; MS = metacognitive skills; TM = time management; ES = environmental structuring; PER = persistence; HS = help-seeking; CEWF&C = communicate effectively with faculty and classmates; CAS = create a schedule; HDSP = have a dedicated study space; KYR = know your resources; MYT = manage your time.
**p* < .05. ***p* < .01. ****p* < .001.

Discussion

In our three-path mediation model, we proposed that the various achievement goal orientations predicted the use of SRL strategies and supportive online learning behaviors, and eventually predicted students' performance expectations. It is clear from structural equation modeling analysis that only mastery goals, including both MAP goals and MAV goals, had significant indirect effects on academic expectation via self-regulated learning strategies and supportive online learning behaviors.

This finding is consistent with those of previous studies. For example, Kaplan and Midgley (1997) discovered that mastery goals were positively related to adaptive self-regulated learning strategies. Similarly, Pintrich (2000b) reported that students who had more mastery goals had the highest likelihood of using adaptive SRL strategies than performance-goals students. Radosevich, Vaidyanathan, Yeo, and Radosevich (2004) also revealed that mastery goals were positively related to the degree to which individuals engaged in self-regulation and how many resources they allocated to their goals. In addition, our finding is in accordance with previous research suggesting that a learner with MAP goals tends to choose deep learning strategies (e.g., comparing and contrasting concepts or generating examples; Al-Emadi, 2001; Pintrich, 2000b). Learners who had strong MAP goals showed a positively significant relationship with cognitive and metacognitive learning strategies, study time and study environment managements, help-seeking behaviors, greater effort exertion and persistence, and more in-depth use of learning strategies (Howell & Watson, 2007; Miller, Behrens, & Greene, 1993; Sakiz, 2011; Vrugt & Oort, 2008), which translates high commitment to high achievement (Hulleman, Schrager, Bodmann, & Harackiewicz, 2010). Payne, Youngcourt, and Beaubien (2007) also found that the MAP goals had the strongest relationships with desirable aspects of self-regulation and performance.

On the other hand, the MAV goals construct was found to be significantly and negatively related to self-regulated learning strategies. MAV goals represent avoiding self-referential or task-referential incompetence (Elliot, 1999). Therefore, learners with MAV goals might choose to study easier material or tend to solve only easier problems. They might also try to stick to their original learning strategies rather than create new ones to handle new types of educational settings (e.g., an online course) because they want to avoid performing worse than in prior situations or take any risk in the unknown situation. Further, some researchers found that MAV goals were linked to maladaptive cognitive and learning strategies, especially in comparison to MAP goals of striving for gains (Howell & Watson, 2007; Van Yperen, Blaga, & Postmes, 2015). In general, MAV goals are associated with less frequent use of SRL and more disorganized behaviors, such as attempting to minimize the effort required to complete academic tasks. Moreover, students with high MAV goals are less likely to adopt deeper processing strategies (e.g., elaboration and organizational strategies) or explore the material using different types of cognitive or thinking strategies and are likely to procrastinate, in turn resulting in lower academic performances/grades (Bernacki, Byrnes, & Cromley, 2012; Howell & Watson, 2007; Pintrich, 2000c).

Moreover, no indirect effects were found from both performance goals, which involve comparison with others, on academic expectations via both SRL strategies and supportive online learning behaviors. This might be because the nature of online courses offers fewer opportunities for direct comparison with peers so that students are less likely to perceive themselves as incompetent and have a lower motivation to perform better than their classmates. These nonsignificant effects are in line with previous research by Zhou and Wang (2019), who found that the effect of both PAP and PAV goals on academic performance was negative but not significant.

Students who hold PAP or PAV goals focus more on judgments of their abilities by comparing themselves with other students and are afraid of falling behind; thus, they tend to use more superficial strategies and avoid effort utilization (Huang, 2011). Kaplan and Midgley (1997) pointed out that performance goals relate positively to maladaptive SRL strategies. Students with PAV goals prefer not to be challenged and tend to be involved in low levels of metacognitive activity (Elliot, 1999; Pintrich, Smith, Garcia, & McKeachie, 1993). Consistent with Coutinho's (2007) study, we did not find any significant mediating effect between performance goals and academic success.

The results of the present study further support the essential role of goal setting on the adoption of SRL strategies that also have a significantly positive effect on the demonstration of supportive online learning behaviors, which, in turn, eventually lead to higher academic expectations. In other words, when students are equipped with self-regulated learning strategies, they become more active in adopting a set of supportive online learning behaviors, such as creating a schedule, managing their time, communicating with faculty and classmates during their online course, knowing their resources, and having a dedicated study space. Accordingly, students who have adopted more supportive online learning behaviors are more confident about understanding the subject matter and expect they will perform well and receive good grades at the end of the semester. According to Wandler and Imbriale (2017), self-regulated learners are likely to manage their time to complete tasks in a timely fashion without procrastination. They can also flexibly adapt or change their physical surroundings, if needed, to make them more conducive to completing their tasks.

Conclusions

Our results showed that, in an online learning environment, SRL strategies and supportive online behaviors are both important intermediaries between students' achievement goal orientations and their academic expectations. Achievement goal orientations play an important role in strengthening and promoting SRL strategies according to learners' needs. The present study revealed that students with higher MAP goals were more likely to use various types of SRL strategies, including the use of metacognitive skills, time management, environmental structuring, persistence, and help-seeking. These self-regulation strategies had a positive association with supportive online behaviors, including communicating effectively with faculty and classmates, creating a schedule, having a dedicated study space, knowing their resources, and managing their time, which, in turn, led to higher grade expectations. On the other hand, students with higher MAV goals were less likely to adopt adequate learning strategies and supportive online behaviors and had lower grade expectations in the online learning environment.

These findings provide online course instructors, designers, and even administrators, with information that allows them to create interventions tailored to students who hold MAV goals. For example, providing students with adequate resources on both SRL strategies and supportive online behaviors may contribute to students' online learning readiness, increase students' academic success expectations, and help reduce attrition rates in online courses.

A few limitations of this study warrant mention. First, our current sample (N = 93) could be viewed as relatively small for SEM analysis. Using the self-reported expected grade (N = 93) instead of actual grade (n = 64) as the outcome measure was to maintain a larger sample size for the analysis. Although only 64 students reported their actual final grade, the matching rate (90.6%, 58 student matches and six student nonmatches) between the expected and the final grades for these students was shown in our study. We have also analyzed an alternative model with both actual and expected grades included in the same model as a latent factor and used the full information maximum likelihood (FIML) approach to handle the missing data. We still obtained the same pattern of significant results as the original model with this alternative model. Therefore, we felt confident using the expected grade as the academic outcome measure. Expanding the current study with additional data collection of the actual grade is another potential alternative to further validate our current model. The second limitation has to do with the cross-sectional nature of the study. A longitudinal study would have provided a better understanding of the potential causal effects across the factors we examined. In addition, future research could employ methods other than self-report in order to gather data about different achievement goals and their associations with online learning behaviors. For example, we could further employ qualitative methods to more fully explore the meaning of the different achievement goals for students with various characteristics and in different online educational settings.

Acknowledgements

This research was supported by a grant from the T3: Texas A&M Triads for Transformation project.

Author Note

Yu-Chen Yeh, Department of Educational Psychology, Texas A&M University
Oi-Man Kwok, Department of Educational Psychology, Texas A&M University
Hsiang-Yu Chien, Department of Educational Psychology, Texas A&M University
Noelle Wall Sweany, Department of Educational Psychology, Texas A&M University
Eunkyeng Baek, Department of Educational Psychology, Texas A&M University
William Alex McIntosh, Department of Sociology, Texas A&M University

Correspondence concerning this article should be addressed to Oi-Man Kwok, Department of Educational Psychology, Texas A&M University, 4225 TAMU, College Station, TX 77843-4225, or email omkwok@tamu.edu.

References

Adesope, O. O., Zhou, M. M., & Nesbit, J. C. (2015). Achievement goal orientations and self-reported study strategies as predictors of online studying activities. *Journal of Educational Computing Research, 53*(3), 436–458.

Aduke, A. F. (2015). Time management and students' academic performance in higher institutions, Nigeria – A case study of Ekiti State. *International Research in Education, 3*(2), 1–12.

Al-Emadi, A. (2001). The relationships among achievement, goal orientation, and study strategies. *Social Behavior and Personality: An International Journal, 29*(8), 823–832.

Annamalai, N. (2018). How do we know what is happening in WhatsApp? A case study investigating pre-service teachers' online activity. *Malaysian Journal of Learning and Instruction, 15*(2), 207–225.

Ayres, R., Cooley, E., & Dunn, C. (1990). Self-concept, attribution and persistence in learning-disabled students. *Journal of School Psychology, 28*, 153–163.

Barnard, L., Paton, V., & Lan, W. (2008). Online self-regulatory learning behaviors as a mediator in the relationship between online course perceptions with achievement. *The International Review of Research in Open and Distance Learning, 9*(2), 1–11.

Beaudoln, M. F., Kurtz, G., & Eden, S. (2009). Experiences and opinions of e-learners: What works, what are the challenges, and what competencies ensure successful online learning. *Interdisciplinary Journal of E-Learning and Learning Objects, 5*, 275–289.

Bernacki, M. L., Byrnes, J. P., & Cromley, J. G. (2012). The effects of achievement goals and self-regulated learning behaviors on reading comprehension in technology-enhanced learning environments. *Contemporary Educational Psychology, 37*(2), 148–161.

Bjork, R. A., Dunlosky, J., & Kornell, N. (2013). Self-regulated learning: Beliefs, techniques, and illusions. *Annual Review of Psychology, 64*, 417–444.

Bradley, R. L., Browne, B. L., & Kelley, H. M. (2017). Examining the influence of self-efficacy and self-regulation in online learning. *College Student Journal, 51*(4), 518–530.

Broadbent, J., & Poon, W. L. (2015). Self-regulated learning strategies & academic achievement in online higher education learning environments: A systematic review. *The Internet and Higher Education, 27*, 1–13.

Cheung, M. W. L. (2007). Comparison of approaches to constructing confidence intervals for mediating effects using structural equation models. *Structural Equation Modeling: A Multidisciplinary Journal, 14*(2), 227–246.

Claessens, B. J. C., Eerde, W. V., Rutte, C. G., & Roe, R. A. (2007). A review of the time management literature. *Personnel Review*, *36*(2), 255–276.

Coutinho, S. A. (2007). The relationship between goals, metacognition, and academic success. *Educate, 7*(1), 39–47.

Dabbagh, N., & Kitsantas, A. (2009). Exploring how experienced online instructors use integrative learning technologies to support self-regulated learning. *International Journal of Technology in Teaching and Learning, 5*(2), 154–168.

Du, J. (2016). Predictors for Chinese students' management of study environment in online groupwork. *International Journal of Experimental Educational Psychology, 36*(9), 1614–1630.

Dweck, C. S. (1999). *Essays in social psychology. Self-theories: Their role in motivation, personality, and development.* New York, NY: Psychology Press.

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*, 256–273.

Elliot, A. J. (1999). Approach and avoidance motivation and achievement goals. *Educational Psychologist, 34*(3), 169–189.

Elliot, A. J., & Church, M. (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology, 72*, 218–232.

Elliot, A. J., & McGregor, H. A. (2001). A 2 × 2 achievement goal framework. *Journal of Personality and Social Psychology, 80*, 501–519.

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist, 34*(10), 906–911.

Gagné, R. M. (1985). *The conditions of learning* (4th ed.). New York, NY: Holt, Rinehart & Winston.

Golestaneh, S. M., & Askari, F. (2013). Help-seeking or help avoidance: Important motivational, personality and metacognitive antecedents' role in help-seeking and help-avoidance between normal and gifted students. *European Online Journal of Natural and Social Sciences, 2*(3), 3403–3410.

Grabinger, R. S., & Dunlap, J. C. (2000). Rich environments for active learning: A definition. In D. Squires, G. Conole, & G. Jacobs (Eds.), *The changing face of learning technology* (pp. 8–38). Cardiff, UK: University of Wales Press.

Hara, N., & Kling, R. (2000). Students' distress with a web-based distance education course. *Information, Communication & Society, 3*(4), 557–579.

Howell, A. J., & Watson, D. C. (2007). Procrastination: Associations with achievement goal orientation and learning strategies. *Personality and Individual Differences, 43*(1), 167–178.

Howland, J. L., & Moore, J. L. (2002). Student perceptions as distance learners in internet-based courses. *Distance Education, 23*(2), 183–195.

Huang, C. (2011). Achievement goals and achievement emotions: A meta-analysis. *Educational Psychology Review, 23*, 359–388.

Hulleman, C. S., Schrager, S. M., Bodmann, S. M., & Harackiewicz, J. M. (2010). A meta-analytic review of achievement goal measures: Different labels for the same constructs or different constructs with similar labels? *Psychological Bulletin, 136*, 422–449.

Im, T., & Kang, M. (2019). Structural relationships of factors which impact on learner achievement in online learning environment. *International Review of Research in Open and Distributed Learning*, *20*(1), 111–124.

Jansen, R. S., Van Leeuwen, A., Janssen, J., Kester, L., & Kalz, M. (2017). Validation of the self-regulated online learning questionnaire, *Journal of Computing in Higher Education, 29*(1), 6–27.

Kaplan, A., Lichtinger, E., & Gorodetsky, M. (2009). Achievement goal orientations and self-regulation in writing: An integrative perspective. *Journal of Educational Psychology, 101*, 51–69.

Kaplan, A., & Midgley, C. (1997). The effect of achievement goals: Does level of perceived academic competence make a difference? *Contemporary Educational Psychology, 22*(4), 415–435.

Kruger, J., & Dunning, D. (1999). Unskilled and unaware of it: How difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of Personality and Social Psychology, 77*(6), 1121–1134.

Lemos, M. S. (1999). Students' goals and self-regulation in the classroom. *International Journal of Educational Research, 31*, 471–485.

Liu, S. Y., Gomez, J., & Yen, C. J. (2009). Community college online course retention and final grade: Predictability of social presence. *Journal of Interactive Online Learning, 8*(2), 165–182.

Lynch, R., & Dembo, M. (2004). The relationship between self-regulation and online learning in a blended learning context. *International Review of Research in Open and Distance Learning, 5*(2), 1–16.

Lytle, R. (2013). *5 tips to succeed in an online course.* Retrieved from https://www.usnews.com/education/online-education/articles/2013/01/14/5-tips-to-succeed-in-an-online-course

Maehr, M. L., & Zusho, A. (2009). Achievement goal theory: the past, present, and future. In K. R. Wentzel & A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 77–104). New York, NY: Routledge.

Miertschin, S. L., Goodson, C. E., & Stewart, B. L. (2015). *Time management skills and student performance in online courses*. Paper presented at the Annual ASEE Conference & Exposition, Seattle, WA.

Miller, R. B., Behrens, J. T., Greene, B. A., & Newman, D. (1993). Goals and perceived ability: Impact on student valuing, self-regulation, and persistence. *Contemporary Educational Psychology, 18*(1), 2–14.

Mock, J. (2015). *7 tips for success when taking online courses.* Retrieved from https://online.illinois.edu/articles/online-learning/item/2015/09/16/7-tips-for-online-success

Morrison, D. (2012). *Five-step strategy for student success with online learning*. Retrieved from https://onlinelearninginsights.wordpress.com/2012/09/28/five-step-strategy-for-student-success-with-online-learning/

Murphy, E. (2008). A framework for identifying and promoting metacognitive knowledge and control in online discussants. *Canadian Journal of Learning and Technology, 34*(2), 9–30.

Muthén, L. K., & Muthén, B. O. (1998–2018). *M*plus *user's guide* (8th ed.). Los Angeles, CA: Muthén & Muthén.

Nicholls, J. G. (1984). Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological Review, 91*, 328–346.

O'Neil, H. F., Jr., & Abedi, J. (1996). Reliability and validity of a state metacognitive inventory: Potential for alternative assessment. *The Journal of Educational Research, 89*(4), 234–245.

Patterson, B., & McFadden, C. (2009). Attrition in online and campus degree programs. *Online Journal of Distance Learning Administration, 12*(2). Retrieved from https://www.westga.edu/~distance/ojdla/summer122/patterson112.html

Payne, S. C., Youngcourt, S. S., & Beaubien, J. M. (2007). A meta-analytic examination of the goal orientation nomological net. *Journal of Applied Psychology, 92*, 128–150.

Pintrich, P. R. (2000a). An achievement goal theory perspective on issues in motivation terminology, theory, and research. *Contemporary Educational Psychology*, *25*(1), 92–104.

Pintrich, P. R. (2000b). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. *Journal of Educational Psychology, 92*, 544–555.

Pintrich, P. R. (2000c). The role of goal orientation in self-regulated learning. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 451–502). San Diego, CA: Academic Press.

Pintrich, P. R., Smith, D.A.F., Garcia, T., & McKeachie, W. J. (1993). Reliability and predictive validity of the motivated strategies for learning questionnaire (MSLQ). *Educational and Psychological Measurement, 53*, 810–814.

Radosevich, D. J., Vaidyanathan, V. T., Yeo, S., & Radosevich, D. M. (2004). Relating goal-orientation to self-regulatory processes: A longitudinal field test. *Contemporary Educational Psychology, 29*, 207–229.

Roblyer, M. D. (1999). Is choice important is distance learning? A study of student motives for taking Internet-based courses at the high school and community college levels. *Journal of Research on Computing in Education, 32*(1), 157–172.

Roper, A. R. (2007). How students develop online skills. *Educause Quarterly, 30*(1), 62–64.

Sakiz, G. (2011). Mastery and performance approach goal orientations in relation to academic self-efficacy beliefs and academic help seeking behaviors of college students in Turkey. *Educational Research, 2*(1), 771–778.

Schunk, D. H. (2005). Self-regulated learning: The educational legacy of Paul R. Pintrich. *Educational Psychologist, 40*(2), 85–94.

Seaman, J. E., Allen, I. E., & Seaman, J. (2018). *Grade increase: Tracking distance education in the United States*. Babson Survey Research Group. Retrieved from http://onlinelearningsurvey.com/reports/gradeincrease.pdf

Shea, P., & Bidjerano, T. (2010). Learning presence: Towards a theory of self-efficacy, self-regulation, and the development of a communities of inquiry in online and blended learning environments. *Computers & Education, 55*(4), 1721–1731.

Sloan, M. (2013). Tips for online learning. *Principal Leadership*, 52–54.

Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. In S. Leinhardt (Ed.), *Sociological methodology 1982* (pp. 290–312). Washington, DC: American Sociological Association.

Steinkamp, K. (2018). Four tips for a successful virtual learning initiative: How to improve student performance and prepare students for the real world by incorporating a successful online learning initiative into your school's curriculum. *Tech & Learning, 38*(8), 2.

Tsai, M. J. (2009). The model of strategic e-learning: Understanding and evaluating student e-learning from metacognitive perspectives. *Educational Technology and Society, 12*(1), 34–48.

Urdan, T. C., & Midgley, C. (2001). Academic self-handicapping: What we know, what more there is to learn. *Educational Psychology Review*, *13*, 115–138.

Van Yperen, N. W., Blaga, M., & Postmes, T. (2015). A meta-analysis of the impact of situationally induced achievement goals on task performance. *Human Performance*, *28*(2), 165–182.

Vrugt, A., & Oort, F. J. (2008). Metacognition, achievement goals, study strategies and academic achievement: Pathways to achievement. *Metacognition and Learning, 3*(2), 123–146.

Wandler, J. B., & Imbriale, W. J. (2017). Promoting undergraduate student self-regulation in online learning environments. *Online Learning, 21*(2), 1–16.

Watkins, R. (2015). *Building skills for e-learning success. Distance learning*. Retrieved from https://onlinelearningtips.com/2015/03/building-skills-for-e-learning-success/

Wolters, C. A., Yu, S. L., & Pintrich, P. R. (1996). The relation between goal orientation and students' motivational beliefs and self-regulated learning. *Learning and Individual Differences*, *8*, 211–238.

Xie, K., & Huang, K. (2014). The role of beliefs and motivation in asynchronous online learning in college-level classes. *Journal of Educational Computing Research*, *50*(3), 315–341.

Yukselturk, E., & Bulut, S. (2007). Predictors for student success in an online course. *Educational Technology & Society, 10*(2), 71–83.

Zhou, M. (2013). Using traces to investigate self-regulatory activities: A study of self-regulation and achievement goal profiles in the context of web search for academic tasks. *Journal of Cognitive Education and Psychology, 12*(3), 287–305.

Zhou, Y., & Wang, J. (2019). Goal orientation, learning strategies, and academic performance in adult distance learning. *Social Behavior and Personality: An International Journal, 47*(8), e8195.

Zimmerman, B. J. (1990). Self-regulated learning and academic achievement: An overview. *Educational Psychologist, 25*(1), 3–17.

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory Into Practice, 41*(2), 64–70.

Zimmerman, B. J., & Schunk, D. H. (Eds.). (1989). *Self-regulated learning and academic achievement: Theory, research, and practice*. New York, NY: Springer-Verlag

Evaluating Online Learning Orientation Design With a Readiness Scale

Juhong Christie Liu
James Madison University

Abstract
Student online learning readiness (SOLR) has been identified as being closely associated with the success of learning in online environments. Online learning orientations have also been used as a key intervention to support students. However, the evaluation practice and research of online learning orientation design are limited. This research studied the effects of an orientation course on SOLR, using a multiyear design-based research with a one-group pretest and posttest method as the evaluation measurement. The design and implementation of a self-paced orientation course in Canvas learning management system was detailed as the intervention. A 20-item SOLR questionnaire was selected as the pretest and posttest instrument. After the initial cycles, a sample of 2,590 college students were invited to participate in the 2017 orientation and respond to the pretest and posttest. Because separate consent forms were distributed and collected at the pretest and posttest stages, the researcher was able to use 445 pretest and 624 posttest datasets. The independent samples *t*-test results indicated statistically significant improvement of SOLR competencies. The exploratory factor analysis results also indicated changes of items associated with the SOLR constructs. The reliability coefficients of all subscales were > .90, with an increase in the reliability of the SOLR instrument as a whole from pretest (α = .92) to posttest (α = .95). Implications for the design and evaluation of online learning orientations and preparing student online learning readiness are discussed toward future design and implementation.

Keywords: student online learning readiness, orientation for online learning, design research, structure and interaction, evaluation

Liu, J.C. (2019). Evaluating online learning orientation design with a readiness scale. *Online Learning, 23*(4), 42-61. doi:10.24059/olj.v23i4.2078

Evaluating Online Learning Orientation Design With a Readiness Scale

Supporting student success in learning has been the core value of education, regardless of formats (Entwistle & Ramsden, 2015; Johnson, Stewart, & Bachman, 2015). The ubiquity of online access to information and communication, flexibility of time and space of learning, and development of online pedagogy have led to the fact that online learning is becoming an integral part of curriculum and instruction. According to the 2018 Online Learning Consortium (OLC) and Babson Research Group, after a decade of stable increase in online enrollment, in fall 2016 more than 30% of students in higher education took at least one course in an online environment (Seaman, Allen, & Seaman, 2018).

Online learning provides opportunities and challenges for students (Kauffman, 2015). Because of the self-regulated nature of online learning and distance between instructors and students, supporting student success in online learning environments has demonstrated dimensions that are different from meeting the needs of on-campus students (Broadbent & Poon, 2015; Cho & Heron, 2015; Kauffman, 2015; Moore & Kearsley, 2011). Dependency on technologies and media for accessing instructional content and instructors; distance between students and enrolled institutions as well as their class community members, including instructors and classmates; and adjustment to online discourse and interaction (Kaymak & Horzum, 2013; Moore & Kearsley, 2011) may present daunting barriers to online students. Finding how to prepare students to successfully fulfill learning performance in online environments has become one of the core research interests in online course design and program administration (Chan, 2017; Lieberman, 2017; Online Learning Consortium, 2016).

Research studies have found that students' online learning readiness (SOLR) affects their academic achievement (Mosa, Mahrin, & Ibrrahim, 2016; Yilmaz, 2017). Online learning readiness is defined as "cognitive awareness and maturity that a student develops for successful learning in a Web-based environment. It manifests in the attributes of recognizing the self-directed nature, formulating learning strategies, obtaining technology competencies, adjusting to digital etiquettes, and being open for help-seeking" (Liu & Roberts-Kaye, 2016, p. 242). Intentional efforts have been invested in identifying these attributes and providing support to develop competencies that are fundamental to online learning success (Horzum, Kaymak, & Gungoren, 2015; Yukselturk & Bulut, 2007). In the meantime, orientation courses or programs are designed and offered to scaffold students' ability to obtain these competencies (Cigdem & Ozturk, 2016; Liu & Adams, 2017). These invite research and evaluation so that informed decisions can be made toward the design and implementation at course and curriculum levels (Farid, 2014; Hung, Chou, Chen, & Own, 2010; Yu & Richardson, 2015). Educational design research depends on evaluative feedback to inform and improve design of these programs (McKenney & Reeves, 2019). For these reasons, the current study aims to answer the following research questions:

RQ1: How has student online learning readiness (SOLR) changed after taking a self-paced asynchronous orientation course for online learning?

RQ2: How can SOLR be used to inform the design of online learning orientations?

Review of Literature

Readiness for online learning means the preparedness of students to perform learning activities in an online environment. It indicates multiple dimensions, including but not limited to comfort in learning with computers, self-regulated learning strategies, and perception of learning community. Most instruments that measure online learning readiness focus on technology preparation and independent study strategies for students (Broadbent & Poon, 2015; Cho & Heron, 2015; Dray, Lowenthal, Miszkiewicz, Ruiz-Primo, & Marczynski, 2011; Hung, Chou, Chen, & Own, 2010; Smith, Murphy, & Mahoney, 2003). Recently, learning readiness in online environments evolves along the development of strategies in pedagogy, instructional design, active learning, and technology affordances for communication and collaboration, which embody more social-cultural activities (Cheon, Lee, Crooks, & Song, 2012; Dabbagh, 2007). In a social-cultural activity system, learning activities in online learning environment have social and communication dimensions with the mediation of technologies. Learning can be optimized through discourse and interaction with communities primarily composed of instructor and peer learners, and in an online learning environment where support can come from personnel in the enrolled institution, libraries, academic program administration, student services, and possibly technical support from outside higher education institution (Baek, Evans, & Barab, 2013; Broadbent & Poon, 2015; Coleman & Coleman, 2013). Therefore, the dimensions of social interaction and communication are also important for the design and evaluation of online learning orientation programs.

Online Learning Readiness

Online learning readiness has been found related to student motivation and academic achievement. Horzum, Kaymak, and Gungoren (2015) studied a convenience sample of 750 students in online learning from Sakarya University. With 420 participation datasets and a structural equation modeling analysis, the authors concluded that SOLR could predict motivation and perception of academic achievement. Cigdem and Ozturk (2016) studied 155 postsecondary military students in an online computer literacy course in a Turkish school. Using Hung, Chou, Chen, and Own's (2010) Online Learning Readiness Scale, the researchers studied the relationship between three constructs in the scale and student academic achievement, which was measured with the end-of-course grades. The three constructs included motivation for online learning, computer/Internet self-efficacy, and self-directed learning. The researchers concluded that self-direction in online learning could strongly predict student achievement.

Yilmaz (2017) studied 236 undergraduate students in a flipped class. The content learning of the class took place mostly in online environments. Student e-learning readiness was measured, as well as their satisfaction and motivation, which was measured with Pintrich, Garcia, McKeachie, and Smith's (1991) Motivated Strategies for Learning Questionnaire (MSLQ). The E-learning Readiness Scale by Yurdugül and Demir (Yilmaz, 2017) included constructs of computer self-efficacy, Internet self-efficacy, online communication self-efficacy, self-directed learning, learner control, and motivation towards e-learning. A structural equation modeling was conducted as the data analysis. E-learning readiness was found to positively affect student satisfaction and MSLQ scores.

The research in learning science also discovered the importance of social dimensions in student readiness to success (Entwistle & Ramsden, 2015; Horzum, Kaymak, & Gungoren, 2015; Tinto, 1975). Yu and Richardson (2015) developed a SOLR model based on Tinto's (1975) student integration model (SIM), which was grounded in social system. The SOLR model consisted of four constructs: social competencies with instructor, communication competencies, social competencies with classmates, and technical competencies. The four-construct SOLR instrument was recently validated by Yu and Richardson (2015) and Yu (2018); see Table 1. Yu and Richardson (2015) tested the validity and reliability of the model with 331 students who took fully online courses through Blackboard Learn in the spring of 2014 in multiple majors of psychology, industrial engineering, animal science, computer science, political science, management, and communications. The exploratory factor analysis results statistically validated the four-factor structure of the SOLR as an instrument. The reliability test resulted in all Cronbach alphas > .823.

Table 1

SOLR Questionnaire (Yu & Richardson, 2015; Yu, 2018)

Construct	Coding for analysis	Items
Technical competencies	TechComp1	I have a sense of self-confidence in using computer technologies for specific tasks.
	TechComp2	I am proficient in using a wide variety of computer technologies.
	TechComp3	I feel comfortable using computers.
	TechComp4	I can explain the benefits of using computer technologies in learning.
	TechComp5	I am competent at integrating computer technologies into my learning activities.
	TechComp6	I am motivated to get more involved in learning activities when using computer technologies.
Social competencies with instructor	SocialComp-Instructor1	Clearly ask my instructor questions.
	SocialComp-Instructor2	Initiate discussions with the instructor.
	SocialComp-Instructor3	Seek help from instructor when needed.
	SocialComp-Instructor4	Timely inform the instructor when unexpected situations arise.
	SocialComp-Instructor5	Express my opinions to instructor respectfully.
Social competencies with classmates	SocialCompPeers1	Develop friendship with my classmates.
	SocialCompPeers2	Pay attention to other students' social actions.
	SocialCompPeers3	Apply different social interaction skills depending on situations.
	SocialCompPeers4	Initiate social interaction with classmates.
	SocialCompPeers5	Socially interact with other students with respect.
Communication competencies	CommComp1	I am comfortable expressing my opinion in writing to others.
	CommComp2	I am comfortable responding to other people's ideas.
	CommComp3	I am able to express my opinion in writing so that others understand what I mean.
	CommComp4	I give constructive and proactive feedback to others even when I disagree.

Note. The instrument is cited with permission from the original author of the SOLR instrument.

Although the authors pointed out the limitations and future directions of this study, the significance of research was in its social aspects of identifying students' sense of social belonging in online learning environments. There were four constructs and 20 items in the SOLR instrument. Among them, the five items of social competencies with instructor and the five items with classmates had relevance to social presence and interaction in online learning environments (Kim, Kwon, & Cho, 2011; Lee, 2014; Moore & Kearsley, 2011). The five technical competencies and four communication competencies were commonly studied in online learning readiness researches (Dray, Lowenthal, Miszkiewicz, Ruiz-Primo, & Marczynski, 2011; Hung, Chou, Chen, & Own, 2010; Smith, Murphy, & Mahoney, 2003). While some attributes of the Yu and Richardson SOLR can be expressions of student characteristics, research in online learning has indicated that proper scaffolding with supportive courses or programs can build student preparedness and strengthened readiness for online learning (Cigdem & Ozturk, 2016; Glazer & Murphy, 2015; Horzum, Kaymak, & Gungoren, 2015; Kauffman, 2015; Liu & Adams, 2017; Taylor, Dunn, & Winn, 2015).

Online Learning Orientation

As part of student services, educational organizations offering online programs or curricula have been providing various orientation programs or resources to support student success (Chan, 2017; Gray, 2004; Lieberman, 2017; Liu & Adams, 2017; Liu & Roberts-Kaye, 2016). These have been primarily focusing on technical training or support for students to be able to use media and technology to learn content and communicate with instructors and educational institutions from distant locations. Tools or technologies that are customized to a university or college, such as those relevant to the learning management system (LMS), help desk, and registration system, usually consist of the initial package of orientation materials (Scagnoli, 2001; Tomei, Hagel, Rineer, Mastandrea, & Scolon, 2009). Through the evolving versions of online learning delivery technologies, these orientation materials have also been designed and packaged to meet the challenges of version compatibility (Scagnoli, 2001). Orientation courses could take an appealing appearance with interactive media (Taylor, Dunn, & Winn, 2015). Some also included hands-on activities with which students could learn the essential LMS functions by completing meaningful activities, such as developing a discussion post, self-introduction wiki page, or completing a time-management worksheet and submitting it as an assignment (Carruth et al., 2010; Liu & Adams, 2017).

Technical preparation was just the initial awareness and baseline of preparing student success, though. In 2008, after surveying the member and provider institutions of the Online Consortium of Independent College and Universities (OCICU) as well as online students, the researchers recommended including course syllabi in orientation packages and having orientation packages regularly reviewed to ensure quality and ease of use (Tomei et al., 2009). Williams and Hellman (2004) surveyed 829 college students in online learning environments about their self-regulated learning. The researchers used Bandura's Self-Efficacy Scale (1989) as the measure. With 708 complete data sets, the researchers conducted an ANCOVA analysis, which allowed the comparison of self-regulated learning between first-generation and second-generation college students. The findings disclosed that the first-generation students lacked self-regulated learning attributes and were less socially integrated and, therefore, more in need of scaffolding to gain the self-regulation skills and social competency for online learning success.

Orientation courses and programs have also started to become tuned in with the instructional and social dimensions of online curriculum. Gilmore and Lyons (2012) reported the effect of a nursing 911 orientation program. Students met for 8 hours at face-to-face meetings for the orientation, familiarizing themselves with the program, personnel, course structures, library resources, and social interaction patterns in online environments. With179 RN-to-BSN students, the dropout rate decreased from 20% to 1%.

Carruth, Broussard, Waldmeier, Gauthier, and Mixon (2010) designed and implemented a one-week orientation online course for nursing students. The orientation provided an overview of the nursing program, expectations of students, principles of e-learning, and activities for students to build computer skills and the ability to use the LMS. After a pilot with 68 new students, the student feedback toward the orientation was very positive, with 97.5% commenting that they were able to perform skills needed for online learning and LMS navigation, and 95.2% indicating that they were able to critically reflect on technology's supportive role in their learning. The one-week orientation program in this study had the *online presence of the three program coordinators throughout the course*. The students were also provided practice activities that were closely related to their use of the LMS and setting career goals.

Online learning orientation sessions can be a tool to improve retention for online learning (Beckford, 2015; Cho, 2012; Robichaud, 2016; Tomei et al., 2009). This type of tool can help students build understanding of the differences between online learning and the traditional learning experience (Beckford, 2015). Building upon technology literacy and access, these orientations can emphasize self-directed and self-disciplined learning. Time-management skills and capability need to be developed or strengthened through these orientations. To alleviate the sense of isolation in online learning environments, these orientations also need to prioritize the development of online communication skills so as to ensure meaning and intention are transmitted smoothly and accurately among members in a class or program. As essential components in online learning orientations, these attributes have been found as the characteristics associated with online learning success (Williams & Hellman, 2004; Yukselturk & Bulut, 2007).

Self-directed learning and online learning strategies were integral components in online learning orientations. Liu and Adams (2017) designed a self-reflective discussion about a successful online learner profile after students watched and read about online learning strategies. Students were also prompted to perform a hands-on exercise in which they were able to download a time-management template, read a short article about effective management of time, log one week of time distribution of study versus other activities with the template, and submit it as an assignment.

Chan (2017) studied online learning orientation programs offered by 100 randomly selected community colleges in 38 states. Among the 39 colleges that offered online-only (21) or in-person and online (18) orientations, topics related to online learning success remained just in technology competencies and access. Research in online learning indicated that supportive orientation programs need to take into consideration social, technical, and communication dimensions because of the constant interactions between humans and technologies in online learning environments (Kaptelinin & Nardi, 2006; Scanlon & Issroff, 2005; Uden, 2006).

Design and Evaluation of Online Learning Orientation

In essence, online learning orientations are designed to eliminate transactional distance, which is a default barrier in online learning because members in a learning community are not in the same physical location (Moore & Kearsley, 2011). Reducing transactional distance can be realized with the design considerations of student–content, student–instructor, student–student, and student–context interactions (Moore & Kearsley, 2011; Benson & Samarawickrema, 2009). These dynamics to optimize interaction with structure should be applied to the design of online learning orientation courses or programs.

Studies found that when the structure of an online learning environment increased, interaction would decrease (Kaymak & Horzum, 2013). Research also indicated that interactions were critical to student perceived satisfaction and social presence in online learning (Swan, 2001, 2002). Swan (2002) studied the role of interaction through analyzing the design factors of 73 courses and conducting content analysis of the online peer-to-peer discussion of one course. The researcher concluded that student–student interaction in online learning was important and that active and supportive verbal indicators were correlated with the sense of learning community and social presence.

So and Brush (2008) studied the design components of collaborative learning and peer interaction in correlation with student perceived satisfaction and social presence. The study was conducted in a health education graduate class. Fifty-five graduate students participated in the study. Collaboratively, the students developed an HIV-AIDS prevention community plan. The mixed methods study analyzed the quantitative data collected with Collaborative Learning, Social Presence, and Satisfaction (CLSS) questionnaire with exploratory factor analysis. The subsequent qualitative data collection was completed through interviews with students. The research findings revealed that communication media permitting immediate feedback and peer interaction were instrumental to collaborative learning and student perceived social presence.

These design propositions can be attuned with online learning orientation design. Furthermore, the effectiveness of the design is in need of more formalized evaluation, which "drives intervention development while at the same time seeking to inform an external scientific community of the results and their possible utility results" (McKenney & Reeves, 2019, p. 161). Watts (2019) evaluated the effectiveness of an online student orientation (OSO) seminar embedded in a master's degree graduate program, using a Community of Inquiry (CoI) framework. A precourse survey, OSO assessment survey developed by the researcher, and a final reflection paper were used as data sources for evaluation. Fourteen graduate students participated in the OSO intervention and the evaluation. Precourse survey responses to open-ended questions indicated that students' perceived readiness in terms of time management, academic skills, communication, ability to use the LMS, and attitudinal actors, such as patience, were important to their success. As OSO activities, the students watched a short video about online learning strategies, participated in an online discussion, and wrote an essay based on the reading of a CoI paper. The evaluation results revealed that students felt OSO activities were useful, helping them build social presence through online discussion and synchronous learning, building confidence through peer interaction, and connecting cognitive and academic presence with their career-related work.

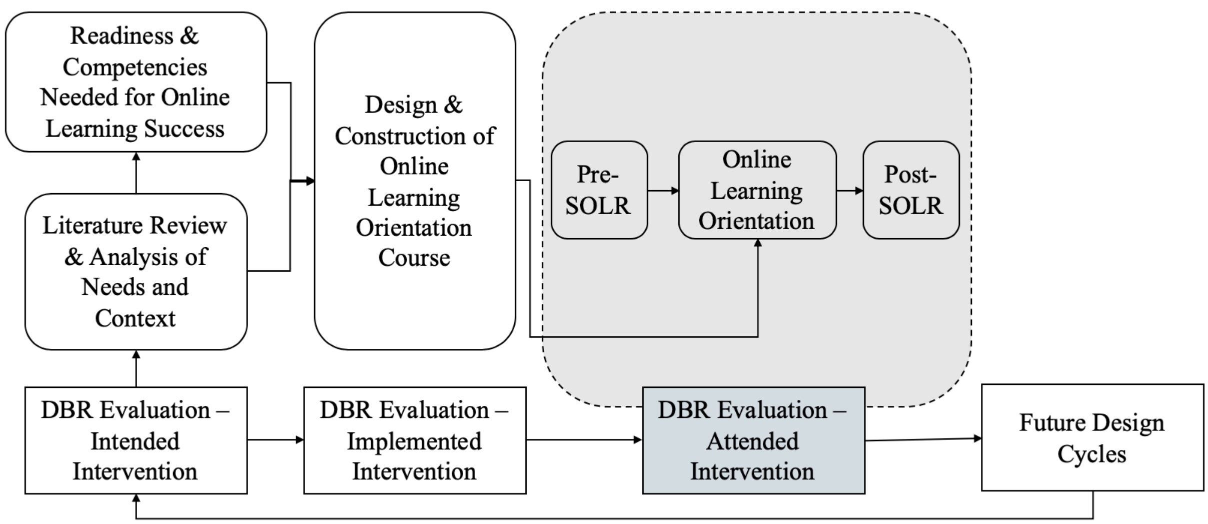

Figure 1. Conceptual framework of evaluation stages of this design research.

Methods

Research Design

This study used a design-based research (DBR) approach and a one group pretest–posttest method as its evaluation measurement (Creswell & Creswell, 2018; McKenney & Reeves, 2019). The design and implementation of online orientation programs can be informed by the evaluation of these orientations (McKenney & Reeves, 2019). Measuring the effectiveness of these supportive interventions can provide an evaluative and reflective base to calibrate existing orientation courses for future versions (Glazer & Murphy, 2015; McKenney & Reeves, 2019). Evaluation results from a validated and reliable SOLR instrument can provide more reliable information to enhance the design of effective online learning orientations (OLOs). These are the core concerns at the evaluation and reflection stage of this design research (McKenney & Reeves, 2019), as illustrated in the conceptual framework Figure 1.

DBR Evaluation—Intended Intervention. The intended intervention of OLO started in the 2014–2015 academic year as the initial stages of analysis and exploration (McKenney & Reeves, 2019). The problem presented to the researcher was about supporting students enrolled in online courses offered during summer sessions for 4-week, 6-week, and 8-week undergraduate and graduate classes for a residential-oriented comprehensive university focusing on undergraduate education and having master's and doctoral programs. Since students did not have experience participating in fully online classes during regular semesters, technology competencies and online self-directed learning were identified as the core needs through a literature review and preliminary analysis. The analysis also included facility, resource, and context analyses (Diamond, 2011; McKenney & Reeves, 2019). At the time, the university had just transitioned to a new LMS, Instructure's Canvas. The student support to summer online courses was a companion service to faculty who designed and developed online courses through a campus faculty development program. Therefore the human resources that could be utilized in the design and implementation of the OLO program had to be efficiently budgeted.

The initial exploration stage included site visits and pilot tests of beta orientation design through programs offering online courses during regular semesters. Feedback from faculty members and graduate student focus groups indicated that technology literacy and online learning strategies, such as communication etiquette and time management, were of primary interest.

DBR Evaluation–Implemented Intervention. The design of the online learning orientation was based on the instructional design process model because of its process-oriented focus on analysis, strategies, and evaluation (Smith & Ragan, 2005). The analysis of the affordances of Canvas LMS unveiled that its customizable learning progress could be used to semi-automate the self-directed learning of students. One outstanding technical feature was the personalized path embedded within the module options. A student would need to complete tasks by the predesigned path. This path was then designed in a sequence of five modules as the intervention, as shown in Figure 2 (Liu & Adams, 2017).

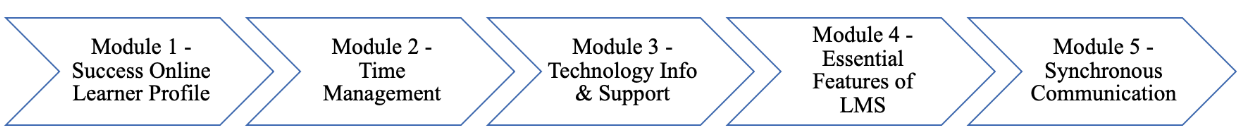

Figure 2. Design and development of online learning orientation.

The intervention in this study was a self-paced asynchronous orientation course designed, developed, and implemented through the Canvas LMS. The course consisted of five modules: (1) Characteristics of Successful Online Learners, (2) Time Management, (3) Support to Online Learning, (4) Essential Features of LMS, (5) Communication with Synchronous Video Conferencing Technology with End-of-Orientation Feedback (Liu & Adams, 2017). The prerequisite and requirement functions built in Canvas modules were designed to monitor the asynchronous online progress of users. Each module presented the content with multiple modes in text, images, and videos, and embedded self-directed learning activities for students.

In Module 1, students read a short essay, watched an open-access video about characteristics of successful online learners, and completed a discussion post on their reflection of a successful online student profile. Directions about how to use Canvas discussion were embedded in the module. Students could *voluntarily* respond to others' posts. In Module 2, students read about time-management strategies and downloaded a template on tracking weekly time distribution on study, work, and other commitments. After completing the template with their own time, students were directed to upload the completed time-management worksheet as an assignment submission. This task was to scaffold the awareness and reflection on effective management of their own time as well as learning the technical procedure of submitting a Canvas assignment and checking a mock grade with feedback. In Module 3, students learned technology-support information provided by the university. They would also learn how to establish an off-campus virtual private network (VPN) connection by searching a full-text article from the university libraries databases, downloading the article, and uploading it back with a brief reflection on the VPN connection experience. Module 4 was about essential features of the LMS. After reviewing selected tutorials, students were expected to complete a self-assessment quiz as a checking point of task completion. In Module 5, students learned synchronous online participation and communication etiquette by reviewing two infographics, one on being a synchronous presenter and the other on being a synchronous participant. After a voluntary testing session of the synchronous audio and video functions, students were prompted to complete a reflective discussion post. The peer interaction in these modules was all voluntary.

This design project completed two pilot iterations in the 2014–15 and 2015–16 academic years. In the process, the university also switched to a different videoconferencing platform and its integration into Canvas. The formative evaluation utilized student feedback built in the orientation course and a self-reporting questionnaire on user perception that was co-developed by the researcher and a campus assessment center. Along the process, updates of literature review informed the selection of a summative evaluation instrument, the Yu and Richardson SOLR (2015), for the 2017 iteration of the OLO intervention (McKenney & Reeves, 2019). Because of limited human resources designated for the project, one grader provided feedback in the three iterations between May and August for the 4-week, 6-week, and 8-week summer sessions. The orientation was highly structured and with minimal student–instructor interaction, and focused on self-directed learning (Liu & Adams, 2017).

DBR Evaluation—Attended Intervention and Its Effectiveness. As illustrated in Table 2, the evaluation took a quantitative approach with the pretest (O1) and posttest (O2) as adapted from the SOLR questionnaire (Yu & Richardson, 2015; Yu, 2018). The SOLR was selected because it identified the student–instructor and student–student interaction dimensions and was validated. The instrument's validity and reliability tests were performed in the Yu and Richardson study with 331 undergraduate students prior to taking for-credit online courses (2015). In addition to the 20 SOLR items, the current study used five demographic questions inquiring about participants' college of study, age group, college year, gender, and student full-time or part-time status.

Table 2

One Group Pretest Posttest Research Method (Creswell, 2014; Creswell & Creswell, 2018)

Pretest	Intervention	Posttest
O1	*X*	*O2*

Evaluation context. After the research protocol was approved by the Institutional Review Board (IRB), the researcher conducted the study in a comprehensive university with undergraduates, master's, and doctoral programs on the East Coast of the United States. The anonymous pretest and posttest questionnaires were created and deployed through the university's Qualtrics Web-based survey system. The links were embedded at the beginning and end of the orientation course in the Canvas LMS. The consent form for the pretest questionnaire clearly stated that if consent was not given, the student could still participate in the course and get the support and orientation training.

In mid-April of 2017, a campus email through student Listserv explaining the purpose of the orientation course and then an invitation from the Canvas course were sent to 2,590 students who registered online to take for-credit courses that the university offered for the summer of 2017. These 4-week, 6-week, and 8-week undergraduate and graduate courses lasted for varied amounts of time from early May to mid-August in 2017. With self-selection, students chose whether to participate in the orientation or not. Clear statements were made in both the campus email and the beginning of the orientation course that participation was voluntary and not related to any for-credit coursework performance.

The data collection was concluded in September of 2017. The Canvas analytics indicated that 675 of the students who accepted the Canvas course invitation completed at least one module, and 615 completed all five modules voluntarily. After accepting the course invitation and logging in to the orientation course, 466 students granted their consent and participated in the pretest SOLR survey which was a Web-based survey built with Qualtrics and linked to the beginning of the online orientation. After having completed at least one module or the entire course, 634 students responded to a separate consent form and the posttest SOLR that was linked to the conclusion of Module 5. A separate consent form for pretest and posttest started the survey once a participant clicked the embedded link.

Participants. Among the 466 participants in the pretest (a response rate of 18%), 445 yielded complete SOLR responses. These participants represented all seven colleges of the university in terms of discipline of study. Among them, 50% were 18–20 years of age, 39% were 21–23 years of age, and 11% were older than 23. Among them, 35% were seniors, 28% juniors, 20% sophomores, 10% graduate students, and 7% first-year students. Participants were 76% female and 24% male, and there were 86% full-time and 14% part-time students.

Among the 634 participants in the posttest (a response rate of 24%), 624 yielded complete SOLR responses. These participants also represented all seven colleges of the university. A total of 51% were 18–20 years of age, 38% were 21–23 years of age, and 10% were older than 23, with seven missing responses to the age question. Of the participants, 32% were seniors, 31% juniors, 19% sophomores, 11% graduate students, and 7% first-year students. Participants were 76% female and 24% male, and there were 86% full-time and 14% part-time students among the posttest participants. These demographics only represented the mixed population of traditional on-campus students and nontraditional off-campus students who chose to take summer online courses in the studied institution.

Evaluation data analysis. The primary interest of this study was to find the effectiveness of the self-paced orientation course using the SOLR instrument. To compare the 20 SOLR competencies for those participants who responded prior to taking the orientation course and those responses after taking the course, an independent-samples *t*-test was performed. The second purpose of this study was to find out how the constructs of SOLR correlated with the design and implementation of the self-directed orientation course. Therefore, exploratory factor analyses (EFA) and reliability analyses were executed to evaluate the structure and consistency of the instrument.

Results

Results of SOLR changes from pretest to posttest. *Statistical analysis results of SOLR changes before and after the orientation course.* An independent-samples *t*-test was conducted to compare the mean scores of the 20 SOLR items in the pretest and posttest, to initially answer Research Question 1: How has student SOLR changed after taking a self-paced orientation course for online learning? The mean scores of posttest responses to all 20 items were higher than those of pretest (Table 3).

For the construct of technology competency, there was a significant difference in *a sense of self confidence in using computer technologies for specific tasks*, pretest (M = 4.44, SD = .75) and posttest (M = 4.54, SD = 0.72); t(1,067) = 2.13, p = .034. A significant difference was also found in the perceived *proficient in using a wide variety of computer technologies*, pretest (M = 4.23, SD = .87) and posttest (M = 4.41, SD = .78); t(1,067) = 3.58, p = .000. For the tech competency item of *feeling comfortable using computers*, the difference between pretest and posttest scores was not significant, pretest (M = 4.58, SD = .66) and posttest (M = 4.61, SD = .65); t(1,067) = .79, p = .429. A significant difference was found in *in explaining the benefits of using computer technologies in learning*, pretest (M = 4.34, SD = .79) and posttest (M = 4.52, SD = .69); t(1.067) = 3.98, p = .000. A significant difference was also found in *feeling competent at integrating computer technologies into my learning activities*, pretest (M = 4.40, SD = .74) and posttest (M = 4.55, SD = .67); t(1,067) = 3.36, p = .001. There was a significant difference in *being motivated to get more involved in learning activities when using computer technologies*, pretest (M = 4.19, SD = .87) and posttest (M = 4.44, SD = .82); t(1,067) = 4.81, p = .000. These results suggest that the self-paced orientation course did significantly change student perceived technology competencies in self-confidence, proficiency, benefits, integration in learning, and motivation in using computer technologies for online learning tasks.

In terms of the construct of social competencies with instructors, there was a significant difference in being able to *clearly ask my instructor questions*, pretest (M = 4.30, SD = .82) and posttest (M = 4.61, SD = .65); t(1,067) = 6.79, p = .000. A significance difference was found in being able to *initiate discussions with the instructor*, pretest (M = 4.12, SD = .91) and posttest (M = 4.53, SD = .70), t(1,067) = 8.28, p = .000. The competency of *seeking help from instructor when needed* increased after the posttest with a significant difference, pretest (M = 4.38, SD = .79) and posttest (M = 4.62, SD = .64); t(1,067) = 5.49, p = .000. A significant difference was also found in *timely informing the instructor when unexpected situations arise*, pretest (M = 4.38, SD = .80) and posttest (M = 4.63, SD = .62), t(1,067) = 8.24, p = .000. There was also a significant difference in the increased competency of *expressing my opinions to instructor respectfully*, pretest (M = 4.39, SD = .79) and posttest (M = 4.65, SD = .58), t(1,067) = 6.57, p = .000.

Table 3

Pretest Posttest Mean and Standard Deviation

Factors	Items	*M*		*SD*	
Technical competencies	TechComp1	4.44	4.54*	.75	.72*
	TechComp2	4.23	4.41*	.87	.78*
	TechComp3	4.58	4.61*	.66	.65*
	TechComp4	4.34	4.52*	.79	.69*
	TechComp5	4.40	4.55*	.74	.67*
	TechComp6	4.19	4.44*	.87	.82*
Social competencies with instructor	SocialComp-Instructor1	4.30	4.61*	.82	.65*
	SocialComp-Instructor2	4.12	4.53*	.91	.70*
	SocialComp-Instructor3	4.38	4.62*	.79	.64*
	SocialComp-Instructor4	4.38	4.63*	.80	.62*
	SocialComp-Instructor5	4.39	4.65*	.79	.58*
Social competencies with classmates	SocialCompPeers1	3.15	3.81*	1.19	1.10*
	SocialCompPeers2	3.41	4.09*	1.16	1.02*
	SocialCompPeers3	3.81	4.29*	.99	.86*
	SocialCompPeers4	3.60	4.13*	1.11	.98*
	SocialCompPeers5	4.18	4.52*	.98	.72*
Communication competencies	CommComp1	4.43	4.61*	.73	.61*
	CommComp2	4.48	4.60*	.68	.62*
	CommComp3	4.48	4.62*	.66	.61*
	CommComp4	4.44	4.59*	.69	.65*

Note. * = Posttest

For the construct *of social competencies with classmates*, there was a significant difference in *developing friendship with my classmates*, pretest (M = 3.15, SD = 1.19) and posttest (M = 3.81, SD = 1.10), t(1,067) = 9.42, p = .000. A significant difference was found in *paying attention to other students' social actions,* pretest (M = 3.41, SD = 1.16) and posttest (M = 4.09, SD = 1.02); t(1,067) = 10.14, p = .000. The increased competency in *applying different social interaction skills depending on situations* was found having a significant difference, pretest (M = 3.81, SD = .99) and posttest (M = 4.29, SD = .86); t(1,067) = 8.44, p = .000. A significant difference was also found in the increased competency of *initiating social interaction with classmates*, pretest (M = 3.60, SD = 1.11) and posttest (M = 4.13, SD = .98); t(1,067) = 8.24, p = .000. There was also a significant difference in increased competency of *socially interacting with other students with respect*, pretest (M = 4.18, SD = .98) and posttest (M = 4.52, SD = .72); t(1,067) = 6.57, p = .000.

Regarding the construct of *communication competencies*, there was a significant difference in the increased competency in feeling *comfortable expressing my opinion in writing to others*, pretest (M = 4.43, SD = .73) and posttest (M = 4.61, SD = .61); t(1,067) = 4.28, p = .000. A significance difference was also found in feeling *comfortable responding to other people's ideas*, pretest (M = 4.48, SD = .68) and posttest (M = 4.60, SD = .62); t(1,067) = 3.07, p = .002. The increased competency in *expressing my opinion in writing so that others understand what I mean* was also found of significant difference, pretest (M = 4.48, SD = .66) and posttest (M = 4.62, SD =.61); t(1,067) = 3.68, p = .000. There was also a significant difference in *giving constructive and proactive feedback to others even when I disagree*, pretest (M = 4.44, SD = .69) and posttest (M = 4.59, SD = .65); t(1,067) = 3.76, p = .000.

The t-test statistical comparison results indicated statistically significant differences in changed SOLR competencies for 19 items, with p < .05, after taking the orientation course. The increase for one item was not significant—that is, *I feel comfortable using computers*.

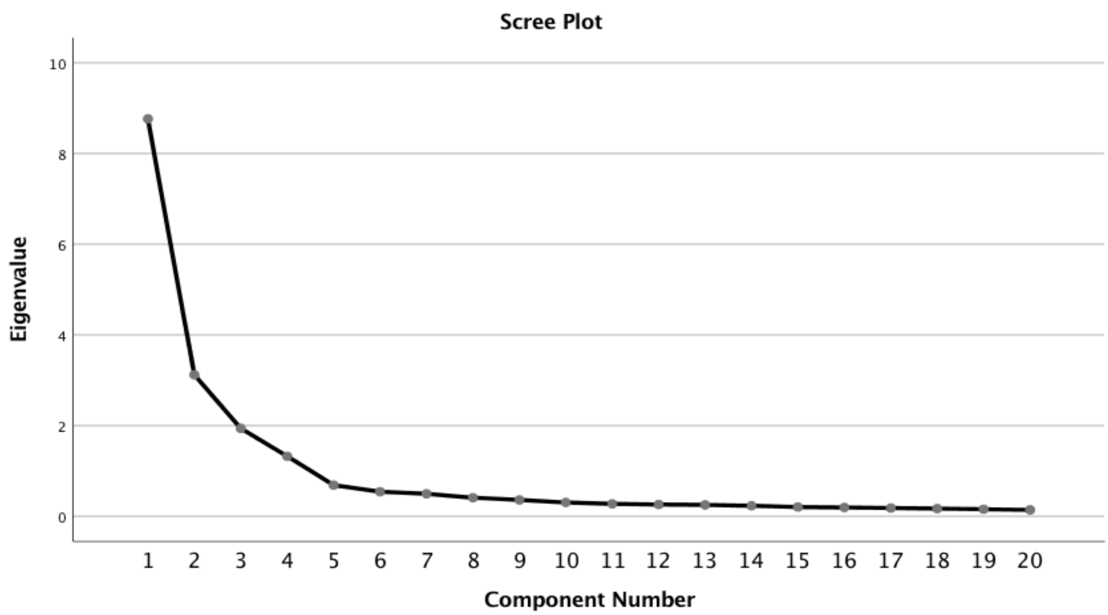

Figure 2. Scree plot of SOLR pretest EFA.

Statistical analysis results with EFA for both pretest and posttest SOLR. The EFA started with an initial analysis of the Kaiser-Meyer-Olkin (KMO) measure of sample adequacy (Meyers, Gamst, & Guarino, 2006). The KMO of pretest result was .92, indicating that the data were suitable for an EFA analysis. Similarly, Bartlett's test of sphericity was significant, $\chi^2(190) = 7{,}238.25$ (p < .001), indicating sufficient correlation between the variables for further analysis. Communalities were fairly high for each of the 20 items, with a range of .55 to .83. A four-factor structure was clear after a principal component analysis with eigenvalues greater than 1.0, as shown in the scree plot (Figure 2). The four factors accounted for 75.7% of the total variance. Factor 1, the six items of technical competencies (eigenvalue = 8.76), accounted for 43.8% of the variance; Factor 2, the five-item social competencies with classmates (eigenvalue = 3.12) accounted for 15.6% of the variance; Factor 3, the five-item social competencies with instructor (eigenvalue = 1.94) accounted for 9.69% of the variance; Factor 4, the four-item communication competencies (eigenvalue = 1.32) accounted for 6.61% of the variance.

For the EFA of posttest responses, the KMO was .95. Similarly, Bartlett's test of sphericity was significant, $\chi^2(190) = 12{,}394.22$ ($p < .001$). Communalities were high for each of the 20 items, with a range of .60 to .85. A three-factor structure was generated after a principal component analysis with eigenvalues greater than 1.0 (Figure 3). The three factors accounted for 75.4% of the total variance. Factor 1, the nine-item combined social competencies with instructor and communication competencies (eigenvalue = 11.46) accounted for 57.3% of the variance; Factor 2, the six-item technical competencies (eigenvalue = 2.02) accounted for 10.13 of the variance; Factor 3, the five-item social competencies with classmates (eigenvalue = 1.59) accounted for 7.95% of the variance.

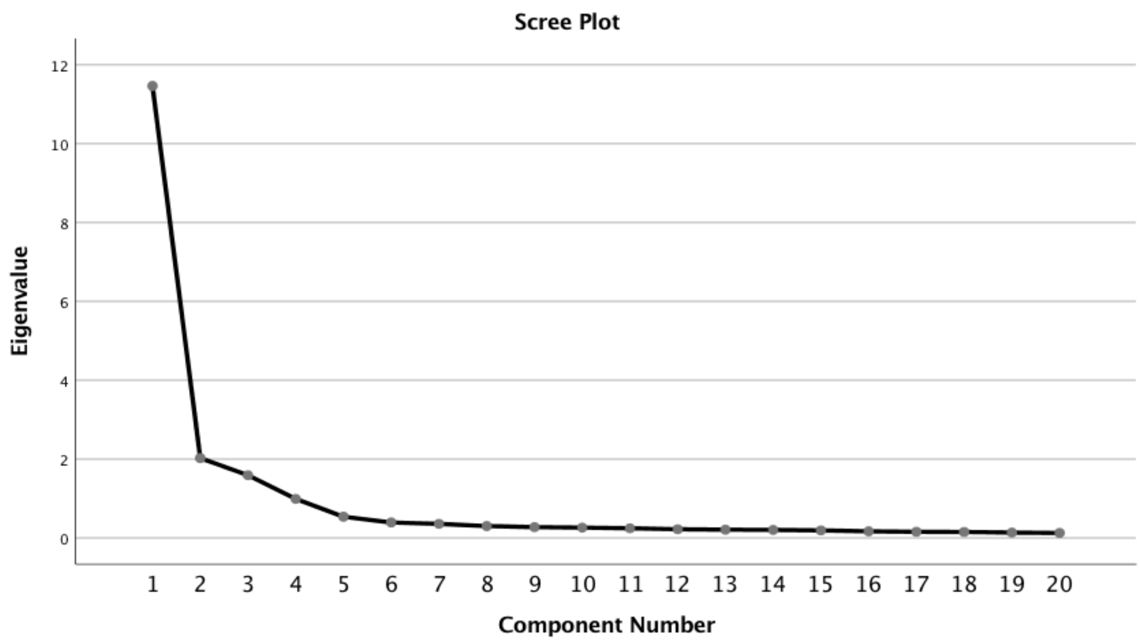

Figure 3. Scree plot of SOLR posttest EFA.

Reliability of the instruments. The Cronbach alphas of the instrument through the pretest (n = 445) and discrete constructs were all above .90, with the 20-item SOLR alpha = .925, six-item technical competency alpha = .922, five-item social competency with instructor alpha = .905, five-item social competency with classmates alpha = 915, and four-item communication competency alpha = .926. The Cronbach alphas of the instrument through the posttest (n = 624) and discrete constructs were all above .90 as well. Since the structure of the SOLR changed to three constructs, the reliability coefficients indicated as the 20-item SOLR coefficient = .955, six-item technical competency coefficient = .941, nine-item social competencies with instructor and communication coefficient = .951, and five-item social competency with classmates coefficient = .914.

Conclusion and Discussion

The key findings of this research were threefold. First of all, this self-paced asynchronous orientation course improved students' online learning readiness in social, technical, and communication domains. Statistically significant improvement was found for 19 out of 20 competencies, except for TechCompetency3: *I feel comfortable using computers*. The SOLR items provided consistent results and meaningful structure for research inferences as a measurement of online learning readiness (Fraenkel, Wallen, & Hyun, 2015). The reliability coefficients for each subscale and the SOLR as a whole in the pretest and posttest were high ($\alpha > .90$). Secondly, student perception of needing peer interaction merged with student–instructor interaction. This indicated the effects of the highly structured nature of this self-directed online orientation course. Students learned the content as guided by the predesigned structure, interacted primarily with the content and one instructor, and perhaps chose not to interact with other peers through online discussion. This was reflected in the changes in the formation of the SOLR constructs. The items loaded to four factors in the pretest, while they reloaded to three factors in the posttest, with nine items of social competencies with instructor and communication competencies loading to one factor. Thirdly, the SOLR instrument (Yu & Richardson, 2015; Yu, 2018) could be used as an evaluative instrument for the design of online orientation courses.

The response results related to *comfort of using computers* may be related to the prevalence of using computers to perform learning tasks. In a 2005 study of 4,374 college-age students from 13 institutions, 96.4% reported using computers for class activities (Kvavik, 2005). The 2017 EDUCAUSE Center for Analysis and Research (ECAR) study reported that 95% of undergraduate students owned a laptop, and nearly all students had more than one device (Brooks & Pomerantz, 2017). The combined loading of social competencies with instructor and communication competencies items may be caused by the self-paced nature of the orientation course. Peer interaction in the course communication was not feasible with the volunteering participation. Participants solely interacted with the course and an implicit general instructor, learning LMS and computer literacy and institution support information, performing online communication etiquette with videoconferencing simulation, and completing time-management tasks.

This study has provided evidence of the impact of orientation courses for students taking online courses. It has confirmed the need for online social competency, study strategy, technical, and communication dimensions in the instructional design of online orientations. The study has also provided an evaluation of the use of the SOLR instrument, which is very important when evaluation instruments and methods need validity and reliability evidence (Farid, 2014). Beyond furthering Yu and Richardson's study (2015), the results of this study support the reuse of SOLR for evaluation research, and planning for online student support. The pretest and posttest comparison provides statistical evidence for instructional design enhancement in designing orientation content for online learning.

There are two limitations to this study. One is the sampling being limited to one institution and one pretest and posttest; so the results are not meant to be generalizable. As a major portion of an educational design research, this was just one of multiple subcycles (McKenney & Reeves, 2019). More cycles with systematic documentation would make the results more generalizable. The second limitation is that the study was deployed by one designer and researcher who also managed the self-paced course. A triangulation of data collection, such as interviews with students, could enhance the study. A closer connection between the orientation with the actual online courses would generate more customized results (Carruth et al., 2010; Creswell & Creswell, 2018; van Rooij & Zirkle, 2016).

Despite these limitations, this study can offer implications for practice in the design of online learning orientations and related evaluation practices. Because the ubiquitous role of online learning in connecting traditional education with professional and continued education, the social competency developed through peer discourses is critical. With limited resources from academic-program-offering institutions, open-access communication platforms might be a consideration in the orientation design to connect student peers. In programs that provide the majority of coursework online, group projects can be designed as an integral part of courses and throughout the program. Evaluative practices, informal or formal, can be planned in parallel with such design so that the documentation can be complete and intentional.

Future research related to the design and evaluation of online learning orientation programs presents many opportunities and potential impacts. As more and more online programs are launched to meet the needs of online enrollment, retention improvement, degree completion, and lifelong learning, online learning orientation is becoming the cornerstone of building a successful learning path. Evolving research and design can expand to include online counseling services for adult learners (Robichaud, 2016), to be inclusive with accessibility and universal design considerations (van Rooij & Zirkle, 2016), to partner with institutional-level policy making and student affairs (van Rooij & Zirkle, 2016), and to collaborate more closely with instructional personnel who are actually conducting online courses, curriculum, and programs (van Rooij & Zirkle, 2016). Connecting the design of online learning orientation with students' career-related work is also a future research direction that can meet the needs of working professionals pursuing academic fulfillment (Watts, 2019).

References

Baek, E. O., Evans, M. A., & Barab, S. A. (2013). Activity theory as a lens for characterizing the participatory unit. In D. Jonassen & M. Driscoll (Eds.), *Handbook of research on educational communications and technology* (2nd ed., pp. 208–223). New York: Routledge.

Bandura, A. (1989). The multidimensional self-efficacy scales (Unpublished test). Stanford University, Stanford, CA.

Beckford, M. M. (2015). The online learning orientation session: An overlooked retention tool. *Distance Learning*, *12*(4), 43.

Benson, R., & Samarawickrema, G. (2009). Addressing the context of e-learning: Using transactional distance theory to inform design. *Distance Education*, *30*(1), 5–21.

Brooks, D. C., & Pomerantz, J. (2017). *ECAR study of undergraduate students and information technology*.

Carruth, A. K., Broussard, P. C., Waldmeier, V. P., Gauthier, D. M., & Mixon, G. (2010). Graduate nursing online orientation course: Transitioning for success. *Journal of Nursing Education*, *49*(12), 687–690.

Chan, M. (2017). Have you been oriented? An analysis of new student orientation and e-orientation programs at US community colleges. *College and University*, *92*(2), 12.

Cheon, J., Lee, S., Crooks, S. M., & Song, J. (2012). An investigation of mobile learning readiness in higher education based on the theory of planned behavior. *Computers & Education*, *59*(3), 1054–1064.

Cho, M. H. (2012). Online student orientation in higher education: A developmental study. *Educational Technology Research and Development*, *60*(6), 1051–1069.

Cho, M. H., & Heron, M. L. (2015). Self-regulated learning: The role of motivation, emotion, and use of learning strategies in students' learning experiences in a self-paced online mathematics course. *Distance Education*, *36*(1), 80–99.

Cigdem, H., & Ozturk, M. (2016). Critical components of online learning readiness and their relationships with learner achievement. *Turkish Online Journal of Distance Education*.

Coleman, A., & Coleman, M. F. (2013). Activity theory framework: A basis for e-health readiness assessment in health institutions. *Journal of Communication*, *4*(2), 95–100.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, CA: Sage publications.

Dabbagh, N. (2007). The online learner: Characteristics and pedagogical implications. *Contemporary Issues in Technology and Teacher Education*, *7*(3), 217–226.

Diamond, R. M. (2011). *Designing and assessing courses and curricula: A practical guide*. John Wiley & Sons.

Dray, B. J., Lowenthal, P. R., Miszkiewicz, M. J., Ruiz-Primo, M. A., & Marczynski, K. (2011). Developing an instrument to assess student readiness for online learning: A validation study. *Distance Education*, *32*(1), 29–47.

Entwistle, N., & Ramsden, P. (2015). *Understanding student learning*. Routledge.

Farid, A. (2014). Student online readiness assessment tools: A systematic review approach. *Electronic Journal of e-Learning*, *12*(4), 375–382.

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2015). *How to design and evaluate research in education* (9th ed.). New York: McGraw-Hill.

Gilmore, M., & Lyons, E. M. (2012). Nursing 911: An orientation program to improve retention of online RN-BSN students. *Nursing Education Perspectives*, *33*(1), 45–47.

Glazer, H. R., & Murphy, J. A. (2015). Optimizing success: A model for persistence in online education. *American Journal of Distance Education*, *29*(2), 135–144.

Gray, B. (2004). Informal learning in an online community of practice. *Journal of Distance Education*, *19*(1), 20–35.

Horzum, M. B., Kaymak, Z. D., & Gungoren, O. C. (2015). Structural equation modeling towards online learning readiness, academic motivations, and perceived learning. *Educational Sciences: Theory and Practice*, *15*(3), 759–770.

Hung, M. L., Chou, C., Chen, C. H., & Own, Z. Y. (2010). Learner readiness for online learning: Scale development and student perceptions. *Computers & Education*, *55*(3), 1080–1090.

Johnson, R., Stewart, C., & Bachman, C. (2015). What drives students to complete online courses? What drives faculty to teach online? Validating a measure of motivation orientation in university students and faculty. *Interactive Learning Environments*, *23*(4), 528–543.

Kaptelinin, V., & Nardi, B. A. (2006). *Acting with technology: Activity theory and interaction design*. MIT press.

Kauffman, H. (2015). A review of predictive factors of student success in and satisfaction with online learning. *Research in Learning Technology*, *23*. https://doi.org/10.3402/rlt.v23.26507

Kaymak, D. Z., & Horzum, M. B. (2013). Relationship between online learning readiness and structure and interaction of online learning students. *Educational Sciences: Theory and Practice*, *13*(3), 1792–1797.

Kim, J., Kwon, Y., & Cho, D. (2011). Investigating factors that influence social presence and learning outcomes in distance higher education. *Computers & Education*, *57*(2), 1512–1520.

Kvavik, R. B. (2005). Convenience, communications, and control: How students use technology. *Educating the Net Generation, 1*(2005), 7-1.

Lee, S. M. (2014). The relationships between higher order thinking skills, cognitive density, and social presence in online learning. *The Internet and Higher Education*, *21*, 41–52.

Lieberman, M. (2017, September 13). Orientation programs set online learners success. *Inside Higher Ed*. Retrieved from https://www.insidehighered.com/digital-learning/article/2017/09/13/orientation-programs-set-online-learners-success

Liu, J. C., & Adams, A. (2017). Design of online student orientation with conceptual and procedural scaffolding. In F. Q. Lai & J. D. Lehman (Eds.), *Learning and knowledge analytics in open education* (pp. 41–68). New York, NY: Springer.

Liu, J. C., & Roberts-Kaye, E. (2016). Preparing online learning readiness with learner-content interaction: Design for scaffolding self-regulated learning. In L. Kyei-Blankson, J. Blankson, E. Ntuli, and C. Agyeman (Eds.), *Handbook of research on strategic management of interaction, presence and participation in online courses* (pp. 216–243). Hershey, PA: IGI Global.

McKenney, S., & Reeves, T. C. (2019). *Conducting educational design research*. Routledge.

Moore, M. G., & Kearsley, G. (2011). *Distance education: A systems view of online learning*. Cengage Learning.

Mosa, A. A., Mahrin, M. N. bin, & Ibrrahim, R. (2016). Technological aspects of e-learning readiness in higher education: A review of the literature. *Computer and Information Science*, *9*(1), 113–127.

Online Learning Consortium. (2016). *Quality scorecard for the administration of online programs*.

Pintrich, P. R., Garcia, T., McKeachie, W. J., & Smith, D. A. (1991). *Motivated strategies for learning questionnaire*. Regents of the University of Michigan.

Robichaud, W. (2016). Orientation programs to increase retention in online community college courses. *Distance Learning*, *13*(2), 57–64.

Scagnoli, N. I. (2001). Student orientations for online programs. *Journal of Research on Technology in Education*, *34*(1), 19–27.

Scanlon, E., & Issroff, K. (2005). Activity theory and higher education: Evaluating learning technologies. *Journal of Computer Assisted Learning*, *21*(6), 430–439.

Seaman, J. E., Allen, I. E., & Seaman, J. (2018). *Grade increase: Tracking distance education in the United States*. Babson Survey Research Group.

Smith, P. J., Murphy, K. L., & Mahoney, S. E. (2003). Towards identifying factors underlying readiness for online learning: An exploratory study. *Distance Education*, *24*(1), 57–67.

Smith, P. L., & Ragan, T. J. (2005). *Instructional design*. John Wiley & Sons.

So, H. J., & Brush, T. A. (2008). Student perceptions of collaborative learning, social presence and satisfaction in a blended learning environment: Relationships and critical factors. *Computers & Education*, *51*(1), 318–336.

Swan, K. (2001). Virtual interaction: Design factors affecting student satisfaction and perceived learning in asynchronous online courses. *Distance Education*, *22*(2), 306–331.

Swan, K. (2002). Building learning communities in online courses: The importance of interaction. *Education, Communication & Information*, *2*(1), 23–49.

Taylor, J. M., Dunn, M., & Winn, S. K. (2015). Innovative orientation leads to improved success in online courses. *Online Learning*, *19*(4), n4.

Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research, 45*(1), 89–125.

Tomei, L., Hagel, H., Rineer, A., Mastandrea, L. A., & Scolon, J. (2009). Do orientation materials help students successfully complete online courses? *International Journal of Information and Communication Technology Education (IJICTE)*, *5*(2), 73–89.

Uden, L. (2006). Activity theory for designing mobile learning. *International Journal of Mobile Learning and Organization*, *1*(1), 81–102.

van Rooij, S. W., & Zirkle, K. (2016). Balancing pedagogy, student readiness and accessibility: A case study in collaborative online course development. *The Internet and Higher Education*, *28*, 1–7.

Watts, J. (2019). Assessing an online student orientation: Impacts on retention, satisfaction, and student learning. *Technical Communication Quarterly*, 1–17.

Williams, P. E., & Hellman, C. M. (2004). Differences in self-regulation for online learning between first-and second-generation college students. *Research in Higher Education*, *45*(1), 71–82.

Yilmaz, R. (2017). Exploring the role of e-learning readiness on student satisfaction and motivation in flipped classroom. *Computers in Human Behavior*, *70*, 251–260.

Yu, T. (2018). Examining construct validity of the Student Online Learning Readiness (SOLR) instrument using confirmatory factor analysis. *Online Learning*, *22*(4), 277–288.

Yu, T., & Richardson, J. C. (2015). An exploratory factor analysis and reliability analysis of the Student Online Learning Readiness (SOLR) instrument. *Online Learning*, *19*(5), 120–141.

Yukselturk, E., & Bulut, S. (2007). Predictors for student success in an online course. *Journal of Educational Technology & Society*, *10*(2), 71–83.

Characterizing MOOC Pedagogies: Exploring Tools and Methods for Learning Designers and Researchers

Rebecca M. Quintana and Yuanru Tan
University of Michigan

Abstract
We explore new tools and methods for learning designers and researchers to characterize pedagogical approaches that are applied to the design of MOOCs. This paper makes three main contributions to literature on MOOC design and evaluation: (1) an Expanded Assessing MOOC Pedagogies instrument for use by learning designers and researchers within their own contexts, (2) a demonstration of how nearest neighbor cluster analysis can be used to identify pedagogically similar MOOCs, and (3) a preliminary analysis of the clusters to account for features and factors that contribute to pedagogical similarity of MOOCs within clusters. This work advances research in the development of MOOC typologies, to allow learning designers and researchers to ask nuanced questions about pedagogical aspects of MOOC design.

Keywords: massive open online courses (MOOCs), assessment instrument, pedagogy, clustering methods

Quintana, R.M., & Tan, Y. (2019). Characterizing MOOC pedagogies: Exploring tools and methods for learning designers and researchers. *Online Learning, 23*(4), 62-84. doi:10.24059/olj.v23i4.2084

Characterizing MOOC Pedagogies: Exploring Tools and Methods for Learning Designers and Researchers

For many researchers and designers who analyze massive open online courses (MOOCs), it is essential to understand the pedagogical perspectives that are instantiated in the design of a course. Despite outward appearances, MOOCs are not a "single monolithic entity" (Major & Blackmon, 2016, p. 12), and great variation exists within the form. The constraints on design imposed by course delivery platforms are well known (Head, 2017), yet these restrictions do not necessarily result in a uniform approach to design. Many instructional teams have resisted a templated approach to design (Seaton, 2016) and have leveraged platform features to develop learning experiences that are mapped to learning goals (Najafi, Rolheiser, Harrison, & Håklev, 2015). Therefore, since MOOC designs and the pedagogical approaches that underlie them are divergent (Admiraal, Huisman, & van de Ven, 2014; Quintana, Tan, & Korf, 2018), it is important for learning designers and researchers to be able to meaningfully characterize these pedagogies. As Swan, Day, Bogle, and van Prooyen (2014) advocated, "finding mechanisms to distinguish among MOOCs or evaluate their underlying components or characteristics should be the first step in the research" (p. 75). By exploring the range of pedagogies that exist within MOOCs, learning designers and researchers can better understand design outcomes, including (1) assessing alignment with design goals and outcomes and (2) understanding how one course compares to another (e.g., when multiple courses exist together within a series).

Yet, developing methods to systematically articulate learning design similarities and differences within MOOCs is challenging. Some MOOC researchers have endeavored to provide a holistic characterization of the instructional design of a course by studying its composition—the type, frequency, and arrangement of course elements (Quintana, Tan, & Korf, 2018; Seaton, 2016). Researchers identified various structures through a process of abstraction and relied on the separation of course content and its internal structure (Davis, Seaton, Hauff, & Houben, 2018). This approach allows designers and researchers to make high-level observations but does not offer insight into underlying approaches to design. Other researchers have sought to distinguish between types of MOOCs, making determinations about how they are similar and different from each other *pedagogically* (Major & Blackmon, 2016). The development of the Assessing MOOC Pedagogies (AMP) instrument represents a major advance in the study of MOOC pedagogies (Swan, Day, Bogle, & van Prooyen, 2014; Swan, Day, Bogle, & van Prooyen, 2015; Swan, Day, & Bogle, 2016). The AMP instrument was designed to characterize the pedagogical design that underlies a MOOC across 10 relevant dimensions (Swan et al., 2015). This approach is concerned with aspects that directly affect learning, such as approach to content presentation and the role of the learner within the course (Reeves, 1996). The AMP tool demonstrates potential to allow its users to make comparisons across multiple MOOCs. For instance, courses that exhibit similar dimensions could be grouped together, which could help researchers articulate a range of pedagogical typologies. Such progress could aid in MOOC design and evaluation and allow researchers to “ask meaningful questions” of these courses (Major & Blackmon, 2016, p. 20).

However, there are remaining challenges—the approaches that are outlined in the AMP literature (e.g., Swan et al., 2015) do not specify precisely *how* learning designers and researchers can make use of the instrument. There are still important details lacking, such as clear explanations of what differentiates one score from another within each dimension of the instrument. Using the present version of the instrument, reviewers would be hard-pressed to achieve consistency in scoring, leading to differences in understanding of a MOOC’s design and low interrater reliability (IRR; i.e., the degree of agreement among multiple raters). Additionally, although the AMP literature indicates that pedagogically similar courses can be grouped once they have been scored using the instrument, there are also no clear guidelines on how to do this in new contexts (i.e., outside of the original studies).

Objectives

What is needed are nuanced expansions to the AMP instrument to provide more specific methods for understanding similarities and differences in design in an effort to support MOOC design and evaluation activities. Our overarching goal was to develop tools and methods for characterizing the pedagogical design of MOOCs, primarily to support learning designers and researchers who want to understand and articulate the pedagogical dimensions that are represented in MOOCs.

To achieve our overarching goal, we identified three subgoals:

- **Expand the AMP instrument.** Our goal was to explore how Swan et al.’s (2015) AMP instrument can be more easily adopted by researchers and practitioners through elaboration and potential modification.

- **Use the Expanded AMP instrument to characterize the design of a MOOC.** Our goal was to employ the updated AMP instrument to assess the pedagogical design of a set of MOOCs, toward identifying clusters of pedagogically similar courses.
- **Use the Expanded AMP instrument for larger MOOC comparison.** Our goal was to use the Expanded AMP instrument to develop and analyze MOOC clusters to understand how underlying features and factors make one group of courses different from another.

Given these objectives, we articulated the following research questions:

1. What elaboration and/or modifications are needed for learning designers and researchers to use Swan et al.'s (2015) AMP instrument to characterize the pedagogical design of MOOCs?
2. What features do pedagogically similar MOOCs share? What factors may contribute to this congruence?

Perspectives

The AMP instrument was initially developed to examine MOOCs that were being considered for college credit (Swan et al., 2015; Swan, Day, & Bogle, 2016). It was based on a pedagogical assessment tool for computer-based education developed by Reeves (1996). Swan et al. (2015) retained six of 14 dimensions: epistemology, role of the teacher, experiential validity (renamed "focus of activities"), cooperative learning, accommodation of individual differences, and user role. Swan et al. (2015) added four new dimensions to the AMP instrument that are relevant to the MOOC context: structure, approach to content, feedback, and activities and assessments. Swan, Day, Bogle, and van Prooyen (2014) explained that the AMP instrument is not intended to provide a rating of the quality of a MOOC but rather to characterize or describe the pedagogical approach that is evident through a MOOC's design.

We detail each dimension of the original AMP instrument:

- **Epistemology.** The epistemology dimension describes the extent to which instruction follows an objectivist approach or constructivist approach to instruction (Jonassen, 1991). Courses designed following an objectivist approach present instructional materials that are oriented toward acquiring knowledge and meeting course goals, while courses designed following a constructivist approach aim to create a rich learning environment where learners have opportunities to generate knowledge through social interaction with peers and draw on external resources in addition to predefined instructional materials.

- **Role of teacher.** The role of teacher dimension discerns the extent to which a course is teacher centered or student centered. In a teacher-centered course (Yuen & Hau, 2006), the majority of the instruction would be characterized as didactic. The instructor has a central role in the presentation of content and does not generally promote experiential learning or learner-to-learner interaction. Conversely, in a student-centered course (Zeki & Güneyli, 2014), the learning environment is designed to allow learners to showcase knowledge gained in multiple ways, through robust discussion and through peer-to-peer interaction facilitated by the instructor.

- **Focus of activities.** The focus of activities dimension sheds light on the process learners take to arrive at a solution to problems within the course. An activity is viewed as convergent if all answers are either right or wrong and there are no alternatives; otherwise it is divergent.

- **Structure.** The structure dimension describes the level of consistency within and across course units and subunits (i.e., weeks and lessons). It also evaluates the clarity of wayfinding information within a course. Highly structured courses are characterized by predictable course components patterns (e.g., quantity and sequence of components), and clear directions and navigational elements. This information provides learners with details about upcoming content and tasks, providing them with an indication of what to expect next.
- **Approach to content.** The approach to content dimension examines the extent to which course content is presented in a concrete or an abstract way. The focus of this dimension is not on whether the content itself is concrete or abstract but on how the instructor chooses to deliver and explain the content. In an abstract content presentation, material is presented as if it is self-explanatory. Concrete content presentation involves providing real-world examples to demonstrate a topic's application to everyday life, thereby making connections to learners' everyday lives.
- **Feedback.** The feedback dimension describes both the *frequency* with which learners receive feedback (frequently or infrequently) and the *types* of feedback learners receive (constructive or unclear). In the context of a MOOC, learners can have the opportunity to receive multiple forms of feedback within a course, both from the instructor and from their peers. When feedback is frequent, multiple opportunities for practice and graded assessments exist within a course. Constructive feedback can take different forms, including (1) elaboration on multiple-choice answers, which is written in advance by the instructor, and (2) personalized comments, given by other learners in the context of peer-graded assignments. Both of these types of feedback can supply information about whether an answer is correct or incorrect. They also offer additional information that learners can use to address and improve specific aspects of their assignment submissions.
- **Cooperative learning.** The cooperative learning dimension describes the extent to which cooperative learning (Roschelle & Teasley, 1995) is unsupported or integral within the design of a course. In a MOOC, cooperative learning can be instantiated in various course activities, including group projects, discussion board activities, and other forms of collaborative work among learners.
- **Accommodation of individual difference.** The accommodation of individual differences dimension describes the extent to which the design of a MOOC accommodates a wide range of individual differences, such as physical or cognitive disabilities. In a multifaceted course where accommodation of individual difference is supported, learners are able to present answers or outcomes through multiple means of representation, thereby directing their own learning (Burgstahler & Cory, 2010; Rose & Meyer, 2002). Course content can be accessed through more than one format (e.g., video, audio, or text).
- **Activities/assessments.** The activities/assessments dimension focuses on the characteristics of tasks within a course, specifically the context of the tasks: artificial or authentic. Tasks situated in artificial contexts usually have no strong connection to real life and in most cases only require declarative knowledge, such as the memorization of certain formulas and definitions (Wiggins & McTighe, 2005). Tasks situated in authentic contexts usually involve higher levels of Bloom's taxonomy (Anderson & Krathwohl, 2001), such as *create*, *apply*, and *evaluate*. By engaging in these tasks, learners have the opportunity to

reflect on the connection between the task itself and its application in real life (Herrington, Reeves, & Oliver, 2006).

- **User role.** The user role dimension discerns whether the course design promotes a passive or generative role for the learner. If the learner's role is passive, they primarily access content developed by the instructor. If the learner's role is generative, they may provide additional examples or links to external materials, enriching content developed by the instructor.

The AMP tool has been taken up by researchers that seek to characterize the pedagogies of individual MOOCs (e.g., Fan, 2017; Skrypnyk, de Vries, & Hennis, 2015). Skrypnyk et al. (2015) used the AMP tool to assess pedagogical dimensions of five MOOCs and found that they all differed in their learning design approach, such as the degree to which the designs were instructor or learner centered. In another example, Fan (2017) used the AMP instrument to assess pedagogical characteristics of five STEM and five non-STEM MOOCs from XuetangX and found differences between the learning design approach of STEM versus non-STEM courses. Swan et al. (2014) used the AMP tool and showed that MOOC pedagogies vary according to the course delivery platform, with courses hosted on Coursera being more instructor centered than courses on the Udacity platform. These MOOCs replicated traditional forms of instruction, including a lecture-based delivery mode followed by traditional assessments (e.g., multiple-choice quizzes).

Researchers have also made significant strides in grouping MOOCs that are similar, toward developing typologies. Swan et al. (2015) used the AMP instrument to derive three MOOC types from their analysis of 17 MOOCs: (1) participation oriented (MOOCs that provide many opportunities for learner interaction with content and other learners), (2) acquisition oriented (MOOCs that focus primarily on content delivery and automated assessment), and (3) self-directed (MOOCs that allow learners to determine their own pathway through a course). At the structural level, Davis et al. (2018) explored methods for clustering MOOCs that exhibit similar sequences of course elements (e.g., videos, readings, discussion prompts). They sought to use quantitative methods, such as transition probabilities and trajectory mining, to measure differences between course designs, thereby allowing course designs to be classified in a scalable fashion.

Machine-learning clustering methods hold promise for systematically grouping *pedagogically similar* courses, although this application is currently not commonly observed within MOOCs. Clustering with machine learning has the advantage of being able to find quantitative, mathematical relationships between data and grouping these data based on these relationships without any biases external to the mathematical data itself (Jain, Murty, & Flynn, 1999). Through machine learning, researchers can often expedite their data analysis or find novel methods of perceiving sets of data based on pure mathematical relationships (e.g., Luo, Wang, & Zhang, 2003). An example of clustering in MOOC research can be found in Hicks, Roy, Shah, Douglas, Bermel, Diefes-Dux, and Madhavan's (2016) analysis regarding characteristics of fully engaged learners in a MOOC. They first used machine-learning clustering methods to group learners based on numerical clickstream data. Learners were divided in terms of click frequency, and those found by the algorithm to click the most in significantly distinct clusters were defined by the researchers as fully engaged. Through their use of machine learning, the researchers were able to group learners based only on quantitative behavioral data. In the present study, we used machine learning to group MOOCs based on the numerical data generated across 10 pedagogical dimensions as defined by the AMP tool (rather than learner data). This approach allowed us to create groups that were based on pedagogical similarities across courses without any other influences (e.g., researchers' knowledge of course goals, subject matter).

Materials and Methods

Our study was conducted in three phases (see Figure 1):

- **Phase 1:** After review of AMP literature, elaborate and/or modify the AMP instrument
- **Phase 2:** Review of 20 MOOCs to test the efficacy of the Expanded AMP instrument
- **Phase 3:** Cluster analysis of 20 MOOCs, using scores from the Expanded AMP instrument as data inputs

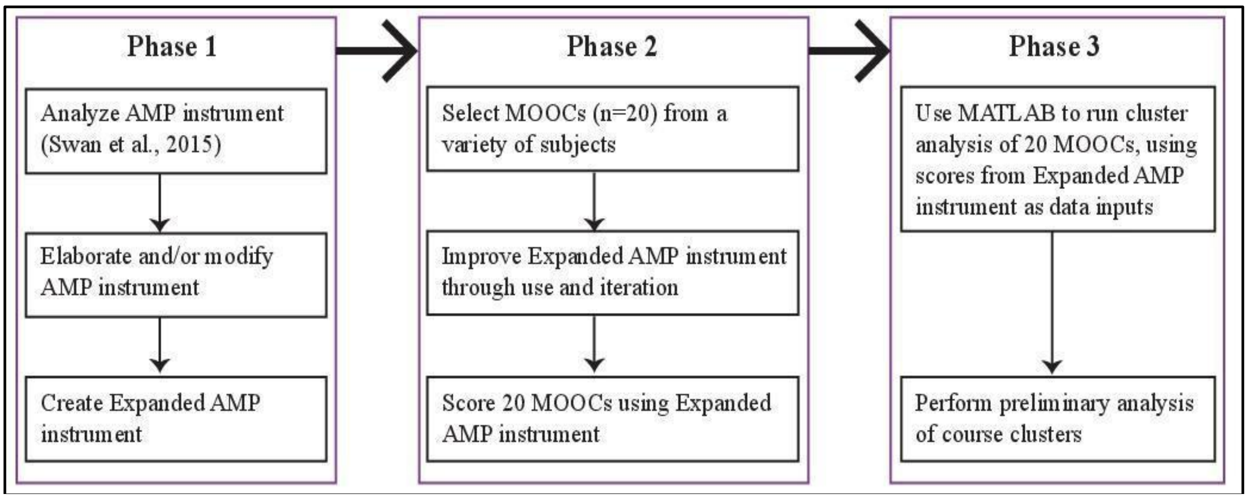

Figure 1. Flowchart depicting the three phases of study.

Phase 1

We used descriptions of the AMP tool (Swan et al., 2014; Swan et al., 2015; Swan et al., 2016) as a foundation for this work, taking careful note of all available details. As we have described, the AMP instrument consists of 10 dimensions, with a scale of 5 for each dimension. Each dimension is anchored by two poles (e.g., abstract and concrete in the approach to content dimension)—see Table 1. Five score levels (i.e., 1–5) relate to the *focus* of each dimension, rather than providing a numeric ranking. For instance, in the epistemology dimension, a score of 1 relates to a highly objectivist approach, and a score of 5 relates to a highly constructivist approach, with neither approach being ranked higher than the other.

Table 1

Dimension Names, Poles, and Ordering of Dimensions From Swan et al.'s (2015) Original AMP Instrument

Pedagogy dimension	Left pole	Right pole
Epistemology	Objectivist	Constructivist
Role of teacher	Teacher centered	Student centered
Focus of activities	Convergent	Divergent
Structure	Less structure	More structure
Approach to content	Concrete	Abstract
Feedback	Infrequent, unclear	Frequent, constructive
Cooperative learning	Unsupported	Integral
Accommodation of individual difference	Unsupported	Multifaceted
Activities/assessments	Artificial	Authentic
User role	Passive	Generative

Two reviewers conducted preliminary testing of the original AMP instrument on five MOOCs (not included in this study) and achieved poor consistency in scoring. Reviewers compared written rationales and discovered that there were discrepancies in their interpretations of the AMP instrument. Through an iterative process, these reviewers fine-tuned the instrument, making deletions, modifications, and elaborations, resulting in the Expanded AMP instrument.

Phase 2

For this study, we chose a sample of 20 MOOCs across a variety of subject areas, including data science (six), social science (three), science (one), health care (three), education (three), computer science (two), and business (two). The selected MOOCs were hosted on Coursera (Coursera, n.d.) and were developed at the authors' home institution over a 4-year time frame. We wanted to include a range of learning designs in our sample. Thus, we selected courses that were developed over a 4-year time frame to represent the course platform feature changes over time. We also selected courses from seven different subject domains to capture the potential differences in learning design caused by content domains.

Two reviewers independently coded three MOOCs from our sample using the Expanded AMP instrument. Initial IRR was 60%. Through discussion, reviewers resolved differences and updated the instrument. Reviewers coded an additional 30% of the sample and achieved IRR of 90%. The first reviewer coded the remaining 55% of the sample, including recoding the initial three test cases. At the end of Phase 2, all 20 MOOCs were coded. See Figure 2 for an example of the application of the AMP instrument to a data science MOOC.

Pedagogical dimension		**Score level**					
Structure	Unstructured	1	2	3	4	5	Structured
Approach to Content Presentation	Abstract	1	2	3	4	5	Concrete
Characteristics of Tasks	Artificial	1	2	3	4	5	Authentic
Feedback	Infrequent, unclear	1	2	3	4	5	Frequent, constructive
Characteristics of Evidence	Convergent	1	2	3	4	5	Divergent
Epistemology	Objectivist	1	2	3	4	5	Constructivist
Instructor Role	Instructor-centered	1	2	3	4	5	Learner-centered
Learner Role	Passive	1	2	3	4	5	Generative
Cooperative Learning	Unsupported	1	2	3	4	5	Integral
Accommodation of Individual Difference	Unsupported	1	2	3	4	5	Multi-faceted

Figure 2. Scored pedagogy dimensions of a data science MOOC using the Expanded AMP instrument.

Phase 3

In order to group MOOCs assessed with the AMP instrument, we chose to use machine learning to investigate what kinds of relations exist among the MOOCs that we analyzed. Through using machine-learning methods, we wanted to generate MOOC groups using scores from the 10 dimensions defined by the AMP tool without any influence from qualitative information about the course. We used MATLAB_R2018a, a numerical computing environment (MATLAB, 2018) to run our analysis. We applied nearest neighbor clustering methods (Philippe, Cojocaru-Mirédin, Duguay, & Blavette, 2010) to calculate the squared Euclidean distance (Dokmanic, Parhizkar, Ranieri, & Vetterli, 2015) between one course's scores on each dimension and every other course to locate the closest neighbors (i.e., courses that were most similar to each other). The squared Euclidean distance allowed the visual patterns in score levels, such as the one captured in Figure 2, to be represented in a quantifiable statistical measure, which further enabled the reviewers to investigate the pedagogical relationships between the 20 MOOCs as scored using the Expanded AMP instrument. With the value of the squared Euclidean distance on the 10 dimensions between the 20 courses, the nearest neighbor clustering methods allowed us to conduct an exhaustive search for the most similar courses and produced clusters based on the value of the squared Euclidean distance. The smaller the squared Euclidean distance was, the more similar the courses were. We performed a preliminary inductive analysis (Thomas, 2006) of the clusters toward understanding what *features* make groups of MOOCs similar (i.e., related to pedagogical design decisions) and what *factors* might contribute to the similarity of the groups (i.e., related to practical considerations). To perform this analysis, we identified prominent features of each cluster relating to pedagogical design decisions. We listed characteristics of courses within these clusters that set them apart from courses in other clusters, such as a focus on providing multiple opportunities for social interaction, an abundance of authentic examples and dramatizations, or a focus on asking learners to present declarative knowledge. To identify potential underlying factors that might influence the design of courses within a cluster, we listed key differentiating features relating to production time frame, team composition, or position of course within a series (if applicable).

Results

Expanded AMP Instrument

We made several substantial adjustments to the original AMP instrument to improve usability, including (1) standardizing and fine-tuning language; (2) modifying descriptions of score levels; (3) adding or elaborating on descriptions of score levels; (4) grouping related dimensions, thus changing the order of the dimensions from the original AMP instrument; (5) writing summaries of each dimension; (6) adding question prompts; and (7) adding a list of course elements that reviewers should focus on for each dimension. See Table 2 for details of these changes.

Table 2

Details and Examples of Our Modification/Elaboration of the Expanded AMP Instrument

Modification/ elaboration action	Description of change	Example(s)
1. Standardizing and fine-tuning language	Standardized and fine-tuned language of dimension names and pole names	We (a) flipped the pole names *Abstract* and *Concrete* to keep the focus of each side of the instrument consistent; we (b) changed the name of the *Approach to Content* dimension to *Approach to Content Presentation* so reviewers would deliberate about presentation approach rather than domain characteristics.
2. Modifying descriptions of score levels	Clarified focus of each dimension where (a) there appeared to be overlapping descriptions with other dimensions, (b) where we expected to see no variation from course to course, (c) and where reviewers were asked to "count" criteria to arrive at score level	We (a) removed "sequenced instruction" from the *Epistemology* dimension because it seemed to relate to the *Structure* dimension; we (b) removed "self-paced" from the *Role of Teacher*, because all Coursera MOOCs are self-paced; we (c) removed "count" criteria such as "2 of 4 criteria met."
3. Adding or elaborating criteria of score levels	Added or elaborated criteria of score levels (a) where they were missing and (b) where further clarification or explanation was needed	We (a) added the "frequency of opportunities for learners to get feedback" as an additional criterion in the *Feedback* dimension; we (b) further clarified "robust discussion is encouraged" by adding "if instructors have provided learners with specific directives to interact with other learners" in the *Instructor Role* dimension.
4. Grouping related dimensions	Reordered sequence of dimensions to create a more logical and intuitive flow and grouped related dimensions	We grouped *Characteristics of Tasks* with *Feedback*, *Characteristics of Evidence* with *Epistemology*, and *Instructor Role* with *Learner Role*.

5. Writing summaries of each dimension	Wrote summaries to introduce the goal of reviewing each dimension, to provide reviewers with specific goals and focus	For the *Feedback* dimension, we added, "This dimension asks reviewers to assess the characteristics and usefulness of the feedback provided (i.e., from instructor, peers, and platform) and the potential that it has to help learners improve performance on future tasks."
6. Adding question prompts	Added guiding question prompts that relate to the poles of each dimension	For the *Epistemology* dimension, we added, "Are instructional materials oriented towards acquiring knowledge? Are course goals predefined and absolute?" (objectivist approach) and "Is the instructional environment oriented towards generating knowledge through social interaction with peers? Is the learner voice evident through the construction of course goals?" (constructivist approach).
7. Adding a list of course elements that reviewers should focus on for each dimension	Added a list of course elements (e.g., quizzes, discussion prompts) that specifically relate to evidence required to score each dimension	For the *Characteristics of Evidence* dimension, we added "Quizzes" and "Peer-graded assignments."

We did not add or remove pedagogical dimensions or alter the number of score levels, which remained at 10 and five, respectively. See Figure 3 for an annotated view of the instructor dimension of the Expanded AMP tool. For each dimension, we identify four additions:

1. **Guiding question prompts related to the poles of each dimension.** These questions can help reviewers confirm whether a course is closer to one poll or the other for each dimension. The questions are structured such that they have "yes" or "no" answers. If the answer to a question is "yes," then this is a good indication that the course exemplifies qualities related to that pole. It is then up to the reviewer to decide how strong the evidence is in order to make a precise determination about the score level.
2. **Criteria of each level in each dimension.** Each score level includes a description of the characteristics that must be present in a course for it to be scored at that level.
3. **A summary statement to introduce the goal of reviewing this dimension.** This statement situates the dimension within the broader AMP instrument.
4. **Suggested course elements to be considered to find evidence of scoring this dimension.** These elements are not meant to be an exhaustive list, but they can direct reviewers where to look first within the course when scoring a particular dimension.

A complete set of all 10 dimensions of the Expanded AMP tool can be found in Appendix A.

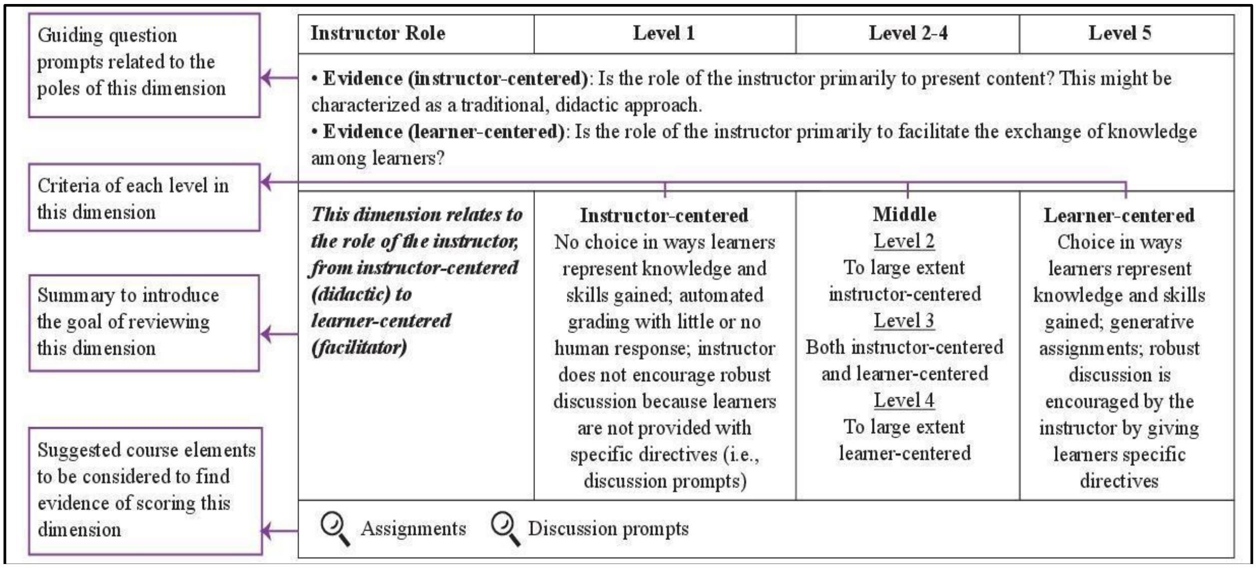

Figure 3. Annotated view of Instructor Role dimension (1 of 10) of the Expanded AMP tool.

In order to provide reviewers with guidance on how to approach scoring each dimension, we elaborated on the evidence that they should consider for each dimension. Note that we present our new order here, which allows for a more logical flow, with related dimensions grouped together:

- Structure
  - Evidence for a structured course includes a similar length and learner workload across units; similar patterns of course components, sequence, and quantity across units; a clear and structured syllabus with detailed information, such as learning outcomes; and sufficient directions for learners to access resources or engage in activities. Evidence for an unstructured course includes imbalanced length and workload across units; no obvious patterns of course components, sequence, and quantity; and lack of wayfinding information.
- Approach to content presentation
  - Evidence for abstract content presentation includes content being presented as self-explanatory without contextualizing concepts with examples. Instructors who adopt a concrete approach to present content usually introduce new concepts together with examples and scenarios.
- Characteristics of tasks
  - When tasks are situated in artificial contexts, learners are expected to only activate declarative knowledge without making connections to the real world. When tasks are situated within authentic contexts, the task setting usually involves real-world problems, and tasks outcomes can potentially be applied to learners' own work or life.
- Feedback
  - To review the *frequency* of feedback, reviewers should examine both the total number of opportunities to receive feedback (e.g., total assessments in a course) and also the distribution of these opportunities (e.g., the interval period between two assessments).

To review the *types* of feedback, reviewers should consider whether the feedback provides information that allows learners to self-correct or further improve.

- Characteristics of evidence
  - Evidence for convergent approaches would be that the majority of assessments are in the form of single-correct-answer questions, such as multiple-choice questions. Evidence for divergent approaches includes open-ended questions that can be answered in multiple ways or projects that can be approached from different perspectives.
- Epistemology
  - Evidence for objectivist approaches to instruction in a MOOC includes (1) instructional design that foregrounds direct instruction, with learners acquiring knowledge primarily through lecture-based modes of content delivery and (2) assessments that lack flexibility and activities do not allow for learners to make connections from personal experiences and to external resources. Evidence for constructivist approaches to instruction in a MOOC includes a rich learning environment that includes a variety of course elements (e.g., videos, discussion prompts) that are employed to deliver information and facilitate interaction and a flexible learning environment that enables learners to integrate personal goals and experiences into activities and assessments.
- Instructor role
  - Evidence for an instructor-centered MOOC includes the following: the majority of assessments are auto-graded with little or no human response; learners have no choice in how they represent assessed learning outcomes; and no specific directives are provided for learners to interact with peers. Evidence for a student-centered course includes the following: the majority of assessments are generative, and learners have choice in ways to demonstrate achievements; multiple robust discussion opportunities are provided and facilitated by instructors or provided by instructors through written directions prepared in advance.
- Learner role
  - Evidence for a generative learner role includes opportunities for learners to generate content and be inspired by the connections between course materials and external resources. Evidence for a passive role includes the lack of opportunities for learners to create content to share within a course. An example of a course design that promotes a passive learner role is one in which the majority of course content consists of lecture videos or readings and learners' contributions are not encouraged.
- Cooperative learning
  - To decide whether cooperative learning is supported in a course, reviewers should first look for evidence that collaboration opportunities such as group projects exist in a course; the next step is to examine whether detailed information and strategies are provided by the instructor to help learners be successful in those cooperative learning settings.
- Accommodation of individual difference
  - Evidence for accommodation of individual difference includes the use of multiple representations to deliver content, such as both text and video being used to describe an assignment, opportunities for learners to make choices in terms of presenting

answers, the flexibility to support self-directed learning, and the compliance of accessibility best practices, such as providing video captions and transcripts.

Larger MOOC Comparison

We used the scores generated from Phase 2 as data inputs for our nearest neighbor analysis. Figure 4 portrays the review of 20 MOOCs using the Expanded AMP instrument; this figure also underscores our need for a systematic method for evaluating pedagogical similarities, since visual comparisons alone would be difficult. Our nearest neighbor analysis of 20 MOOCs resulted in seven groupings of pedagogically similar MOOCs (Figure 5), with each group consisting of two to four MOOCs.

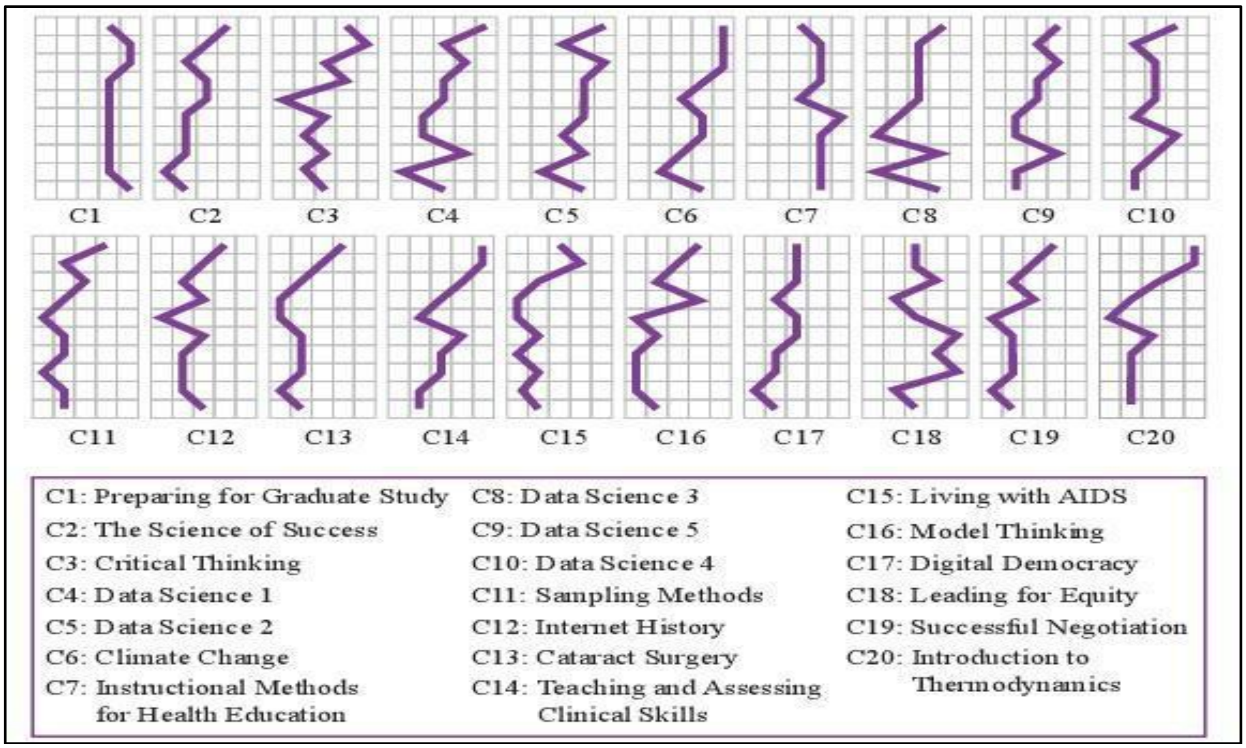

Figure 4. Top: scores of 20 MOOCs coded using Expanded AMP instrument. Bottom: key of working names for 20 MOOCs in sample.

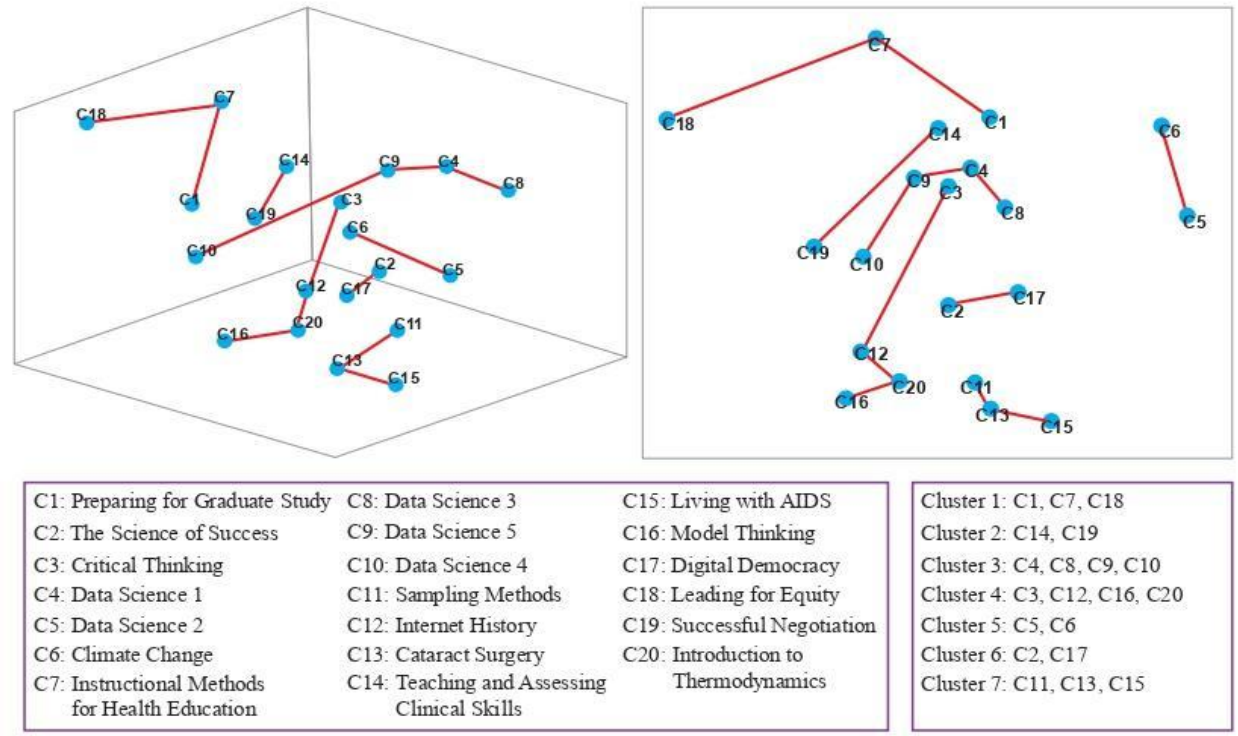

Figure 5. Top left: squared Euclidean distance of 20 MOOCs represented in a 3-D plot, with nearest neighbors connected by red lines. Top right: top view of the 3-D plot to show the seven clusters of pedagogically similar courses. Bottom left: key of working names for 20 MOOCs in sample. Bottom right: seven clusters of pedagogically similar courses.

Our inductive analysis of these clusters led to the following *preliminary insights* related to pedagogical design decisions (features) and practical considerations (factors) that could account for the relationships we identified through the cluster analysis.

Features. Five of the seven clusters consisted of MOOCs from different domains (e.g., Cluster 5 contained a data science course and a social science course), while the remaining two clusters consisted of MOOCs from related domains (e.g., Cluster 1 contained one medical education course and two courses about higher education).

All clusters consisted of courses that were related along several pedagogical dimensions from the Expanded AMP instrument. Through our inductive analysis, we articulated three distinctive attributes that likely influenced design decisions:

- **consistency in course composition** (i.e., nearly identical sequences of elements, from week to week),
- **use of a theoretical perspective** (e.g., use of constructivist-oriented pedagogies, with many opportunities for learners to generate knowledge), and
- **implementation of signature pedagogies** (e.g., use of teaching methods that are known to prepare learners to be practitioners in a professional field, and imparting a set of beliefs about professional attitudes, values, and dispositions). (Shulman, 2005)

Factors. We also considered factors that could influence pedagogical design in our inductive analysis (i.e., those not related to the dimensions that are reviewed using the AMP instrument):

- **courses created by same instructional design team** (i.e., learning designers who supported faculty members),
- **courses produced within the same time frame** (e.g., one cluster was produced before elaborative feedback for quizzes was available on the MOOC platform), and
- **courses created as part of a single specialization** (i.e., courses created by different instructors but bundled as a related group of courses).

Discussion

This study responds to Reich's (2015) challenge to MOOC researchers to move beyond studies of engagement (e.g., completion rates) and to move toward studies of factors that lead to *learning*. Using Swan et al.'s (2015) AMP instrument as a foundation, we developed the Expanded AMP instrument, which will allow researchers and learning designers to consistently characterize the pedagogies of MOOCs within their own contexts. We anticipate that this expanded tool will support learning designers who desire a vocabulary to talk about the style of instruction in a MOOC. Such a vocabulary can facilitate communication between learning designers and other stakeholders by providing points of reference. Learning designers can use this vocabulary as a guideline for the pedagogical design of a course as it is being built and also use it for the evaluation of MOOCs by giving a means to measure how the final course design aligns with original pedagogical goals.

The systematic and replicable approach that we present for grouping pedagogically similar courses addresses Reich's (2015) second challenge, that of progressing from studies of individual courses to making comparisons across multiple courses. Using the AMP tool along with clustering methods has made it possible for us to group pedagogically similar courses in a systematic and accurate manner. Our preliminary inductive analysis gave us a good starting point for understanding why courses may have been grouped together and has enabled us to understand the pedagogical features and potential underlying factors that likely contributed to the similarity of courses within each cluster. We are also working on refining our approach so that we can know more precisely how each pedagogical dimension contributes to the similarity of courses within a cluster, by identifying the score variation on each dimension.

Use of these tools and methods could lead to the development of additional MOOC typologies (i.e., building on Sfard's [1998] acquisition and participation models) that are based on a nuanced understanding of underlying pedagogies. These approaches could also support learning designers and researchers who want to explore program-level considerations. For example, as MOOC series are becoming more prominent, learning designers must attend to pedagogical considerations at both the course and the series level. We hope that our work creates a pathway from research to practice, where practitioners who are deeply involved in the design and evaluation of MOOCs can use these developing tools and methods to characterize the pedagogical approaches that underlie design, allowing them to tell powerful stories that are based on evidence.

References

Admiraal, W., Huisman, B., & van de Ven, M. (2014). Self- and peer assessment in massive open online courses. *International Journal of Higher Education, 3*(3), 119–128.

Anderson, L. W., & Krathwohl, D. R. (2001). A taxonomy for learning, teaching, and assessing (abridged ed.). Boston, MA: Allyn and Bacon.

Burgstahler, S. E., & Cory, R. C. (Eds.). (2010). *Universal design in higher education: From principles to practice*. Cambridge, MA: Harvard Education.

Coursera: Take the world's best courses, online. (n.d.). Retrieved from http://www.coursera.org

Davis, D., Seaton, D., Hauff, C., & Houben, G. (2018). Toward large-scale learning design: Categorizing course designs in service of supporting learning outcomes. In *Proceedings of the Fifth (2018) Annual ACM Conference on Learning at Scale* (L@S). ACM.

Dokmanic, I., Parhizkar, R., Ranieri, J., & Vetterli, M. (2015). Euclidean distance matrices: Essential theory, algorithms, and applications. *IEEE Signal Processing Magazine, 32*(6), 12–30. doi:10.1109/msp.2015.2398954

Fan, Y. (2017). Use the AMP tool to characterize pedagogical approaches taken by MOOC courses in mainland China. *International Journal, 11*(1), 141–146.

Head, K. J. (2017). *Disrupt this! MOOCs and the promises of technology*. Lebanon, NH: University Press of New England.

Herrington, J., Reeves, T. C., & Oliver, R. (2006). Authentic tasks online: A synergy among learner, task, and technology. *Distance Education*, *27*(2), 233–247.

Hicks, N. M., Roy, D., Shah, S., Douglas, K. A., Bermel, P., Diefes-Dux, H. A., & Madhavan, K. (2016, October). Integrating analytics and surveys to understand fully engaged learners in a highly-technical STEM MOOC. In *2016 IEEE Frontiers in Education Conference* (FIE) (pp. 1–9). IEEE.

Jain, A. K., Murty, M. N., & Flynn, P. J. (1999). Data clustering: A review. *ACM Computing Surveys (CSUR), 31*(3), 264–323.

Jonassen, D. H. (1991). Objectivism versus constructivism: Do we need a new philosophical paradigm? *Educational Technology Research and Development, 39*(3), 5–14.

Luo, M., Wang, L. N., & Zhang, H. G. (2003). An unsupervised clustering-based intrusion detection method. *Acta Electronica Sinica, 31*(11), 1713–1716.

Major, C. H., & Blackmon, S. J. (2016). Massive open online courses: Variations on a new instructional form. *New Directions for Institutional Research, 2015*(167), 11–25.

MATLAB R2018a (2018). The MathWorks, Inc., Natick, Massachusetts, United States.

Najafi, H., Rolheiser, C., Harrison, L., & Håklev, S. (2015). University of Toronto instructors' experiences with developing MOOCs. *The International Review of Research in Open and Distributed Learning*, *16*(3).

Philippe, T., Cojocaru-Mirédin, O., Duguay, S., & Blavette, D. (2010). Clustering and nearest neighbour distances in atom probe tomography: The influence of the interfaces. *Journal of Microscopy, 239*(1), 72–77.

Quintana, R. M., Tan, Y., & Korf, N. (2018). *Visualizing course structure: Using course composition diagrams to reflect on design*. Paper presentation at the Annual Meeting of the American Educational Research Association. April 13–17. New York, New York.

Reeves, T. (1996). Evaluating what really matters in computer-based education. In M. Wild & D. Kirkpatrick (Eds.), *Computer education: New perspectives* (pp. 219–246). Mathematics, Science and Technology Education Centre, Edith Cowan University, Perth.

Reich, J. (2015). Rebooting MOOC research. *Science, 347*(6217), 34–35.

Roschelle, J., & Teasley, S. D. (1995). The construction of shared knowledge in collaborative problem solving. In C. E. O'Malley (Ed.), *Computer-supported collaborative learning* (pp. 69–197). Berlin: Springer-Verlag.

Rose, D. H., & Meyer, A. (2002). *Teaching every student in the digital age: Universal design for learning*. Alexandria, VA: ASCD.

Seaton, D. (2016, January 29). Exploring course structure at HarvardX: A New Year's resolution for MOOC research [blog post]. Retrieved from https://vpal.harvard.edu/blog/exploring-course-structure-harvardx-new-year's-Resolution-mooc-research

Sfard, A. (1998). On two metaphors for learning and the dangers of choosing just one. *Educational Researcher, 27*(4), 4–13.

Shulman, L. S. (2005). Signature pedagogies in the professions. *Daedelus, 134*(3), 52–59.

Skrypnyk, O., de Vries, P., & Hennis, T. (2015). Reconsidering retention in MOOCs: The relevance of formal assessment and pedagogy. In *Proceedings of the Third (2015) European MOOCs Stakeholder Summit* (pp. 166–172).

Swan, K., Day, S., & Bogle, L. (2016). Metaphors for learning & MOOC pedagogies. In *Proceedings of Third (2016) ACM Conference on Learning at Scale* (L@S) (pp. 125–128). ACM.

Swan, K., Day, S., Bogle, L., & van Prooyen, T. (2014). AMP: A tool for characterizing the pedagogical approaches of MOOCs. *E-Mentor, 2*(54), 75–85.

Swan, K., Day, S., Bogle, L., & van Prooyen, T. (2015). AMP: A tool for characterizing the pedagogical approaches of MOOCs. In C. J. Bonk, M. M. Lee, T. C. Reeves, & T. H. Reynolds (Eds.), *MOOCs and open education around the world* (pp. 105–118). New York, NY: Routledge.

Thomas, D. R. (2006). A general inductive approach for analyzing qualitative evaluation data. *American Journal of Evaluation*, *27*(2), 237–246.

Wiggins, G. P., & McTighe, J. (2005). *Understanding by design*. Alexandria, VA: ASCD.

Yuen, K. M., & Hau, K. T. (2006). Constructivist teaching and teacher-centred teaching: A comparison of students' learning in a university course. *Innovations in Education and Teaching International, 43*(3), 279–290.

Zeki, C. P., & Güneyli, A. (2014). Student teachers' perceptions about their experiences in a student centered course. *South African Journal of Education, 34*(3).

Appendix A

Expanded AMP instrument full version (consists of one scoring sheet and 10 scoring guide sheets with detailed explanation for 10 pedagogical dimensions respectively)

Pedagogical category		**Ratings**					
Structure	Unstructured	1	2	3	4	5	Structured
Approach to Content Presentation	Abstract	1	2	3	4	5	Concrete
Characteristics of Tasks	Artificial	1	2	3	4	5	Authentic
Feedback	Infrequent, unclear	1	2	3	4	5	Frequent, constructive
Characteristics of Evidence	Convergent	1	2	3	4	5	Divergent
Epistemology	Objectivist	1	2	3	4	5	Constructivist
Instructor Role	Instructor-centered	1	2	3	4	5	Learner-centered
Learner Role	Passive	1	2	3	4	5	Generative
Cooperative Learning	Unsupported	1	2	3	4	5	Integral
Accomodation of Individual Difference	Unsupported	1	2	3	4	5	Multi-faceted

1/11

Structure	**Level 1**	**Levels 2-4**	**Level 5**
• **Evidence (unstructured):** Are units presented without any apparent consistent internal structure? Is the course organized without consistency across units? Are clear directions and navigational elements missing from the course? • **Evidence (structured):** Are units organized consistently (e.g., by element type, sequence)? Is the learners experience of the course consistent from unit to unit? (e.g., can learners make a reasonable prediction of what to expect?) Are clear directions and navigational elements present within the course?			
This dimension describes the level of consistency of organization and clarity of structure throughout the MOOC.	**Unstructured:** No apparent consistency of organization either within units or across units. Lack of clear directions and unclear navigation.	**Middle** Level 2 To a small degree consistent and structured Level 3 Evidence of some consistency and structure Level 4 Mostly consistent and structured	**Structured:** Structure is evident through consistent organization within units; consistent organization from unit to unit; clear directions; transparent navigation

CCD Videos or readings that provide additional guidance

2/11

Note: CCD in the bottom left refers to the Course Composition Diagrams that the reviewers created for each course in the sample (n = 20) by following the method developed by Quintana, Tan, and Korf (2018). CCD is a type of interactive visualization used by learning designers and researchers to represent the sequence and pattern of course elements.

Approach to Content Presentation	**Level 1**	**Levels 2-4**	**Level 5**
● **Evidence (abstract):** Is content presented as if it is self-explanatory, without examples of how it relates to or is used in the real world or everyday life? ● **Evidence (concrete):** Is content presented with examples of how the subject relates to or is used in the real world or everyday life?			
This dimension asks reviewers to examine the extent to which content is presented/applied in a concrete or abstract way.	**Abstract:** Presentation does not include examples of how it relates to or is used in the real world or everyday life (i.e., material is presented as if it is self-explanatory)	**Middle** Level 2 The presentation of the majority of content is abstract Level 3 A balance between abstract and concrete presentation of content Level 4 The presentation of the majority of content is concrete	**Concrete:** Presentation includes examples of how this subject relates to or is used in the real world or in everyday life

Videos Readings

3/11

Characteristics of Tasks	**Level 1**	**Levels 2-4**	**Level 5**
● **Evidence (artificial):** Are tasks situated in contexts that are not authentic? Do activities ask learners to state declarative knowledge, formulas, rules, or definitions? ● **Evidence (authentic):** Are tasks situated in authentic contexts? Do tasks regularly involve real world problems?			
This dimension asks reviewers to evaluate the extent to which activities and assessments are artificial or authentic	**Artificial:** Tasks are not situated in authentic contexts; for example, learners are only asked to provide declarative knowledge, formulas, rules, or definitions (e.g., lower level tasks on Bloom's taxonomy).	**Middle** Level 2 Tasks primarily require learners to state declarative knowledge Level 3 Some tasks involve real world problems Level 4 Tasks require learners to engage in real-world problem solving projects.	**Authentic:** Tasks are situated in authentic contexts for the learner; tasks and assessments regularly involve real world problems (e.g., higher level tasks on Bloom's taxonomy)

Peer-graded assignments Quizzes (Discussion prompts)

4/11

Feedback	Level 1	Levels 2-4	Level 5
• Evidence **(infrequent, unclear):** Does the learner have infrequent opportunities to receive feedback? Is the feedback unhelpful (e.g., no elaborative feedback provided, feedback is not personalized)? • Evidence **(frequent, constructive):** Does the learner have frequent opportunities to receive feedback? Is the feedback useful (e.g., clear, constructive, and personalized)?			
This dimension asks reviewers to assess the characteristics and usefulness of the feedback provided (i.e., from instructor, peers, and platform) and the potential that it has to help learners improve performance on future tasks.	**Unclear:** Learner has infrequent opportunities to receive feedback; feedback is not clear or constructive (neither correct answers nor elaborative feedback are provided); feedback does not address specific aspects of learners' contributions	**Middle** Level 2 Feedback is mostly infrequent and unclear Level 3 Elements of both infrequent/ unclear and frequent/constructive feedback are present Level 4 Feedback is mostly frequent and constructive	**Constructive:** Learner has frequent opportunities to receive feedback; clear and constructive (correct answer with elaborative feedback); personalized (directly addresses learners' contributions)

Quizzes Peer-graded assignments (Discussion prompts)

5/11

Characteristics of Evidence	Level 1	Levels 2-4	Level 5
• **Evidence (convergent):** When learners are in the process of arriving at a solution, do they consider only one possible answer (e.g., as with questions in STEM courses)? • **Evidence (divergent):** When learners are in the process of arriving at a solution, do they consider multiple answers (e.g., as with activities in the humanities)?			
This dimension asks reviewers to identify how learners arrive at an answer or solution along a continuum of convergent (considering only one answer) to divergent (considering many possible answers)	**Convergent:** All answers are either right or wrong and there are no alternatives	**Middle** Level 2 Majority of required evidence is convergent Level 3 Both convergent and divergent OR many tasks allow more than one pathway to correct answer Level 4 Majority of required evidence is divergent	**Divergent:** All questions can be answered correctly in multiple ways

Peer-graded assignments Quizzes

6/11

<table>
<tr><th>Epistemology</th><th>Level 1</th><th>Levels 2-4</th><th>Level 5</th></tr>
<tr><td colspan="4">Evidence (objectivist approach): Are instructional materials oriented towards acquiring knowledge? Are course goals predefined and absolute?
Evidence (constructivist approach): Is the instructional environment oriented towards generating knowledge, through social interaction with peers? Is the learner voice evident through the construction of course goals?</td></tr>
<tr><td>This dimension asks the reviewer to discern the epistemological thrust of a MOOC

This dimension relates to what is provided to the learner AND what the learner does.</td><td>Objectivist:
Focus on instructional materials that are oriented toward acquiring knowledge; and course goals are predefined and absolute</td><td>Middle
<u>Level 2</u>
To large extent objectivist
<u>Level 3</u>
Both objectivist and constructivist elements are present
<u>Level 4</u>
To large extent constructivist</td><td>Constructivist:
Focus is on creating a rich “learning environment” where learners draw from a variety of sources to acquire knowledge, including peers; integration of learners’ goals, experiences, and abilities into their learning environment</td></tr>
</table>

Videos Readings Discussion prompts Assignments Syllabus

7/11

<table>
<tr><th>Instructor Role</th><th>Level 1</th><th>Levels 2-4</th><th>Level 5</th></tr>
<tr><td colspan="4">Evidence (instructor-centered): Is the role of the instructor primarily to present content? This might be characterized as a traditional, didactic approach.
Evidence (learner-centered): Is the role of the instructor primarily to facilitate the exchange of knowledge among learners?</td></tr>
<tr><td>This dimension relates to the role of the instructor, from instructor-centered (didactic) to learner-centered (facilitator)</td><td>Instructor-centered:
No choice in ways learners represent knowledge and skills gained; automated grading with little or no human response; instructor does not encourage robust discussion because learners are not provided with specific directives (i.e., discussion prompts)</td><td>Middle
<u>Level 2</u>
To large extent instructor-centered
<u>Level 3</u>
Both instructor-centered and learner-centered
<u>Level 4</u>
To large extent learner-centered</td><td>Learner-centered:
Choice in ways learners represent knowledge and skills gained; generative assignments; robust discussion is encouraged by the instructor by giving learners specific directives</td></tr>
</table>

CCDs Assignments Discussion prompts

8/11

Learner Role	Level 1	Levels 2-4	Level 5
• **Evidence (passive):** Are learners required to access predetermined course content (e.g., lectures and readings)? • **Evidence (generative):** Are learners asked to generate content and make connections from external sources to course materials?			
This dimension asks reviewers to evaluate the extent to which the learner's role is passive or generative.	**Passive:** The learner's role is primarily to access various presentations from the instructor (e.g., lecture videos) and other course materials (e.g., readings).	**Middle** Level 2 The learner's role is to a large extent passive Level 3 The learner's role is both passive and generative Level 4 The learner's role is to a large extent generative	**Generative:** The learner's role is primarily to generate content, making connections from external sources to course materials.

CCDs Assignments Discussion prompts

9/11

Cooperative Learning	Level 1	Levels 2-4	Level 5
• **Evidence (unsupported):** Are cooperative participant structures missing in the instructional design? • **Evidence (integral):** Are cooperative participant structures present in the instructional design?			
This dimension asks reviewers to evaluate the extent to which cooperative learning is unsupported or integral within the MOOC.	**Unsupported:** Learner-to-learner interactions are not encouraged (e.g., through discussion boards); learners are not provided with strategies to be successful in cooperative participant structures; group activities are not part of the instructional design	**Middle** Level 2 Cooperative learning is mostly unsupported Level 3 Some elements of cooperative learning are evident Level 4 Cooperative learning is to a large extent integral	**Integral:** Learner to learner interactions are encouraged (e.g., through discussion boards); learners are provided with strategies to be successful in cooperative participant structures; assessment of collaborative work is evident and valued; group activities are a main part of the instructional design

Assignments Discussion prompts Readings

10/11

Accomodation of Individual Difference	**Level 1**	**Levels 2-4**	**Level 5**
• **Evidence (unsupported)**: Is application of universal design principles missing from the course? Does the instructional design fail to provide opportunities for learners to make choices within the course? • **Evidence (multi-faceted)**: Is there evidence of both the application of universal design principles? Does the instructional design provide opportunities for learners to make choices within the course?			
This dimension asks reviewers to evaluate the extent to which the design of the MOOC accommodates a wide range of individual differences	**Unsupported:** universal design principles are not applied; instructions from the instructor are presented in *either* verbal or written formats; self-directed learning and individual choice in representation mode is not supported in the instructional design	**Middle** Level 2 Accomodation of individual difference is mostly unsupported Level 3 Some elements of a multi-faceted approach are evident Level 4 Accomodation of individual difference is to a large extent multi-faceted	**Multi-faceted:** universal design principles are applied (e.g., video is captioned); verbal and written presentations from the instructor are designed to work together (e.g., video and text describing an assignment); self-directed learning is allowed and supported; opportunities for learners to present answers through multiple modes of representation

Videos Readings Accessibility sources 11/11

Instructional Quality of Business MOOCs: Indicators and Initial Findings

Marc Egloffstein
University of Mannheim

Kristina Koegler
University of Hohenheim

Dirk Ifenthaler
University of Mannheim and Curtin University

Abstract
The concept of *instructional quality* is central to the design and evaluation of massive open online courses (MOOCs). As MOOCs from the field of business and management are gaining importance both in academia and professional learning, questions on how to determine and improve the quality of these offerings arise. In this paper, we introduce an instrument for evaluating MOOCs against a set of theoretically grounded instructional design principles. After an overview of related research, we describe the concise course scan rubric and its application in detail. A pilot study with $N = 101$ business MOOCs reveals their rather low overall instructional quality. While most aspects of structuredness and clarity are rated high, the implementation of instructional design principles falls notably behind. The implications from our study point toward a learner-oriented notion of instructional quality and individualized learning and increased learner support in business MOOCs.

Keywords: massive open online courses (MOOCs), business and management, instructional design, instructional quality, concise course scan

Egloffstein, M., Koegler, K., Ifenthaler, D. (2019). Instructional quality of business MOOCs: Indicators and initial findings. *Online Learning, 23*(4), 85-105. doi:10.24059/olj.v23i4.2091

Instructional Quality of Business MOOCs: Indicators and Initial Findings

Massive open online courses (MOOCs) have been a trending topic in educational technology since inception in 2008. Departing from utopian-like expectations, such as the “democratization” of higher education with unrestricted und ubiquitous access, MOOCs have overcome much disillusionment and criticism (Wiley, 2015) and reached a state of productivity. In the past, many MOOCs showed unsatisfactory completion rates (Jordan, 2015), leading research toward topics like motivation, retention and completion, and satisfaction or engagement (Joksimović et al., 2018; Zhu, Sari, & Bonk, 2018; Zhu, Sari, & Lee, 2018). Parts of these phenomena investigated in the past few years are associated with the instructional quality of MOOCs. Margaryan, Bianco, and Littlejohn (2015) have operationalized these concerns under the umbrella of "instructional design quality," which is intended to represent the level of implementation of instructional design principles.

In the meantime, MOOC providers like Coursera, edX, Udacity, or FutureLearn are shifting their offerings toward more business-oriented formats and corporate training (Shah, 2019). MOOCs are taking root as tools for digital workplace learning, and, thereby, gaining acceptance among employers (Hamori, 2017) as well as employees (Egloffstein & Ifenthaler, 2017). With more than 18% of MOOCs stemming from the field of business and management, business MOOCs formed the second-largest section among the global MOOC offerings in 2018 (Shah, 2018); stated another way, of the 11,400 MOOCs offered in 2018 (Shah, 2019), nearly one in five were business MOOCs.

A market review in the field of business and management from 2018 revealed 481 business MOOCs offered by the top 100 universities from the Times Higher Education Ranking (Egloffstein, Ebner, & Ifenthaler, 2019). Looking at the topics covered, 27% of those business MOOCs could be assigned to the general and strategic management subdomain, 16% were dealing with entrepreneurship, 15% covered topics from accounting and finance, and 12% addressed management and leadership skills (with the rest of the courses being classified into one of six additional smaller sections). Given the number and diversity of those courses, it becomes evident that business schools are starting to seize the potential of MOOCs for academic teaching (Whitaker, New, & Ireland, 2016). At the same time, business MOOCs are becoming more important for professional learning and development.

Against this background, the instructional design of business MOOCs and its relationship to quality aspects comes into the spotlight. A fundamental question is this: How can the instructional quality of MOOCs in the field of business and management be determined? In response, we introduce an instrument for evaluating business MOOCs against a set of theoretically grounded instructional design principles. After an overview of related research, we describe the indicators, present a pilot study, and offer implications for future research and development in this area and with this instrument.

Assessing Pedagogical Aspects of MOOCs

The concept of *instructional quality* is central to the design and evaluation of MOOCs. Although quality issues have been a trending topic in the MOOC literature (Zawacki-Richter, Bozkurt, Alturki, & Aldraiweesh, 2018), there is still comparatively little research on pedagogical aspects of MOOCs and their relationship to quality (Margaryan, Bianco, & Littlejohn, 2015). As operationalizations of instructional quality depend on the underlying instructional model and pedagogical assumptions in the corresponding domain, different frameworks and approaches have been applied.

Generally, standardized evaluation instruments for online courses (Baldwin, Ching, & Hsu, 2018) can be used for MOOCs as well. For example, Lowenthal and Hodges (2015) applied Quality Matters (QM), a common quality-assurance framework from the United States. The QM peer-review process is centered around eight general standards, with at least five among them directly linked to instructional quality (e.g., Standard 3: Assessment and measurement, Standard 4: Instructional materials). In an evaluation of six MOOCs from different providers, none passed the initial review, all failing on college-related learner support standards.

Khalil, Brunner, and Ebner (2015) developed an evaluation grid for xMOOCs. While the 30 criteria in the three categories—"system," "interaction," and "contents"—of this evaluation grid were not developed upon a specific pedagogical theory, they clearly relate to instructional quality.

The elaborate evaluation of 15 courses from 12 different providers involved participant observation and the documentation of interaction and activities. Results show high average scores in the content category over all courses, and striking deficiencies in the interaction category in four of the courses.

In a qualitative embedded single case study, Kocdar, Okur, and Bozkurt (2017) analyzed three Coursera-style xMOOCs in depth. As a research framework, they applied the 12 dimensions for characterizing MOOCs by Conole (2013), some of which can be directly associated with instructional quality (e.g., degree of communication, type of learner pathway, and amount of reflection). The results of Kocdar et al.'s (2017) study showed that the "openness," "massiveness," "diversity," "use of multimedia," "communication among learners," "learning pathway," and "amount of reflection" dimensions were rated high. The "communication with instructors," "degree of collaboration," and "autonomy" dimensions were rated medium, whereas the "quality assurance," "certification," and "formal learning" dimensions were rated low.

Yilmaz, Ünal, and Çakır (2017) evaluated six Turkish MOOCs from a single platform according to instructional design principles. The 32 items of their online evaluation form were structured according to the seven principles for good practice in undergraduate education (e.g., ease of use, emphasizing time on task, encourage active learning, feedback) by Chickering and Gamson (1987) and based on the 2016 version of the Quality Online Course Initiative Rubric (Illinois Online Network, 2018). Results showed that paid courses had no advantages over free courses. The authors also found a number of drawbacks, such as limited instructor feedback or lack of opportunities for resource sharing among students.

Building on the well-known e-learning design principles (i.e., segmentation, redundancy, pretraining, contiguity, learner control, modality, practice, worked examples, feedback, coherence, multimedia, and personalization principle) by Clark and Mayer (2008), Oh, Chang, and Park (2018) analyzed 40 STEM MOOCs. Their initial findings showed differences in the application of those principles: segmentation and redundancy were applied to a very large extent, whereas practice, worked examples, and feedback principles were least applied. Further analyses revealed significant platform differences in the application of the contiguity, practice, and feedback principles, as well as significant differences in the application of the redundancy, practice, and feedback principles according to the course level difficulty (introductory vs. intermediate).

As a clearly pedagogically oriented approach, the assessing MOOC pedagogies (AMP) tool (Swan, Day, Bogle, & van Prooyen, 2015) builds on an existing instrument for evaluating the pedagogical dimensions of computer-based education by Reeves (1996). AMP generates a course-specific profile over 10 pedagogical dimensions (i.e., epistemology, role of teacher, focus of activities, structure, approach to content, feedback, cooperative learning, accommodation of individual differences, activities/assessment, and user role), each being rated on a bipolar scale. An initial comparison of 13 STEM MOOCs revealed differences in pedagogies on the provider level. The expanded sample then showed further differences between STEM and non-STEM courses. Additionally, three pedagogical patterns, so-called "metaphors for learning" (Swan, Day, & Bogle, 2016) have been identified (i.e., acquisition, participation, self-direction).

Fan (2017) later used the AMP tool to evaluate 10 MOOCs from the Chinese provider XuetangX. This analysis revealed differences in the pedagogical approaches of STEM and non-STEM MOOCs. In an analysis of four MOOCs from the Malaysian UNIMAS platform, Taib, Chuah, and Aziz (2017) asked both learners and instructors to apply the AMP tool. Results showed differences in the respective course profiles, with only four dimensions rated unequivocally by learners and instructors over the courses surveyed. Quintana and Tan (2019) recently introduced an expanded version of the AMP tool with adjusted terminology and more sophisticated indicators. After rating 20 MOOCs (from the same platform and institution but from different subject areas), they demonstrated how nearest neighbor cluster analysis can help identify pedagogically similar MOOCs.

The evaluation framework used by Margaryan et al. (2015) is based on a set of design criteria originally developed for professional learning (Collis & Margaryan, 2005) and the Expanded Pebble-in-the-Pond Instructional Design Checklist (Merrill, 2013). The Course Scan rating scheme builds on the first principles of instruction, as synthesized by Merrill (2002): Learning is promoted when (1) instruction is *problem-* or *task-centered*, (2) learners *activate* existing knowledge and connect it to new knowledge, (3) learners are exposed to *demonstrations* of what they are expected to learn, (4) learners *apply* and practice what they have learned, and (5) learners *integrate* what they have learned into their everyday life. These five principles focus on learning activities. In addition, five further theoretically grounded principles focusing on learning resources and learning support were incorporated in the rating instrument: (6) *collective knowledge*: learning is promoted when learners contribute to the collective knowledge; (7) *collaboration*: learning is promoted when learners collaborate with others; (8) *differentiation*: learning is promoted when different learners are provided with individualized learning pathways; (9) *authentic resources*: learning is promoted when learning resources come from real-world settings, and (10) *feedback*: learning is promoted when learners are given expert feedback on their performance.

The Course Scan instrument has 37 items in three sections: (a) Course Details (7 items), (b) Objectives and Organization (6 items), and (c) Instructional Principles (24 items). Among a heterogeneous sample of 76 MOOCs with different pedagogies (xMOOCs and cMOOCs) from different providers and domains, the instructional quality was essentially low: Out of 72 possible total points, no MOOC scored above 28 points. While nearly all MOOCs presented well-packaged, structured offerings, there was only limited evidence of instructional principles.

Chukwuemeka, Yoila, and Iscioglu (2015) used the Course Scan rubric to evaluate 27 random courses from the Open Education Europa Network. Their results indicated low overall instructional quality, as most of the courses did not follow the principles of instruction. Likewise, the 12 offerings from Eastern Mediterranean University Open CourseWare analyzed by Yoila and Chukwuemeka (2015) scored rather low. Watson, Watson, and Janakiraman (2017) used an extended version of the Course Scan instrument to assess nine MOOCs on attitudinal change, yielding better results than in the reference study.

Analyzing MOOCs in the Field of Business and Management

Research Questions Given the partially inconclusive findings on pedagogical aspects of MOOCs on the one hand and the importance of content-related pedagogies on the other, we decided to analyze instructional quality not as an overarching generic concept but rather in a domain-specific approach. As MOOCs from the field of business and management represent one of the largest sections in the global MOOC market and as there is only scarce evidence concerning their instructional quality, the following research questions (RQs) formed the basis of this exploratory study:

- RQ 1: How can the instructional quality of MOOCs in the field of business and management be described in terms of structuredness and fit with existing instructional design principles?
- RQ 2: Which categories point toward high instructional quality of business MOOCs, and which categories indicate room for improvement?

- RQ 3: Are there systematic differences concerning instructional quality based on distinctive features of business MOOCs, such as provider/platform, geographic region, and authoring institution?

Rating Instrument, Sample, and Procedure Due to its conceptual fit with some common principles of business education (e.g., problem-centeredness and active learning) and its focus on professional learning, we used the Course Scan rating scheme as a basis for our instrument. After an initial review, we decided to drop similar and potentially equivocal indicators and thus reduce the number of items (e.g., "To what extent are the problems in the course typical of those learners will encounter in the real world?" vs. "To what extent do the activities in the course relate to the participants' real workplace problems?"). In contrast to the original instrument, with item numbers ranging between 1 (e.g., *activation*) and 6 (*problem centeredness*), we decided to address each of Merrill's principles with two distinctive items and each of the more straightforward additional principles with only one single item. The final Concise Course Scan (CCS) rubric consists of three sections with 20 items in total.

Section A comprises five items in five categories, which refer to the structuredness and clarity of a course. High ratings imply a clear and comprehensive description of the *course structure*, its *contents*, the expected *effort*, the *target audience*, and the corresponding *learning goals*. In Section B, we operationalized Merrill's first principles of instruction. Ten items address the five categories: problem-centeredness, activation, demonstration, application, and integration (covered by two items each). Section C comprises of five items in five additional categories, which reflect key instructional quality aspects, like feedback, collaboration and cooperation, authenticity of learning materials, and individualization and differentiation. Following the assumption that learner activity plays a crucial role in instructional quality, we exchanged the contribution to a collective knowledge pool category (whose operationalization was very close to the collaboration category) from the original Course Scan rubric accordingly.

Table 1 illustrates the CCS rubric and its sections, categories, and items. The categories in Section A and C are operationalized by one item, those in Section B by two items each. Every item is rated on a scale from 0 (*not at all true*—i.e., not in place) to 3 (*very much true*—i.e., in place to a large extent) points. For the weighting of the sections, we decided on a ratio of 1:2:2 for the points to be achieved in A, B, and C. This was based on the assumptions that instructional quality should be determined by the implementation of instructional principles rather than by course organization, and that the first principles and the additional principles should be equally important. Therefore, we doubled the raw points of Section C before adding them to the calculation. All in all, a weighted sum score adding up to a maximum of 75 points was calculated over the three sections as a measure for the overall instructional quality of a MOOC.

An analysis of the internal consistency of the instrument revealed a Cronbach's alpha of .822, which is satisfactory. In Section A, there were two items that slightly affected the internal consistency negatively—namely, learning goals (1) and requirements/effort (3). As these items are highly relevant for determining the course objectives and organization, excluding them from the rubric was not considered. The CCS rubric is subject to ongoing development concerning the formulation of categories, items, and indicators.

Table 1

Concise Course Scan Scoring Rubric

Section/category	Items	Max. pts.
A) Structuredness and clarity		15 x 1
1. Learning goals	Learning goals are described comprehensively.	
2. Audience	The target audience is clearly described.	
3. Requirements/effort	Course requirements are described sufficiently.	
4. Course contents	The course contents are described in detail.	
5. Course structure	The course structure is clear.	
B) First principles of instruction		30 x 1
6. Problem centeredness	The course tasks are linked to real-world problems.	
	The course tasks are at the center of activities.	
7. Activation	The necessary prior knowledge is clearly described.	
	The course elements (contents, tasks) build on prior knowledge.	
8. Demonstration	New knowledge is being demonstrated in a coherent way.	
	Media is being used adequately to demonstrate new knowledge.	
9. Application	New knowledge can be applied and practiced in a coherent way.	
	The knowledge transfer to additional contexts is being promoted.	
10. Integration	The reflection of new knowledge is being promoted.	
	The discussion of new knowledge is being promoted.	
C) Additional principles of instruction		15 x 2
11. Feedback	Feedback is an integral element of the course.	
12. Authentic resources	The course materials are authentic.	
13. Differentiation	The course enables different learning pathways, according to learners' needs.	
14. Cooperation/collaboration	The course promotes collaboration and cooperation.	
15. Learner/activity orientation	The course promotes active learning.	

Note. Items scored from 0 to 3 points each.

The sample of our pilot study (see Appendix) consisted of *N* = 101 courses. We randomly selected the courses from MOOC aggregators and course catalogues. Primary inclusion criteria were course language (generally English, with one "outlier" taught in German selected for comparison only) and course accessibility during the assessment period. In an attempt to approximate the market shares from the time of the assessment, we included courses from seven different MOOC providers, with a different number of courses each. The sample included MOOCs from eight topic areas in the field of business and management. Eighty-six courses were authored by academic institutions and 15 by nonacademic institutions. Most of the authoring institutions were North American (*n* = 38) or European (*n* = 37). In addition, 17 courses were authored by Australian institutions, eight from Asia, and just one from Africa. Session-based courses (*n* = 76) outweighed the self-paced courses (*n* = 25) in the sample. As calculated from the given information in the course specifications, the mean course length was 5.1 weeks (*SD* = 2.5; min = 1 week, max = 13 weeks), and the participants were engaged in coursework for approximately four hours per week (*SD* = 2.1; min = .5 hours; max = 11 hours).

Three trained raters, each with a background in pedagogy and instructional design, performed the assessment within a period of four months. After an initial training, it took about one-and-a-half hours on average to rate one single course. Five courses were coded by all three raters. Intercoder reliability was analyzed with Kendall's coefficient of concordance. The overall reliability was satisfying (*W* = .85). Pairwise comparisons of raters led to values between *W* = .83 and *W* = .99.

Results

RQ1: Overall Instructional Quality of Business MOOCs

For the first research question, we analyzed the mean scores and standard deviations for each section and for the weighted sum scores. Concerning Section A (i.e., structuredness and clarity), the courses reached 11.55 points out of 15 on average (*SD* = 2.10). The lowest score of seven was reached by three courses in the sample, while the highest score of 15 was reached by six of the 101 MOOCs we analyzed. In terms of Section B (i.e., first principles of instruction), the mean score was 16.34 points out of 30 (*SD* = 5.58). A minimum score of 5—which illustrated a very low instructional quality—was assigned to two courses with the topics business intelligence and strategic management. The highest score of 27 points was assigned to only one MOOC on social enterprises. In Section C (i.e., Additional principles), the mean score was 12.85 points out of 30 (*SD* = 3.35).

Across all category groups, the mean weighted sum score was 40.75 points of a potential 75 points (*SD* = 9.25). The courses with the highest ratings reached 56 points, and the lowest ratings only added up to 17 points. The 10 top courses, reaching between 53 and 56 points on the CCS rubric, are shown in Table 2. Reflecting on the achieved ratings over the three sections, it becomes obvious that even among the top-rated courses, Section C falls behind when compared to Section B.

Table 2

Top 10 Courses From the Concise Course Scan Assessment

Course title	Provider	Institution	Section A (≤ 15 pts.)	Section B (≤ 30 pts.)	Section C[a] (≤ 30 pts.)	Overall score (≤ 75 pts.)
Business Foundations	edX	University of British Columbia	14	24	18	56
Commercialization of Social Enterprises	Future Learn	Free University of Bruxelles	11	27	18	56
Operations Management	Coursera	University of Illinois	15	23	18	56
Innovation Management	Future Learn	University of Leeds	13	27	16	56
Fundamentals of Project Planning and Management	Future Learn	University of Virginia	14	22	20	56
Reputation Management in a Digital World	edX	Curtin University	14	24	16	54
Business Model Implementation	edX	Delft University of Technology	13	24	16	53
Global Impact: Cultural Psychology	Coursera	University of Illinois at Urbana-Champaign	13	22	18	53
Leading and Managing People-Centered Change	Future Learn	Durham University	11	24	18	53
Ethics for Managers	Canvas Network	Santa Clara University	14	21	18	53

Note. [a] Raw points in Section C weighted with factor 2.

Further, a correlation analysis revealed significant interrelations between the three sections. High ratings on structuredness and clarity (Section A) correspond with a higher quality related to Merrill's (2002) first principles of instruction detailed in Section B (r = .418**) as well as with better scores regarding the additional principles of instruction found in Section C (r = .342**). The strongest correlation, however, was found between Section B and C (r = .646**). Not too surprisingly, it appears that courses that address principles like problem-centeredness or integration are likely to show higher values concerning authentic resources or learner/activity orientation.

RQ2: Areas of Improvement

In the next step, we set out to identify categories that showed room for improvement. Table 3 offers an overview of the means and standard deviations for all categories. The highest average rating within Section A (M = 2.56; SD = .65) was reached in the category covering clear descriptions of the course contents, with the highest score of 3 reached by n = 66 courses of the sample. The lowest mean score was noted for the category clear description of the target audience. Notably, seven courses were rated with the minimum score of 0 in this category. In the other categories in Section A, there were only a few courses with the lowest rating ($n < 10$), and most courses reached higher scores.

Pertaining to Section B, the highest mean ratings ($M = 2.08$; $SD = .65$) were observed for the item on the adequate implementation of media (demonstration category). The highest score was reached by $n = 36$ courses here. The lowest ratings were achieved for the item on problem orientation (problem centeredness category; $M = 1.39$; $SD = .87$). Lower rated categories were integration ($M = 1.68$; $SD = .66$), application ($M = 1.55$; $SD = .84$) and activation ($M = 1.49$; $SD = .69$). The number of courses which were rated 0 on an item varied between $n = 1$ (integration: reflection being promoted) and $n = 35$ (application: knowledge transfer being promoted). On average, there were $n = 17$ courses rated 0 which is a higher amount compared to Section A.

In Section C, finally, the best ratings were assigned for a regular integration of feedback during the course ($M = 1.99$; $SD = .84$). The maximum score of 3 points was assigned to 32 courses. Learner orientation ($M = .68$; $SD = .49$) as well as the degree of differentiation ($M = .50$; $SD = .50$) were rated particularly low. Concerning the implementation of different learning pathways according to the learners' needs, $n = 50$ courses were rated 0.

All in all, Section A shows much less room for improvement than the other sections, while two categories in Section B and C were rated particularly low.

Table 3

Descriptive Statistics Over the Categories of the Concise Course Scan Assessment

	M	*SD*	*Min*	*Max*
Section A				
Learning goals	2.35	.655	1	3
Audience	2.00	1.01	0	3
Requirements	2.32	.958	0	3
Course contents	2.56	.654	1	3
Course structure	2.33	.665	0	3
Section B				
Problem-centeredness	1.39	.874	0	3
Activation	1.49	.687	0	2.5
Demonstration	2.08	.653	0.5	3
Application	1.55	.843	0	3
Integration	1.68	.655	0.5	3
Section C				
Feedback	1.99	.843	0	3
Authentic resources	1.98	.678	0	3
Differentiation/ individualization	.50	.502	0	1
Cooperation/collaboration	1.27	.615	0	3
Learner/activity orientation	.68	.488	0	2

Note. Categories in Sections A and C based on single items. Categories in Section B based on two-item-scales.

RQ3: Distinctive Course Features and Instructional Quality

Concerning systematic differences between different groups of business MOOCs, we focused on six distinctive features. We considered provider/platform, course topic, region, pacing, course type, and authoring institution as relevant categories that could have an influence on instructional quality. As detailed in Table 4, we conducted variance analyses and found significant differences due to provider/platform, region, and authoring institution, as shown in Table 4.

Table 4

Systematic Differences Between the Courses Analyzed in the Concise Course Scan Assessment

	(A)		(B)		(C) [a]		Total [b]	
Section	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Provider/Platform								
Canvas Network (n = 10)	12.3	1.7	17.0	3.8	13.2	4.2	42.5	8.1
Coursera (n = 25)	11.5	2.1	16.2	5.6	12.2	3.8	39.9	10.0
edX (n = 24)	12.3	2.2	18.5	4.3	13.2	2.3	43.9	6.8
FutureLearn (n = 19)	12.1	1.8	19.3	4.4	13.7	2.8	45.0	6.6
iversity (n = 8)	11.3	2.4	18.0	3.3	16.0	1.9	45.3	3.2
Open2Study (n = 10)	9.9	.3	7.5	.9	11.4	2.5	28.8	3.5
Udacity (n = 5)	8.8	1.6	9.8	4.6	8.4	3.6	27.0	9.5
F-value; η^2	3.93**; η^2 = .200		11.11**; η^2 = .415		3.94**; η^2 = .201		9.19**; η^2 = .370	
Region								
North America (n = 38)	11.7	2.4	17.2	5.2	12.3	3.8	41.3	10.0
Europe (n = 37)	11.9	1.8	17.8	4.9	14.1	2.9	43.7	7.5
Asia (n = 8)	11.1	2.6	14.1	4.9	11.8	2.9	37.0	8.8
Australia (n = 17)	10.7	1.6	12.3	6.4	12.2	2.3	35.2	9.1
Africa (n = 1)	12.0	--	16.0	--	8.00	--	36.0	--
F-value; η^2	1.050; η^2 = .042		3.795**; η^2 = .137		2.453*; η^2 = .093		3.123*; η^2 = .115	
Authoring Institution								
Academic (n = 86)	11.7	2.0	17.1	5.2	13.2	3.3	41.9	8.5
Nonacademic (n = 15)	10.7	2.4	12.2	5.9	12.2	3.3	33.9	10.6
T-value; η^2	1.659; η^2 = .027		3.266**; η^2 = .097		2.463*; η^2 = .058		3.274**; η^2 = .098	

Note. [a b] Analysis based on weighted scores.
* $p < .05$. ** $p < .01$.Í

Concerning *provider/platform*, we found significant differences between Udacity and the other MOOC providers ($.002 < p < .039$) as well as between Open2Study and the other providers evaluated in this study ($.000 < p < .039$). Thereby, Udacity showed significantly lower mean ratings than the rest. The effect sizes were the strongest for Section B ($\eta^2 = .415$). The highest means were reached by courses administrated by FutureLearn and iversity. However, these differences were not statistically significant.

In search of potential regional differences, we analyzed MOOCs from five geographic *regions* (i.e., North America, Europe, Asia, Australia, and Africa). We found small but significant differences in instructional quality in every section except Section A. In our sample, Australian courses showed the lowest means in most of the categories. This, however, relates to the fact that most of the Australian courses in our sample were offered by the provider/platform Open2Study and that these courses did not fare too well in our evaluation rubric. In contrast, courses from Europe scored significantly higher ($p = .018$; $\eta^2 = .115$).

With regard to the *authoring institution*, we found that MOOCs that were authored by academic institutions showed slightly higher instructional quality than those from nonacademic institutions. The total effect was small but statistically significant ($p = .001$; $\eta^2 = .098$).

Significant effects were not revealed for any of the other variables and categories analyzed. In detail, *course topic*, *course type*, and *pacing* were irrelevant when discussing potential impact factors on instructional quality. First of all, in terms of the eight different topic areas addressed by the MOOCs in the sample (see Appendix), we did not find any statistically significant differences. There was no systematic variation of instructional quality due to course topics here. Secondly, we analyzed different course types, as we differentiated four groups by a median split of the variables weekly course load and course length. This led to four distinctive course types: short course/high effort, short course/low effort, long course/high effort, and long course/low effort. However, the intensity and duration of the coursework implemented in the MOOCs of our sample were not systematically related to their instructional quality. Finally, being either session based or self-paced, the MOOCs in this study did not significantly differ with respect to instructional quality.

Discussion

Findings and Implications

This research focused on analysis of the instructional quality of MOOCs from the field of business and management. We introduced a rating instrument with 20 items in 15 categories in three sections. In an explorative study, three trained raters analyzed $N = 101$ business MOOCs. The overall findings indicate low overall instructional quality of the analyzed MOOCs. This finding corresponds to previous research in the field (e.g., Margaryan, Bianco, & Littlejohn 2015). Structuredness and clarity as well as adequate media integration as part of the Demonstration category were rated best, but otherwise the implementation of instructional design principles (first principles from Merrill [2002] as well as additional principles) was rather insufficient. More specifically, the rated courses showed substantial shortcomings with regard to an adequate individualized support of learners and the implementation of collaborative elements. Such results correspond with Spector's (2017) call for greater personalized learning in MOOCs, be it with adaptive digital technology or through instructor-selected activities (Bonk et al., 2018).

Our results also point toward ample room for improvement in MOOC design. From the domain-specific perspective, the low scores in problem/task orientation are of most concern. In their present implementations, business MOOCs do not fit too well with the case-based teaching approach widely accepted as good practice in business education. For problem-centered business MOOCs, there is a clear need for “relevant and intentionally designed activities with both formative and summative assessments” (Spector 2017, p. 143) developed around complex, real-world tasks with corresponding authentic materials. This, of course, might come into conflict with one of the defining characteristics of the MOOC concept, which is to provide highly scalable online instruction at very low marginal costs. Hence, it remains a challenging task for instructional designers to bridge this gap and to explicitly address domain-specific pedagogical affordances.

In line with Reich (2015), our study also focused on comparisons of MOOCs across different contexts. With respect to systematic differences between business MOOCs depending on their characteristic features, we analyzed the potential effects of six variables: provider/platform, region, authoring institution, course type, pacing, and course topic. We found that courses administered by Open2study and Udacity scored significantly lower than MOOCs from other providers, with Udacity (who have been focusing on corporate training in recent years) scoring lowest in most of the categories. Further, courses authored by nonacademic institutions scored slightly lower. One suggestion, therefore, is that providers of VET or professional development MOOCs should take adequate actions not to fall behind (cf. Paton, Fluck, & Scanlan, 2018), especially when following the demands for smaller course sizes and tailored “learning nuggets” that seem to evolve around MOOCs in professional contexts (e.g., Egloffstein & Schwerer, 2019). In contrast, academic business MOOCs can be considered suitable for professional learning and development given that these MOOCs seem to align better with the instructional quality standards established in the field. The observed variations due to provider/platform and regional differences point in the same direction, as most of the Australian courses in our sample ran on the Open2Study platform. Although one could have expected that “platform capabilities have a strong influence on what can and will be done pedagogically” (Blackmon & Major, 2017, p. 210), we did not find any additional platform differences of statistical significance. Here, a deeper analysis with an extended sample is necessary to further clarify possible effects. With regard to course type (intensity), topic, and pacing, no systematic differences could be found.

Limitations and Future Research

The reported study has some evident limitations. First, the sample size and selection could be questioned, as the 101 business MOOCs in this study are far from being representative. Although we tried to approximate the market shares with a “snapshot” at the time of our analysis, we could, of course, capture only a fraction of the global MOOC market. XuetangX from China, for example, the third-largest MOOC provider in terms of registered students (Shah, 2018), had to be omitted due to language barriers. The same applies to Miríadax, which serves the Ibero-American world, France Université Numérique, and a number of other regional providers. Cross-cultural studies could provide fruitful insights here, as it is largely unclear how regional influences could affect the concept of instructional quality.

Likewise, the rating instrument must be continuously improved, with a constant focus on valid indicators. As business MOOCs keep on evolving, we will continue our study and try to include more courses in our sample. Repeated measures, on the other hand, could provide valuable insights not only for research but also for a systematic quality assurance. MOOC providers then could build on empirically grounded instructional design knowledge to improve their offerings.

Additionally, it seems necessary to analyze learner interactions and instructional processes in MOOCs more rigorously. Such research is needed because the relationship between instructional design quality and instructional process quality is still debated. Most probably, a thorough course scan with participant observation over a longer period could lead to a better understanding here.

Regarding the instructional quality of MOOCs in general, we concur with Littlejohn and Hood's (2018) call for the development and evaluation of new measures. Thereby, measures from the instructor perspective must be complemented by measures capturing the learner perspective. Learner characteristics, learning processes, and learning outcomes (Biggs, 1993) could provide a rich set of additional indicators for instructional quality. An extended learning analytics approach focusing on learner motivation and emotions could add others layers of detail.

The current study presents valuable insights into the instructional quality of MOOCs in the field of business and management. Drawing upon the results, future tasks for instructional designers in this rapidly evolving field of distance education become evident. As this occurs, a prospective agenda for MOOC research can be mapped and interrogated.

References

Baldwin, S., Ching, Y.-H., & Hsu, Y.-C. (2018). Online course design in higher education: A review of national and statewide evaluation instruments. *Tech Trends*, *62*(1), 46–57. doi:10.1007/s11528-017-0215-z

Biggs, J. (1993). From theory to practice: A cognitive systems approach. *Higher Education Research & Development, 12*(1), 73–85. doi:10.1080/0729436930120107

Blackmon, S. J., & Major, C. H. (2017). Wherefore art thou MOOC? Defining massive open online courses. *Online Learning, 21*(4), 195–221. doi:10.24059/olj.v21i4.1272

Bonk, C. J., Zhu, M., Kim, M., Xu, S., Sabir, N., & Sari, A. R. (2018). Pushing toward a more personalized MOOC: Exploring instructor selected activities, resources, and technologies for MOOC design and implementation. *The International Review of Research in Open and Distributed Learning, 19*(4), 92–115. doi:10.19173/irrodl.v19i4.3439

Chickering, A. W., & Gamson, Z. F. (1987). Seven principles for good practice in undergraduate education. *AAHE Bulletin 39*(7), 3–7.

Chukwuemeka, E. J., Yoila, A. O., & Iscioglu, E. (2015). Instructional design quality: An evaluation of open education Europa networks' open courses using the first principles of instruction. *International Journal of Science and Research, 4*(11), 878–882.

Clark R. C., & Mayer, E. R. (2008). *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning*. San Francisco, CA: Pfeiffer.

Collis, B., & Margaryan, A. (2005). Design criteria for work-based learning. Merrill's first principles of instruction expanded. *British Journal of Educational Technology, 36*(5), 725–739. doi:10.1111/j.1467-8535.2005.00507.x

Conole, G. (2013). MOOCs as disruptive technologies: Strategies for enhancing the learner experience and quality of MOOCs. *RED. Revista de Educación a Distancia, 39*, 1–17.

Egloffstein, M., Ebner, B., & Ifenthaler, D. (2019). Digital learning from scratch: Initiating MOOCs within a business school. In M. Calise et al. (Eds.), *EMOOCs-WIP 2019: Proceedings of Work in Progress Papers of the Research, Experience and Business Tracks* (pp. 121–127). Aachen: CEUR Workshop Proceedings.

Egloffstein, M., & Ifenthaler, D. (2017). Employee perspectives on MOOCs for workplace learning. *TechTrends, 61*(1), 65–70. doi:10.1007/s11528-016-0127-3

Egloffstein, M., & Schwerer, F. (2019). Participation and achievement in enterprise MOOCs for professional development: Initial findings from the openSAP University. In D. Sampson, J. M. Spector, D. Ifenthaler, P. Isaías, & S. Sergis (Eds.), *Learning technologies for transforming large-scale teaching, learning, and assessment* (pp. 91–103). Cham: Springer. doi:10.1007/978-3-030-15130-0_6

Fan, Y. (2017). Use the AMP tool to characterize pedagogical approaches taken by MOOC courses in Mainland China. *International Journal, 11*(1), 141–146.

Hamori, M. (2017). The drivers of employer support for professional skill development in MOOCs. In C. Delgado Kloos, P. Jermann, M. Pérez-Sanagustín, D. Seaton, & S. White (Eds.), *Digital education: Out to the world and back to the campus. EMOOCs 2017* (pp. 203–209). Cham: Springer.

Illinois Online Network. (2018). *Quality Online Course Initiative (QOCI) Rubric*. Retrieved from https://www.uis.edu/ion/resources/qoci/

Joksimović, S., Poquet, O., Kovanović, V., Dowell, N. M., Mills, C., Gašević, D., … Brooks, C. (2018). How do we model learning at scale? A systematic review of the literature on MOOCs. *Review of Educational Research*, *88*, 43–86. doi:10.3102/0034654317740335

Jordan, K. (2015). Massive open online course completion rates revisited: Assessment, length and attrition. *The International Review of Research in Open and Distance Learning, 16*(3), 341–358. doi:10.19173/irrodl.v16i3.2112

Khalil, M., Brunner, H., & Ebner, M. (2015). Evaluation grid for xMOOCs. *International Journal of Emerging Technologies in Learning*, *10*(4), 40–45. doi:10.3991/ijet.v10i4.4653

Kocdar, S., Okur, M., & Bozkurt, A. (2017). An examination of xMOOCs: An embedded single case study based on Conole's 12 dimensions. *The Turkish Online Journal of Distance Education*, *18*(4), 52–65.

Littlejohn, A., & Hood, N. (2018). Designing for quality? In A. Littlejohn & N. Hood (Eds.), *Reconceptualising learning in the digital age: The [un]democratising potential of MOOCs* (pp. 79–94). Singapore: Springer. doi:10.1007/978-981-10-8893-3

Lowenthal, P. R., & Hodges, C. B. (2015). In search of quality: Using quality matters to analyze the quality of massive, open, online courses (MOOCs). *The International Review of Research in Open and Distributed Learning, 16*(5), 83–101. doi:10.19173/irrodl.v16i5.2348

Margaryan, A., Bianco, M., & Littlejohn, A. (2015). Instructional quality of massive open online courses (MOOCs). *Computers & Education, 80*, 77–83. doi:10.1016/j.compedu.2014.08.005

Merrill, M. D. (2002). First principles of instruction. *Educational Technology Research and Development, 50*(3), 43–59. doi:10.1007/BF02505024

Merrill, M. D. (2013). *First principles of instruction: Identifying and designing effective, efficient and engaging instruction*. Hoboken, NJ: Pfeiffer.

Oh, E., Chang, Y., & Park, S. W. (2018). *Design review of MOOCs: Application of e-learning design principles.* Paper presented at the 2018 AECT Convention. Kansas City, MO.

Paton, R. M., Fluck, A. E., & Scanlan, J. D. (2018). Engagement and retention in VET MOOCs and online courses: A systematic review of literature from 2013 to 2017. *Computers & Education, 125,* 191–201. doi:10.1016/j.compedu.2018.06.013

Quintana, R., & Tan, Y. (2019). *Characterizing MOOC pedagogies: Exploring new tools and methods for learning designers and researchers*. Paper presented at the 2019 AERA Annual Meeting. Toronto, Ontario.

Reeves, T. (1996). *Evaluating what really matters in computer-based education*. Retrieved from https://www.eduworks.com/Documents/Workshops/EdMedia1998/docs/reeves.html

Reich, J. (2015). Rebooting MOOC research. *Science*, 347(6217), 34–35. doi:10.1126/science.1261627

Shah, D. (2018, December 12). By the numbers: MOOCS in 2018. *Class Central*. Retrieved from https://www.class-central.com/report/mooc-stats-2018/

Shah, D. (2019, January 6). Year of MOOC-based degrees: A review of MOOC stats and trends in 2018. *Class Central.* Retrieved from https://www.class-central.com/report/moocs-stats-and-trends-2018/

Spector, J. M. (2017). A critical look at MOOCs. In M. Jemni, Kinshuk, & M. K. Khribi (Eds.), *Open education: From OER to MOOCs* (pp. 135–147). Heidelberg: Springer.

Swan, K., Day, S., & Bogle, L. (2016). Metaphors for learning & MOOC pedagogies. In *Proceedings of Third ACM Conference on Learning at Scale (L@S).* (pp. 125–128). Edinburgh, United Kingdom.

Swan, K., Day, S., Bogle, L., & van Prooyen, T. (2015). AMP: A tool for characterizing the pedagogical approaches of MOOCs. In C. J. Bonk, M. M. Lee, T. C. Reeves, & T. H. Reynolds (Eds.), *MOOCs and open education around the world* (pp. 105–118). London: Routledge.

Taib, T. M., Chuah, K. M., & Aziz, N. A. (2017). Understanding pedagogical approaches of Unimas MOOCs in encouraging globalised learning community. *International Journal of Business and Society, 18*, 838–844.

Watson, W. R., Watson, S. L., & Janakiraman, S. (2017). Instructional quality of massive open online courses: A review of attitudinal change MOOCs*. International Journal of Learning Technology, 12*(3), 219–240. doi:10.1504/IJLT.2017.088406

Whitaker, J. W., New, J. R., & Ireland R. D. (2016). MOOCs and the online delivery of business education. What's new? What's not? What now? *Academy of Management Learning & Education*, *15*, 345–365. doi:10.5465/amle2013.0021

Wiley, D. (2015). The MOOC misstep and the open education infrastructure. In C. J. Bonk, M. M. Lee, T. C. Reeves, & T. H. Reynolds (Eds.), *MOOCs and open education around the world* (pp. 3–11). London: Routledge.

Yılmaz, A. B., Ünal, M., & Çakır, H. (2017). Evaluating MOOCs according to instructional design principles. *Journal of Learning and Teaching in Digital Age*, *2*(2), 26–35.

Yoila, A. O., & Chukwuemeka, E. J. (2015). Instructional design quality evaluation of Eastern Mediterranean University open courses. *International Journal of Scientific Research in Science, Engineering and Technology, 1*(6), 1–7.

Zawacki-Richter, O., Bozkurt, A., Alturki, U, & Aldraiweesh, A. (2018). What research says about MOOCs – An explorative content analysis. *The International Review of Research in Open and Distributed Learning*, *19*(1), 242–259. doi:10.19173/irrodl.v19i1.3356

Zhu, M., Sari, A., & Bonk, C. (2018). A systematic review of MOOC research methods and topics: Comparing 2014-2016 and 2016-2017. In *Proceedings of EdMedia: World Conference on Educational Media and Technology* (pp. 1673–1682). Amsterdam, Netherlands.

Zhu, M., Sari, A., & Lee, M. M. (2018). A systematic review of research methods and topics of the empirical MOOC literature (2014–2016). *The Internet and Higher Education*, *37*, 31–39. doi:10.1016/j.iheduc.2018.01.002

Appendix

List of MOOCs Included in the Study

No.	Course title	Course topic	Platform/ provider	Authoring institution
1	Business Ethics for the Real World	General & Strategic Management	Canvas Network	Santa Clara University
2	Ethics for Managers	General & Strategic Management	Canvas Network	Santa Clara University
3	Global Human Capital Trends	Human Resources & Organization	Canvas Network	Columbia University
4	Increase Your Tips: Success in the Service Industry?	General & Strategic Management	Canvas Network	Ocean County College
5	Asset Pricing	Accounting & Finance	Canvas Network	University of Chicago Booth School of Business
6	Biobased Economy Introduction	General & Strategic Management	Canvas Network	Avans University of Applied Sciences
7	Green Marketing	Marketing	Canvas Network	Heliopolis University
8	Business Start-Up: Turn your Entrepreneurship Dreams into Reality	Entrepreneurship	Canvas Network	Southern Alberta Institute of Technology
9	The Art of Negotiation	Management Skills & Leadership	Coursera	University of California, Irvine
10	Operations Management	Operations Management	Coursera	University of Illinois at Urbana-Champaign
11	Intercultural Management	Management Skills & Leadership	Coursera	ESCP Europe
12	Brand and Product Management	Marketing	Coursera	IE Business School
13	Building High-Performing Teams	Human Resources & Organization	Coursera	University of Pennsylvania
14	Leadership and Emotional Intelligence	Management Skills & Leadership	Coursera	Indian School of Business
15	Global Impact: Cultural Psychology	Marketing	Coursera	University of Illinois at Urbana-Champaign
16	International Business Environment	General & Strategic Management	Coursera	University of London International Programmes
17	Intro to International Marketing	Marketing	Coursera	Yonsei University
18	Critical Perspectives on Management	Management Skills & Leadership	Coursera	IE Business School
19	Evidence-Based Global Management	General & Strategic Management	edX	Australian National University
20	Buyer Behaviour and Analysis	Marketing	edX	Curtin University

No.	Course title	Course topic	Platform/ provider	Authoring institution
21	Introduction to Inclusive Talent Acquisition	Human Resources & Organization	edX	Perkins School for the Blind
22	Supply Chain Technology and Systems	Operations Management	edX	Massachusetts Institute of Technology
23	Business Foundations	General & Strategic Management	edX	The University of British Columbia
24	Introduction to Corporate Finance	Accounting & Finance	edX	Columbia University
25	Fundamentals of Manufacturing Processes	Operations Management	edX	Massachusetts Institute of Technology
26	Business Model Implementation	General & Strategic Management	edX	Delft University of Technology
27	Six Sigma: Analyse, Improve, Control	Human Resources & Organization	edX	Technical University of Munich
28	Becoming an Effective Leader	Management Skills & Leadership	edX	University of Queensland
29	Business Fundamentals: Customer Engagement	Marketing	FutureLearn	The Open University
30	Finance Fundamentals: Investment Theory and Practice	Accounting & Finance	FutureLearn	European Union Committee of the Regions
31	The Digital Economy: Finance for Business Growth	Accounting & Finance	FutureLearn	The Open University
32	Leading and Managing People-Centred Change	Management Skills & Leadership	FutureLearn	Durham University
33	Foundation of Innovation and Entrepreneurship in China	Entrepreneurship	FutureLearn	City University of Hong Kong
34	Innovation Management: Winning in the Age of Disruption	General & Strategic Management	FutureLearn	University of Leeds
35	Construction Ethics and Compliance	General & Strategic Management	FutureLearn	Chartered Institute of Building (CIOB)
36	Modern Empowerment in the Workplace	Human Resources & Organization	FutureLearn	The Open University
37	Time Management Strategies for Project Management	Project Management	FutureLearn	Purdue University
38	Innovation: The World's Greatest	Entrepreneurship	FutureLearn	University of Leeds
39	Social Innovation MOOC (EN)	Entrepreneurship	iversity	EBS Business School
40	Corporate Digital Learning	Human Resources & Organization	iversity	KPMG
41	New Business Models - Working Together on Value Creation	Entrepreneurship	iversity	Radboud University Nijmegen
42	eTourism: Communication Perspectives	General & Strategic Management	iversity	Università della Svizzera italiana
43	Decent Work in Global Supply Chains	Operations Management	iversity	Pennsylvania State University

No.	Course title	Course topic	Platform/ provider	Authoring institution
44	Managing Innovation	General & Strategic Management	iversity	LUISS Rome
45	Competitive Strategy	General & Strategic Management	Coursera	LMU Munich
46	Interest Rate Models	Accounting & Finance	Coursera	Ecole Polytechnique Lausanne
47	Introduction to Operations Management	Operations Management	Coursera	University of Pennsylvania
48	Supply Chain Management: A Learning Perspective	Operations Management	Coursera	Korea Advanced Institute of Science
49	Supply Chain Planning	Operations Management	Coursera	Rutgers University
50	Accounting and Finance	Accounting & Finance	edX	Indian Institute of Management Bangalore
51	An Introduction to Credit Risk Management	Accounting & Finance	edX	Delft University of Technology
52	Fundamentals of Microeconomics	Management Skills & Leadership	edX	University Carlos III Madrid
53	Marketing Management	Marketing	edX	Indian Institute of Management Bangalore
54	Supply Chain Design	Operations Management	edX	Massachusetts Institute of Technology
55	Commercialization of Social Enterprises: Stemming the Tide of Mission Drift	General & Strategic Management	FutureLearn	Free University of Bruxelles
56	Fundamentals of Project Planning and Management	Project Management	FutureLearn	University of Virginia
57	Starting a Business 1: Vision and Opportunity	Entrepreneurship	FutureLearn	University of Leeds
58	App Marketing	Marketing	Udacity	Google
59	Classification Models	Marketing	Udacity	Udacity
60	How to Build a Startup	Entrepreneurship	Udacity	Udacity
61	Problem Solving with Advanced Analytics	Marketing	Udacity	Udacity
62	Segmentation and Clustering	Marketing	Udacity	Udacity
63	Digital.Me: Managing your Digital Self	Management Skills & Leadership	Canvas Network	University of Derby
64	Entrepreneurship and Innovation	Entrepreneurship	Canvas Network	University of Greenwich
65	Marketing in a Digital World	Marketing	Coursera	University of Illinois at Urbana-Champaign
66	Managing the Organization: From Organizational Design to Execution	Human Resources & Organization	Coursera	University of Illinois at Urbana-Champaign
67	How to Finance and Grow Your Startup – Without VC	Accounting & Finance	Coursera	University of London, London Business School
68	Corporate Finance I: Measuring and Promoting Value Creation	Accounting & Finance	Coursera	University of Illinois at Urbana-Champaign

No.	Course title	Course topic	Platform/ provider	Authoring institution
69	Business Growth Strategy	General & Strategic Management	Coursera	University of Virginia
70	Preparing to Manage Human Resources	Human Resources & Organization	Coursera	University of Minnesota
71	Budgeting and Scheduling Projects	Project Management	Coursera	University of California, Irvine
72	The Importance of Listening	Marketing	Coursera	Northwestern University
73	Project Management: The Basics for Success	Project Management	Coursera	University of California, Irvine
74	Supply Chain Fundamentals	Operations Management	edX	Massachusetts Institute of Technology
75	Entrepreneurship: DO Your Venture	Entrepreneurship	edX	Indian Institute of Management Bangalore
76	Reputation Management in a Digital World	Management Skills & Leadership	edX	Curtin University
77	Digital Strategy and Action	General & Strategic Management	edX	Babson College
78	Corporate Finance	Accounting & Finance	edX	Indian Institute of Management Bangalore
79	Project Management Techniques for Development Professionals	Project Management	edX	Banco Interamericano de Desarrollo
80	Entrepreneurship 103: Show Me The Money	Entrepreneurship	edX	Massachusetts Institute of Technology
81	Creativity & Entrepreneurship	Entrepreneurship	edX	Berklee College of Music
82	Risk Management for Projects	Project Management	edX	University of Adelaide
83	Finance Fundamentals: Financial Planning and Budgeting	Accounting & Finance	FutureLearn	The Open University
84	The Digital Economy: Selling Through Customer Insight	Marketing	FutureLearn	The Open University
85	Social Enterprise: Turning Ideas into Action	General & Strategic Management	FutureLearn	Middlesex University Business School
86	What Is Leadership?	Management Skills & Leadership	FutureLearn	Deakin University
87	Management and Leadership: Leading a Team	Management Skills & Leadership	FutureLearn	The Open University
88	Business Process Management: An Introduction to Process Thinking	Management Skills & Leadership	FutureLearn	Queensland University of Technology
89	New Business Models	Entrepreneurship	iversity	Radboud University Nijmegen
90	Innovation for Powerful Outcomes	Entrepreneurship	Open2Study	Swinburne University of Technology
91	Entrepreneurship and Family Business	Entrepreneurship	Open2Study	RMIT University
92	Human Resources	Human Resources & Organization	Open2Study	Open2Study (Industry) courses

No.	Course title	Course topic	Platform/ provider	Authoring institution
93	Online Advertising	Marketing	Open2Study	Open2Study (Industry) courses
94	Financial Planning	Accounting & Finance	Open2Study	Sydney TAFE
95	Leadership: Identity, Influence and Power	Management Skills & Leadership	Open2Study	Macquarie Graduate School of Management
96	Sports and Recreation Management	General & Strategic Management	Open2Study	Sydney TAFE
97	Principles of Project Management	Project Management	Open2Study	Polytechnic West
98	Strategic Management	General & Strategic Management	Open2Study	Open2Study (Industry) courses
99	Financial Literacy	Accounting & Finance	Open2Study	Macquarie University
100	New Models of Business	General & Strategic Management	Coursera	University of Virginia
101	Industrie 4.0	General & Strategic Management	iversity	Fraunhofer IAP

Designing MOOCs to Facilitate Participant Self-Monitoring for Self-Directed Learning

Meina Zhu
Wayne State University

Curtis J. Bonk
Indiana University

Abstract
This study investigated the design and delivery of MOOCs to facilitate student self-monitoring for self-directed learning (SDL) using mixed methods. The data sources of this study included an online survey with 198 complete respondents, semistructured interviews with 22 MOOC instructors, and document analysis of 22 MOOCs. Study results indicated that MOOC instructors considered self-monitoring skills critical for SDL. To foster students' self-monitoring, MOOC instructors reported that they facilitated students' self-monitoring by helping students with internal feedback and providing external feedback. Students' internal feedback included cognitive and metacognitive processes. To facilitate cognitive processes, MOOC instructors provided quizzes, tutorials, learning strategies, learning aids, and progress bars. For metacognition, these instructors provided reflection questions and attempted to create learning communities. In addition, MOOC instructors, teaching assistants, and peers provided external feedback for students' self-monitoring. Across these findings, technology played a central role in supporting students' self-monitoring.

Keywords: massive open online courses (MOOCs), self-monitoring, self-directed learning, instructional design, MOOC instructors

Zhu, M., & Bonk, C.J. (2019). Designing MOOCs to facilitate participant self-monitoring for self-directed learning. *Online Learning, 23*(4), 106-134. doi:10.24059/olj.v23i4.2037

Designing MOOCs to Facilitate Participant Self-Monitoring for Self-Directed Learning

Previous studies have argued that self-directed learning (SDL) is critical to adult education (Garrison, 1997; Merriam, 2001). Given that most MOOC learners are adults (Shah, 2017), SDL is also considered pivotal in MOOCs (Bonk, Lee, Reeves, & Reynolds, 2015; Kop & Fournier, 2010; Terras & Ramsay, 2015). However, a variety of studies have stated that learners feel anxious about SDL and expect to have instruction and guidance on SDL at the beginning of courses (Hewitt-Taylor, 2001; Lunyk-Child, Crooks, Ellis, Ofosu, & Rideout, 2001; Prociuk, 1990). Not surprisingly, facilitation is expected to ensure that students confidently develop the appropriate SDL skills (Kell & Deursen, 2002; Lunyk-Child et al., 2001).

Along with motivation and self-management, self-monitoring is one of the key elements of SDL (Garrison, 1997). Self-monitoring involves cognitive and metacognitive processes, which include monitoring one's own learning strategies and the ability to think about thinking. For example, self-directed learners know how to evaluate their learning and self-reflect. Previous studies argued that self-monitoring can improve students' performance (Chang, 2007; Coleman & Webber, 2002). In addition, some studies have indicated that teaching self-monitoring skills can benefit learners (e.g., Delclos & Harrington, 1991; Maag et al., 1992; Malone & Mastropieri, 1992; Schunk, 1982)

However, as several researchers have pointed out, the instructional design and actual delivery of MOOCs from the perspective of MOOC instructors are significantly underexamined (Margaryan, Bianco, & Littlejohn, 2015; Ross, Sinclair, Knox, Bayne, & Macleod, 2014; Watson et al., 2016; Zhu, Sari, & Lee, 2018); especially lacking is research on instructor perceptions in terms of facilitating student self-monitoring for SDL.

In response, this study examined how instructors design and deliver MOOCs to facilitate learners' self-monitoring skills for SDL. It also explored how different technologies are used to facilitate such self-monitoring. A key purpose is to begin to understand how MOOC instructors put considerations related to facilitating self-monitoring skills into MOOC designs and delivery.

The following research questions guided this study:

1. How do instructors design and deliver MOOCs to facilitate participant self-monitoring skills for SDL?
2. How are technologies used to support participant self-monitoring skills for SDL in MOOCs?

Self-Directed Learning (SDL) and Self-Monitoring

The theoretical framework used in this study is Garrison's (1997) three-dimensional model of SDL. The framework includes: (1) self-management (task control); (2) self-monitoring (cognitive responsibility); and (3) motivation (entering and task). This manuscript primarily focuses on one critical element of SDL—namely, self-monitoring. As internal self-monitoring alone is not enough to promote cognitive improvement, instructors were encouraged to provide external feedback to support learners' self-monitoring. It is important to point out that Garrison considered self-monitoring to be a prerequisite of SDL (Garrison, 1997).

As an important part of SDL, self-monitoring focuses on learners' skills to track and evaluate their progress towards specific learning goals (Chang, 2007). Self-monitoring involves self-awareness, which might help learners control their learning process and keep them on task. In addition, self-monitoring training can be effective in improving adaptive goal setting and learning. Several empirical studies have shown that students benefit from being taught self-monitoring skills (e.g., Delclos & Harrington 1991; Maag et al., 1992; Malone & Mastropieri, 1992; Schunk, 1982). Moreover, Zimmerman (1999) argued that self-monitoring should be strategically planned and implemented.

Using this chain of research as a guide, Zimmerman and Paulsen (1995) proposed four phases for teaching to enhance students' self-monitoring skills. These phases included: (1) baseline self-monitoring, which refers to initial data collection about the academic activity; (2) structured self-monitoring, which means that students conduct self-observation based on a structured monitoring protocol offered by the instructor; (3) independent self-monitoring, in which learners adapt the course-related self-monitoring protocol to their own personal needs; and (4) self-regulated self-monitoring, in which learners develop monitoring protocols on their own.

SDL and Self-Monitoring in MOOCs

To date, studies in the emerging field of MOOCs and open education have indicated that students should be self-motivated and self-directed in MOOCs (Kop & Fournier, 2011; Rohs & Ganz, 2015). Given that many researchers have demonstrated that SDL is essential to adult education (Brockett & Hiemstra, 1991; Candy, 1991; Garrison, 1997; Merriam, 2001), and that most MOOC learners are adults (Shah, 2017), SDL is considered an essential element in MOOCs (Bonk et al., 2015; Kop & Fournier, 2011; Terras & Ramsay, 2015). Consequently, research interest in SDL in MOOCs has steadily increased (Bonk et al., 2015).

Previous studies on SDL have focused on the general perceptions of SDL from students' perspectives (Bonk et al., 2015; Loizzo, Ertmer, Watson, & Watson, 2017) as well as the relations between elements of SDL in MOOCs (Beaven et al., 2014; Kop & Fournier, 2011; Terras & Ramsay, 2015). For example, Terras and Ramsay (2015) examined MOOCs from a psychological perspective, wherein they alluded to some central aspects of SDL, such as motivation and self-monitoring.

While the number of universities offering MOOCs is expanding (Shah, 2019), most studies continue to focus on the student's perspective, such as motivation and completion rates (Zhu et al., 2018). Unfortunately, as alluded to earlier, scant research directly investigates the design of MOOCs to facilitate self-monitoring for SDL from the instructor's perspective. Given this gap in the research, the present study examined instructor perceptions and practices related to their facilitation of self-monitoring for SDL in the design of MOOCs.

Methods

This study adopted a sequential mixed methods design (Creswell & Plano-Clark, 2017; Fraenkel & Wallen, 2009), which includes quantitative data collection and analysis followed by qualitative data collection and analysis (Creswell & Plano-Clark, 2017). The data sources of this study consist of three main elements: (1) an online survey sent to 1,891 MOOC instructors worldwide via SurveyMonkey, of which 1,083 email requests were opened and 198 valid responses were received; (2) in-depth interviews with 22 instructors who volunteered to participate; and (3) detailed course reviews of the MOOCs taught or designed by the 22 interviewees. The use of these different data sources enabled the researchers to triangulate the data (Patton, 1990). In effect, this approach provided a more nuanced understanding of instructors' perceptions related to designing and delivering MOOCs for SDL than solely relying on one data source (Baxter & Babbie, 2004).

Data Collection

Online survey. The survey used in this study was adapted from an instrument developed by Fisher and King (2010) and Williamson (2007) to measure student SDL, which, in turn, was based on the conceptual framework of Garrison (1997). It is important to point out that semistructured interviews with four MOOC instructors and a pilot survey with 48 MOOC instructors were conducted to design and develop the survey instrument (Zhu & Bonk, 2019). The final survey contained a total of 29 questions, including 20 five-point Likert-scale questions, three closed-ended questions about their perceptions of SDL, including self-monitoring in MOOCs, and six questions related to different demographic information of the participants. Among the 20 five-point Likert-scale questions, seven were related to self-monitoring strategies, such as learners' goal setting, self-evaluation, responsibility of learning, learning belief, and so on. The demographic information covered MOOC instructors' online design and teaching experiences (including MOOC teaching experiences), the number of enrolled students in their most recent MOOCs, and so on.

To test the internal reliability of the survey, a Cronbach's alpha was conducted in SPSS. The Cronbach's alpha for self-monitoring was quite acceptable at 0.76. To confirm whether the survey questions measured the construct, an exploratory factor analysis (EFA) was conducted in SPSS. The results showed that the survey questions measured each construct well.

MOOC instructor interviews. Based on an extensive literature review, expert feedback, and survey data analysis results, an interview protocol with 12 questions was developed (see Appendix). The participants of the interviews were a subset of the survey sample. They were selected based on both voluntary participation and their answers to the survey questions. The following criteria were utilized to identify and select the interview participants, who value facilitating student SDL. First, survey participants must have volunteered to be interviewed by providing their email information at the end of the survey. Second, the survey responses had to show that these interview participants considered students' SDL skills when designing and delivering MOOCs. Third, respondent mean scores for five-point Likert-scale questions needed to be higher than 2.5. With the previous three criteria, 70 MOOC instructors were selected. Fourth, the country of the MOOC offered, subject areas or topics addressed, previous experience with online or blended learning, prior MOOC teaching experience, MOOC format (i.e., instructor-led with teaching support, instructor-led without teaching support, self-paced, etc.), and MOOC providers or platforms utilized were all considered when selecting interviewees. The goal was to interview MOOC instructors from highly diverse backgrounds in order to better represent instructional practices for facilitating self-monitoring and related SDL skills and competencies in MOOCs.

Using the fourth criterion, 22 MOOC instructors were selected from 70 volunteers for the interviews (see Table 1). It is important to mention that Guest, Bunce, and Johnson (2006) found that saturation occurred within the first 12 interviews in nonprobabilistic sampling interviews. In this study, the researcher found that the data had reached saturation after finishing 22 instructor interviews. As shown in Table 2, the resulting MOOC instructor interviewees were teaching in the United States ($n = 9$), UK ($n = 6$), Australia ($n = 3$), France ($n = 1$), Belgium ($n = 1$), the Netherlands ($n = 1$), and Israel ($n = 1$). For privacy purposes, the names of the interviewees were assigned pseudonyms.

Table 1

Interviewees' Demographic Information

Pseudonym	Country	Subject area	Platform	Gender	No. of O/B	No. of M	Mode of the M
Lucas	U.S.	Social science	edX	M	0	1	I without T
Branden	U.S.	Education	Udacity	M	0	5 or more	Self-paced
Logan	U.S.	Literacy and language	Coursera	M	5 or more	5 or more	I with T
Emma	U.S.	Literacy and language	Coursera	F	2	1	Self-paced
Jason	U.S.	Science	edX	M	1	1	I with T
Jackson	U.S.	Medicine and health	Coursera	M	5 or more	1	Self-paced
Samuel	U.S.	Education	FutureLearn	M	4	3	Self-paced
Hannah	U.S.	Education	Blackboard	F	5 or more	1	I with T
Ashley	U.S.	Education	edX	F	0	5 or more	I with T
Andrew	UK	Art	FutureLearn	M	0	3	I with T
Emily	UK	Medicine and health	FutureLearn	F	2	2	I with T
Aiden	UK	Social science	FutureLearn	M	0	1	Self-paced
Henry	UK	Social science	FutureLearn	M	0	1	Self-paced
Joseph	UK	Medicine and health	FutureLearn	M	1	1	Self-paced
Joshua	UK	Literacy and language	FutureLearn	M	2	2	I with T
Mason	Australia	Education	Coursera	M	5 or more	1	I with T
Ethan	Australia	Business	Coursera	M	3	1	I without T
Ben	Australia	Social science	edX	M	1	1	I with T
Paul	France	Science	Coursera	M	1	1	I with T
Fernando	Belgium	Research methods	Blackboard	M	5 or more	3	I with T
Jacob	Netherlands	Science	Coursera	M	0	1	I with T
Dylan	Israel	Science	Coursera	M	5 or more	3	I without T

Note. *No. of O/B* refers to the number of online or blended courses participants had designed or taught prior to the design of the MOOCs. *No. of M* means the number of MOOCs participants had designed or taught. *Mode of M* refers to the delivery mode of MOOCs. In this column *I without T* means that the mode of the MOOC is instructor without teaching assistants. *I* represents *instructor*. *T* represents *teaching assistants*.

Table 2

Mean Score and Standard Deviation of the Specific Self-Monitoring Skills That the Participants' MOOC Facilitated

Items		Mean	SD
1.	Helps the student be in control of his/her learning	4.15	0.55
2.	Helps the student set his/her own learning goals	3.68	0.91
3.	Helps the student evaluate his/her own performance	3.94	0.78
4.	Helps the student be responsible for his/her learning	4.06	0.79
5.	Helps the student be able to focus on a problem	3.87	0.74
6.	Helps the student be able to find out information related to learning content for him/herself	4.02	0.70
7.	Helps the student have high beliefs in his/her abilities of learning	3.73	0.74

Before the interview, the researcher sent the interview protocol to interviewees to better prepare them for it. In addition, the researcher reviewed each interviewee's MOOC to be familiar with the course and intelligently support the interview conversation. The interview data-collection process lasted more than two months. Interviews were conducted via Zoom, an encrypted videoconferencing tool. Each interview lasted around 30–60 minutes, with the interview time across the 22 interviewees totaling 828 minutes. On average, each interview lasted nearly 38 minutes. The data reached a saturation point after 22 interviews, as there was limited new information identified at that point of the interview process (Creswell & Plano-Clark, 2017; Merriam, 1988, 2009). Thus, it was decided that no additional interview invitations were necessary.

Several research steps were followed to enhance the quality of this study. For example, the interviews were video recorded and transcribed verbatim by the researcher immediately after each interview. To better inform and focus the researchers, initial data analysis was conducted after each interview to inform the following interview. As a means of promoting validity, the researchers conducted member checking with interviewees to confirm the accuracy of the transcripts. Ten of the interviewees provided detailed revision (e.g., misspelling corrections), while 12 replied without revision but claimed that the transcript was accurate. As supplemental materials, two participants shared their research papers on MOOC-related teaching with the researcher. In order to track and reflect on the process, the researcher maintained a research log to keep notes of the interview process. In addition, to solicit participants, a $20 Amazon gift card was provided to all the interviewees to compensate for their interview and member-checking time.

Document analysis. The documents for analysis were the MOOCs designed or taught by the interviewees. In fact, the researcher analyzed documents such as learning resources, activities, and assessments provided in MOOCs both before and after the instructor interview. The MOOCs provided by those interviewees were reviewed for triangulation of the data to enhance the validity of the study.

Data Analysis

The survey used a five-point Likert scale to measure instructors' perceptions of self-monitoring in MOOCs. Consequently, the data was analyzed using descriptive statistics, such as mean, frequency, and percentage, in SPSS and Excel.

In terms of the qualitative data, a classical content analysis, which counts the number of times each code occurs, and a constant comparison analysis were conducted in NVivo 12. The researcher's verbatim transcription was implemented for coding. To promote validity, first-level member checking was conducted, which means that transcripts were sent back to the 22 interviewees for a member check to ensure the accuracy of the transcripts. Following member checking, the researchers utilized classical content analyses to abductively analyze data (Leech & Onwuegbuzie, 2007). The unit of analysis in this study was the meaning unit.

To perform an abductive content analysis, the lead researcher had a general self-monitoring concept and research questions in mind. Then, she read through the entire set of data, chunked the data into smaller meaningful parts, labeled each chunk with a code, and compared each new chunk of data with previous descriptions; any similar chunks were labeled with the same code. Once all the data had been coded, the lead researcher grouped the codes by similarity to identify themes. In general, the researcher read through the transcripts and conducted open coding followed by methods recommended by Haney, Russell, Gulek, and Fierros (1998).

Results

Survey Participant Disciplines and Online Experience

Survey participants (n = 198) were from more than 20 different disciplines in this study. The subjects that MOOC instructor participants taught included social science (22.7%), medicine and health (13.6%), language and literacy (12.1%), business and management (11.1%), art and humanities (7.1%), physical science (6.6%), computer science (6.1%), data science (6.1%), biology (5.1), mathematics (4.5%), engineering (2.5%), and other areas (2.5%).

Interestingly, 102 out of 198 participants (51.5%) had no online or blended course design and teaching experience prior to designing their first MOOC (see Figure 1). At the other end of the spectrum, 37 participants (18.6%) designed or taught five or more online or blended courses prior to designing their initial MOOC.

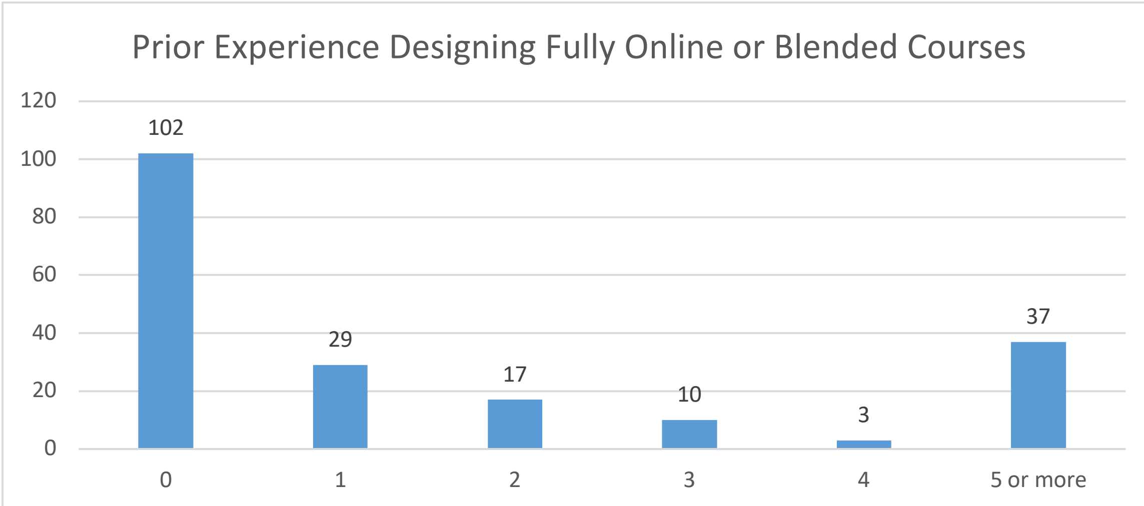

Figure 1. Instructor experience related to designing fully online or blended courses prior to designing their first MOOC.

With regard to MOOC design and teaching experience, 59.6% participants (*n* = 118) had designed or taught only one MOOC (see Figure 2). On the other hand, 9.6% participants (*n* = 19) had previously designed or taught five or more MOOCs.

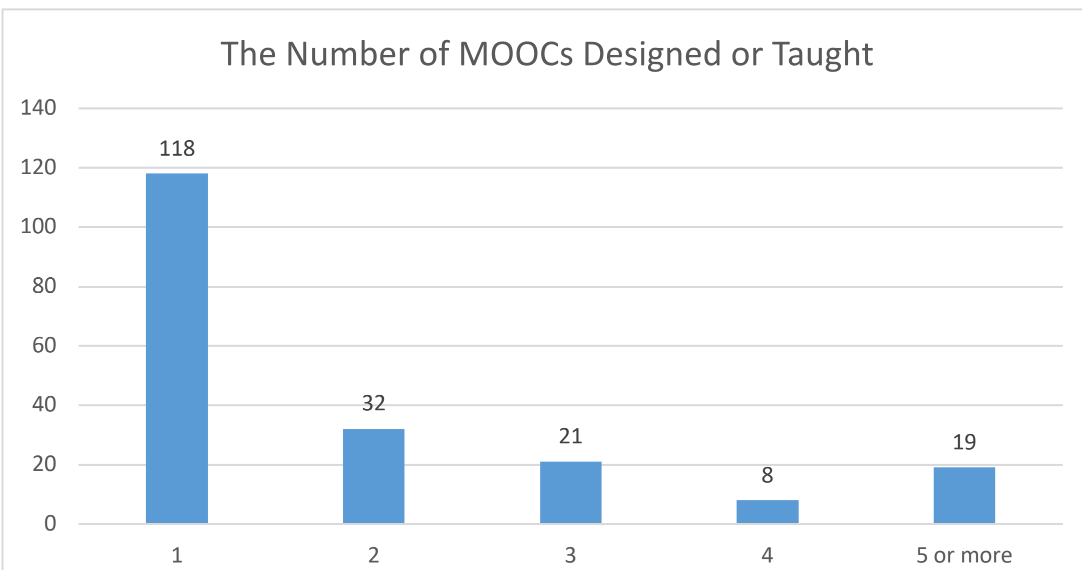

Figure 2. The number of MOOCs that the instructor had designed or taught.

In terms of delivery modes of survey participants' MOOCs, 42.9% of their MOOCs (*n* = 85) were self-paced. In line with our previous studies, which found between 35% and 43% of MOOCs being instructor led with teaching assistant, moderator, or tutor support (Bonk et al., 2018; Zhu, Bonk, & Sari, 2018), 33.3% MOOCs (*n* = 66) were led by instructors with such additional support, followed by 29 MOOCs with instructor led without TA support (14.6%; see Figure 3).

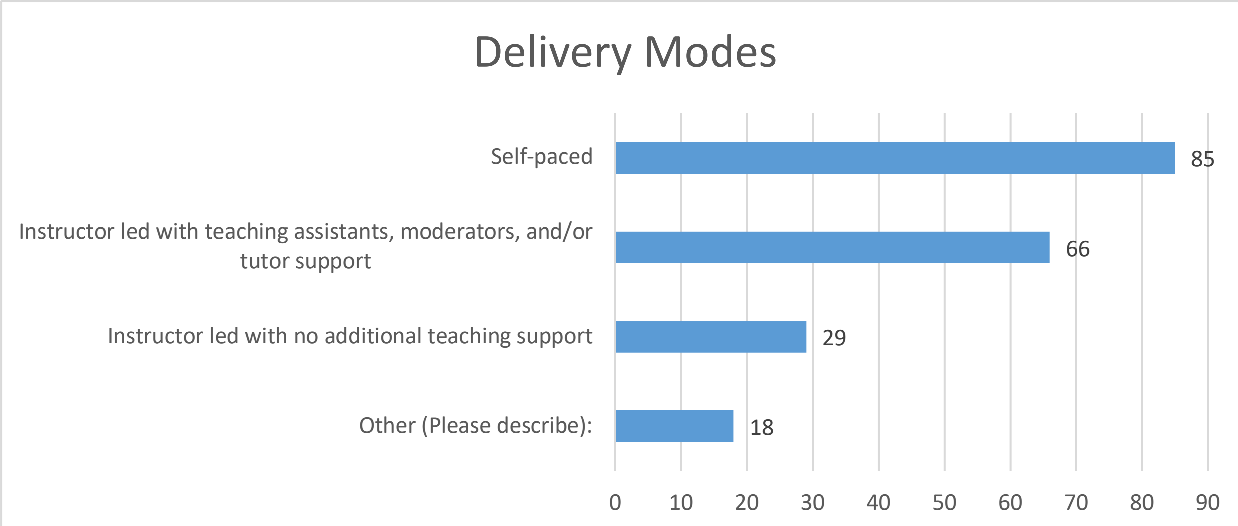

Figure 3. Survey participants' MOOC delivery format.

Research Question 1: How Do Instructors Design and Deliver MOOCS to Facilitate Participant Self-Monitoring Skills for SDL?

Survey Results

Instructors (*n* = 198) ranked on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*) whether the design and delivery of their MOOC helps students to develop SDL skills in terms of various components. For instance, the majority of MOOC instructors surveyed reported that the design and delivery of their MOOCs helped students to be more in control their learning. Specifically, 33.3% of MOOC instructors (*n* = 66) chose *strongly agree* and 57.6% (*n* = 114) reported agree. Only three selected *disagree* or *strongly disagree*.

In terms of the statement that "the MOOC helps students set their learning goals," 46 out of 198 (23.2%) MOOC instructors reported that they strongly agreed, while 99 instructors (50.0%) reported that they agreed with the statement (see Figure 4). Twenty-one percent of MOOC instructors (*n* = 42) selected *neutral*. The remaining 11 (5.6%) instructors reported that they disagreed or strongly disagreed.

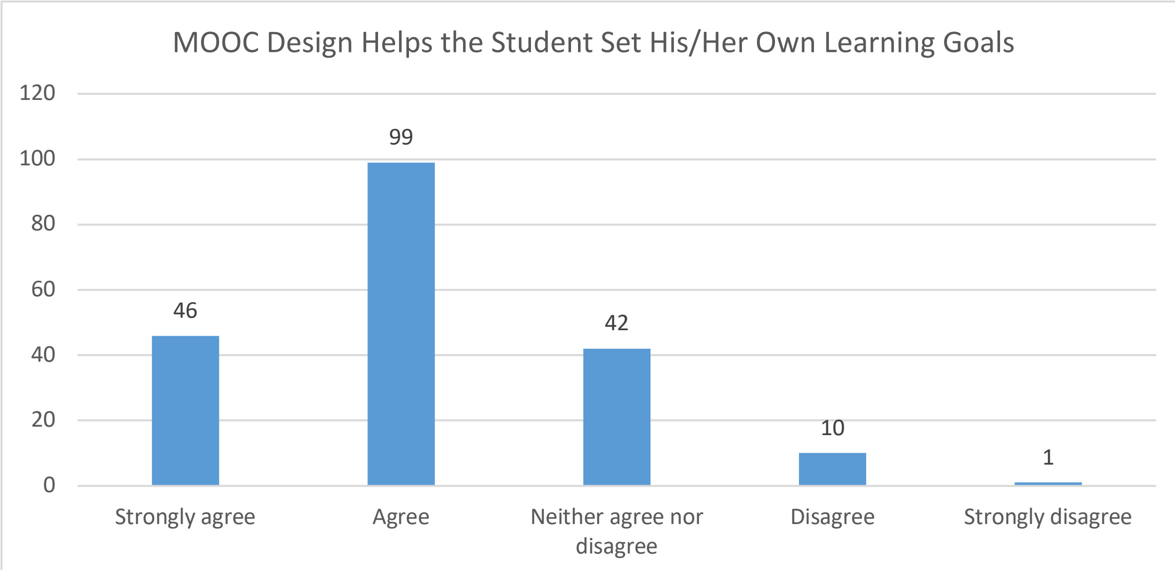

Figure 4. MOOC design helps the student set his/her own learning goals (*n* = 198).

Over 80% of MOOC instructors (*n* = 160) agreed or strongly agreed that their MOOCs help students evaluate their own performance (see Figure 5). Twenty-eight MOOC instructors (14.1%) selected neutral. The other 10 MOOC instructor respondents (i.e., 5.1%) indicated that they disagreed with that statement.

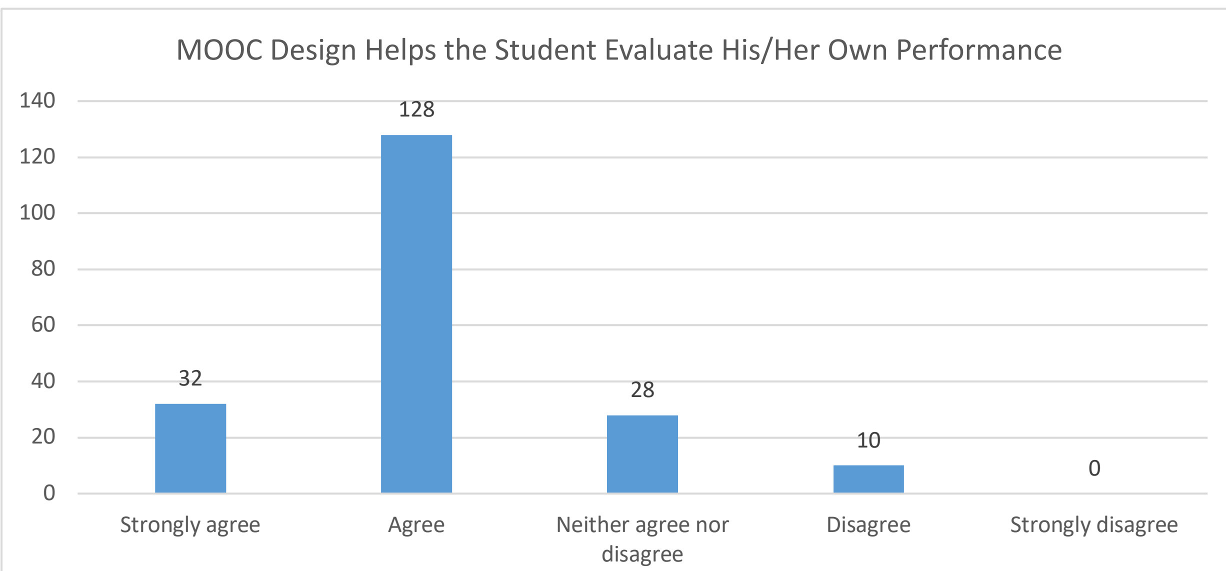

Figure 5. MOOC design helps the student evaluate his/her own performance (*n* = 198).

Regarding the statement "MOOC design helps the student be responsible for his/her learning," a majority of MOOC instructors (88.4%; *n* = 175) reported that they strongly agreed or agreed with this statement (see Figure 6). Twenty-one MOOC instructors (10.6%) selected neutral. As a sign of the importance of SDL in MOOCs, just one each selected *disagree* or *strongly disagree*.

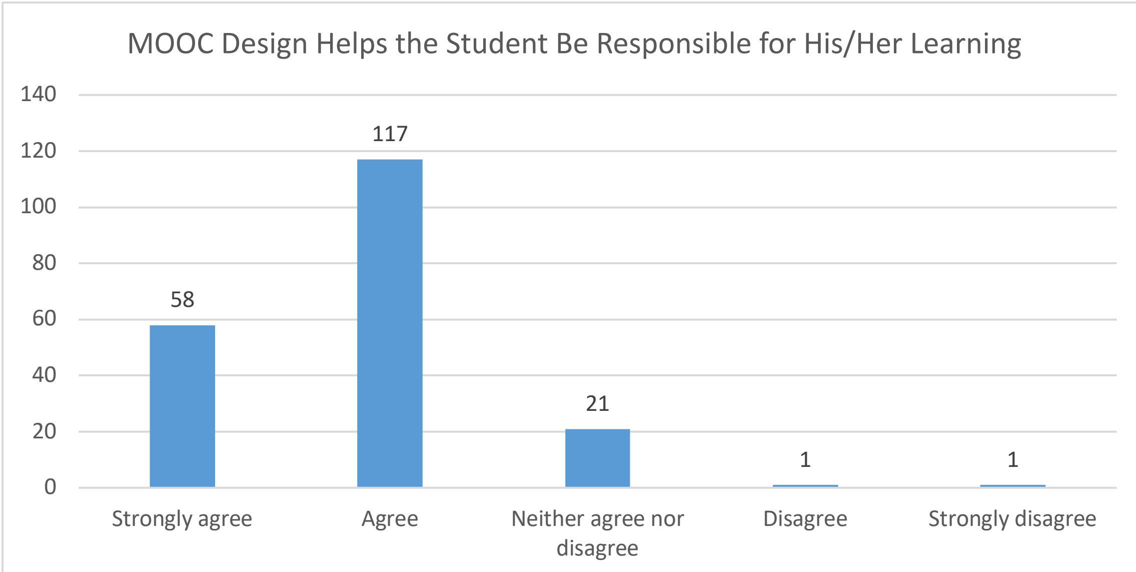

Figure 6. MOOC design helps the student be responsible for his/her learning (*n* = 198).

In terms of helping students focus on a problem, 74.2% of MOOC instructors (*n* = 147) agreed or strongly agreed with the statement. And 46 out of 198 MOOC instructors (23.2%) held a neutral attitude. The other five respondents (2.5%) reported that they disagreed or strongly disagreed that it "helps the student be able to focus on a problem."

Regarding the statement that "the MOOC design helps the student be able to find information related to learning content for him/herself," 23.7% of MOOC instructor respondents (*n* = 47) strongly agreed with that statement, and 47.5% (*n* = 94) agreed with it. In addition, 44 out of 198 MOOC instructors (22.2%) responded neutrally to that statement. The rest of the respondents (6.6%; *n* = 13) reported *strongly disagree* or *disagree*.

Last but not least, for the statement "the MOOC helps the student have high beliefs in his/her abilities of learning," 41.9% (*n* = 83) agreed with the statement, and another 18.2% of the MOOC instructor respondents (*n* = 36) strongly agreed. Perhaps somewhat more telling, 35.4% MOOC instructors (*n* = 70) neither agreed nor disagreed with the statement. The remaining nine instructors (4.5%) reported that they strongly disagreed or disagreed with the statement.

Interview Results

During the interviews, MOOC instructors reported that they facilitated students' self-monitoring in a range of ways, from helping students with internal feedback to providing external feedback (see Table 3 for details). Of course, external feedback and internal feedback are intertwined. Students' internal feedback includes cognitive and metacognitive processes. Cognitive processing involves self-observation, self-judgment, and self-reaction. Metacognitive processing is related to reflection and thinking critically. External feedback is provided not only by the MOOC instructors but also by their teaching assistants as well as students' peers in the MOOC.

Table 3

Strategies to Facilitate Students' Self-Monitoring

Strategies		**Quotations**
Internal feedback		
Cognition	Quiz	In every module, there is a self-assessment quiz that they can take as many times as they want to demonstrate mastery. So that helps them self-assess whether they're getting the content that I want them to learn. (Hannah)
	Tutorials	I think that's actually a very useful skill in itself for them to learn. And it's really funny, because we think nowadays it's 2018. And, of course, all school teachers know how to set up a website, and how to download an image, and put it in a Web page, and how to edit it. Oh, yes, of course, they don't. They don't have a clue. … It's a sort of bonus little skills for people. (Mason)
	Learning strategies	We had one video right at the beginning. Students had access. That gave people advice about learning in a MOOC. (Lucas)
	Learning aids	I walk them through in the first module in a sequential way in the video, where I'm showing them the course. So all of these videos walk them through all of the different elements of the course. … So I really try to be as organized and scaffold it as early as possible, so they can be successful on all those task oriented type things. (Hannah)
	Modeling	Because we're teaching people how to teach. We have to do a lot of strategies that help teachers. … Like, we have to model the behavior a lot. (Logan)
Metacognition	Reflection questions	We introduced kind of moments that video was stopped and there was a question. The student had to think of it a bit. Sometimes it was kind of a rhetorical question. There wasn't even [an] answer required. But it was just a pause for a while to let the student reflect. (Jacob)
	Learning community	We've got a Facebook community of teachers who teach through the medium of English to international audiences. And that's another place for conversation and networking. So people start to realize what they want to achieve, and what they want to improve, and where they want to focus on the course. And they can communicate more effectively on the MOOC because they are networking outside. So that sometimes happens. (Joshua)
External feedback		
Instructors		I think it's really important to keep students both in the MOOC and on campus in a feedback loop. "OK, you are learning. You probably don't even know you're learning some of these things. But, you have picked them up." It is important to keep having those conversations with them, [and] having that feedback loop both through the panels and the lectures. (Joseph)
Teaching assistants (TAs)		There is a discussion board. In [the] discussion board, I have an assistant, who monitored a discussion board. She reviews all the discussion items on a regular basis each week. She answers the questions that she is familiar with. If she's not, then she ask[s] me. And I write her responses. And she posts in her own language. (Jackson)
Peers		The way assessment works for our assignments, there are instructions. We asked learners to submit in the forums. And then we have guidelines for peer feedback. Again, all of this is on the forum system. So people are providing feedback to their peers in the forums. (Ashley)

Facilitate student internal feedback. MOOC instructors help student self-monitoring in terms of both cognitive and metacognitive processes. To help students' cognitive learning processes, MOOC instructors indicated that they usually provided quizzes for self-assessment, tutorials on technology use, navigational aids for the course, supplemental resources, and instructional modeling. They also supported effective learning strategies with their instructional scaffolds, feedback, and suggestions, such as the best sequences for studying the related topics. Scholars claim that self-assessment helps students reflect on their learning and achievement (Pintrich & Zusho, 2002; Zimmerman & Schunk, 2001). In this study, 13 out of 22 MOOC instructors mentioned that they used quizzes or tests to help student self-assessment. Jacob, a science instructor from the Netherlands, stated the following:

> Well, I think there was always a few test questions in between. Indeed, they were really self-monitoring questions because you did not to pass them or so to go on. There is really self-monitoring questions just to see if you get the highlights from either the video or the reading material that was presented. I think that helps [the] student at least to do the self-monitoring part. … We introduced kind of moments that video was stopped and there was a question. The student had to think of it a bit. Sometimes it was kind of a rhetorical question. There wasn't even [an] answer required. … And the question was then to let students think about how you think this would work or something like that.

Besides quizzes for self-assessment, MOOC instructors provided tutorials on technology use to support students' cognitive learning processes. For instance, Mason, an education instructor from Australia, stated that he made a tutorial on how to use a tool (i.e., WordPress) to help students' learning in the MOOC. In addition, MOOC instructors provided learning strategies and tips to students. One example is that a medicine and health instructor, Joseph, provided discussion participation tips. As he detailed,

> I told people that we cover a wide range of topics. It is really up to you what you want to concentrate on most. Do not try to read every post. Do not try to respond [to] every post. Because you spend 4–5 hours a week. You have to make some choice[s]. I think that give[s] them advice on learning strategies.

MOOC instructors also reported that they provided navigational aids for students learning in MOOCs. For instance, Hannah, an education instructor from the United States, provided scaffolding to students to help them focus on tasks. For instance, she noted that:

> We also have a visual map, too. Just to give them different ways to look at the topics that we cover for each module. And then I get them some common terminology in the course in case they are brand new and don't know some of these terms and what the expectations are as participants.

Henry made learning resources available to help students' cognitive processes. As he observed, "I think we try to get the resources they can refer to. If you get stuck, they can come back to the previous videos." Logan, a language and literacy instructor from the United States, used a different strategy to help students' cognitive processes. The students in his course were mainly teachers who were teaching or would teach English as a foreign language (EFL) learners. In order to help EFL teachers, he modeled teaching approaches to his students, which allowed them to believe that it was easy to achieve their goals.

In addition to the strategies used to facilitate students' cognitive processes, MOOC instructors also paid attention to facilitating students' metacognitive processes. In terms of metacognition, the interviewees indicated that they encouraged students to reflect and think critically by providing reflection questions and opportunities to reflect. They also attempted to build learning communities. Five out of 22 MOOC instructors had self-reflection questions embedded in the MOOC to encourage students' self-reflection. A social science instructor from Australia, Ben, observed the following:

> In terms of self-monitoring, I think students often find it very difficult to self-evaluate and self-recognize. As I mentioned earlier, I've got three modules. At the end of each module, I have those questions that I talked about what you have learned now, and what you are not sure about, and what you need more information about.

However, the language instructor from the UK, Joshua, encouraged students to reflect on their previous learning through watching summary videos before they moved on. As he noted,

> At the end of each week, we've made a video, a live video, to try and draw attention to what different people were saying. Because we could notice patterns of what people were saying … we could draw attention to particular participant, and say, "This person is doing this. That sounds pretty interesting. This other person is doing that. And that sounds really interesting." We were hoping to draw people's attention to the bigger trends that [are] happening. Maybe they don't notice. They do the step. And then they go to the next step. They forget what came before. So we were trying to encourage people to go back and discuss the basics before they moved on.

Another strategy that MOOC instructors reported that they used is to create a learning community to help students' reflection and have conversations with peers. The learning community can help students communicate with each other effectively concerning course tasks. As an example, Joshua from the UK stated that he created a Facebook page for students to interact and communicate with each other. This concurs with the previous studies, such as Sze-Yeng and Hussain (2010) and Fischer and Sugimoto (2006). Fischer and Sugimoto (2016) indicated that learning communities can transfer the isolated image of the reflective practitioner (Schon, 1983) to reflective communities (Fischer, 2005) for self-directed learning.

Provide external feedback to help students' self-monitoring. Besides helping students' internal feedback processes, MOOC instructors also mentioned that they provided external feedback to help student self-monitoring. The external feedback was usually from MOOC instructors, teaching assistants (TAs), and student peers.

Six out of 22 MOOC instructors mentioned that they or their TAs provided feedback to students to assist in monitoring their learning. In addition, Joseph from the UK held synchronous meetings with students in Google Hangouts to provide feedback to them. One example that he mentioned was the following:

> I think, one of the things, which hopefully, help students to reflect and learn meaningfully was the synchronously meeting using Google Hangout[s] at the end of Week Two, Four, and Six. We encourage students to post questions or talking points. And my colleague and I respond to some points.

Given that 12 out of 22 MOOC instructors had TAs in their MOOCs, the TAs helped provide feedback to students. For instance, the science instructor, Jason, had his graduate student as his TA to provide feedback to students on a discussion board. He observed that,

> People would write in questions or comments or whatever. And, I wasn't managing the discussion board in any of the versions of MOOCs that we offered. I had my graduate student, Josh. He's closer to the age of most of the learners. He could develop conversations that I probably didn't have the social skills to develop. … And in our case, it was Nate who have been very, very, very closely involved in the development of the MOOC. Nate knew where the strong and weak points of the MOOC were, and could answer people's questions about not only sharks, but what they [were] supposed to take away from this.

Thirteen out of 22 MOOC instructors talked about how they use peer assessment to help students' self-monitoring. They highlighted that self-monitoring is a social process, which involves interaction with others. Peer assessment was considered beneficial for both the learners who provided the feedback and the learners who received feedback (Barak & Rafaeli, 2004; Dochy, Segers, & Sluijsmans, 1999). In peer assessment, students not only get other students' feedback but also help them self-reflect through providing feedback to peers. For example, a literacy and language instructor, Emma, used peer assessment in her MOOC to motivate students and help them with self-reflection. As Emma observed,

> We also put in peer evaluation because they thought that the interaction between students would motivate them. We give a very, very basic syllabus because we don't know what the educational background and the levels of the students [are]. … Maybe five different key points enable them to evaluate other students on assignment[s]. Just to make it accessible, but to also keep them engaged as other people are looking at their work. But they're also looking at other work to see like what's a more advanced learner doing with this assignment, and how you can be near that or learn from them.

Suggestions to help student self-monitoring. Different MOOC instructors held different opinions on helping students with self-monitoring, such as through assessment, facilitation with discussion, providing diverse materials, and adaptive learning systems. Eight out of 22 MOOC instructors provided suggestions on using assessment for self-monitoring. Emily, a medicine and health instructor from the UK, pointed to the value of embedding short quizzes with immediate feedback. As she suggested, "Take opportunities to allow students to easily assess their own learning, quizzes, and tasks that they can get immediate feedback. I think that is very important."

Similarly, Jacob from the Netherlands also thought some simple questions are helpful. However, he emphasized the quizzes embedded in videos for self-monitoring and motivation. His experience with such types of quizzing is shown in the following quote:

> And one feature I really like is that you could [i.e., foster self-monitoring], if you had built in questions in the videos. The video stopped, the student was forced to think [for] him or herself before the video proceeded. I think it helps because if you just passively basically watch this video it's very easy to stop thinking. And I think with built in video questions, that keeps them alert. … I mean that gives kinds of motivation and self-monitor[ing].

However, Mason from Australia pointed out that using diverse ways to demonstrate students' learning is more important than just multiple-choice questions. He stated that,

> There are things you're going to assess. But much more important is that the way that the student shows [that] they're learning, right? So you need to make those outcomes related to real life. It's not good enough to just have multiple choice questions that confirm whether or not they learn some facts that might be necessary for a little part of the course. … But people need to go out and make something. They need to go out and have a chance to think and share their ideas. And so that's very, very important for assessment design I think.

Besides self-assessment mentioned above, Henry, a social science instructor from the UK, suggested having peer assessment for practical reasons. He observed, "We have people write a paragraph in English. I may have them peer review it. Because this course has so many people, we cannot mark with these assessments. So we did peer review."

Fernando, a research methods instructor from Belgium, emphasized that instructors should facilitate discussion. Per Fernando, "You've got to use the possibilities that come with the MOOC environment and really facilitate that MOOC conversation." Similarly, Henry, a social science instructor who teaches history, stated,

> We find the MOOCs work best when they're very actively mentored. If you use the social learning platform that relies on discussions. Discussions flow better if the learners have a sense that the educators are in the room with them. So when my MOOC was running, I spen[t] ten minutes every day to answer a couple of questions. That's enough to let people see that I'm in there. I am listening. I'm kind of following along. I got 2 or 3 master's and PhD students that we pay to do six hours a week of being in there and commenting on the stuff. That really helps. We got a lot of very positive feedback on that from people saying they've noticed that the MOOC is really well supported by the university.

In addition to assessment and feedback comments and ideas mentioned above, MOOC instructors suggested providing diverse and appropriate learning materials to students. For instance, a business instructor from Australia, Ethan, stated that,

> I had appropriate readings and resources to go through. They were supplemented with industry reports as well. So, there was a whole lot of different levels of content. And I think that was pretty important to give that a variety of some things such as something that is very simple, and something that is a bit more complicated.

MOOC Review Results

Through reviewing 22 MOOCs, we found that the design and delivery of MOOCs facilitated students' self-monitoring through their internal cognitive and metacognitive processes as well as various external support structures and mechanisms. The facilitation with cognitive processes included quizzes, providing introductions, aids to help with course navigation, progress bars, and optional resources. To help metacognitive processes, these MOOC instructors encouraged students to share their thoughts in discussion forums and attempted to build a sense of a learning community.

Facilitate student self-monitoring. As mentioned before, these MOOC instructors provided practice quizzes with immediate feedback to enable students to assess their own learning. Whereas some of the quizzes were independent tasks, others were embedded in MOOC videos (see Figure 7 for an example). As shown in Figure 8, after students took a quiz, they could obtain immediate system-generated feedback and brief comments.

Figure 7. Example of quizzes embedded in videos.

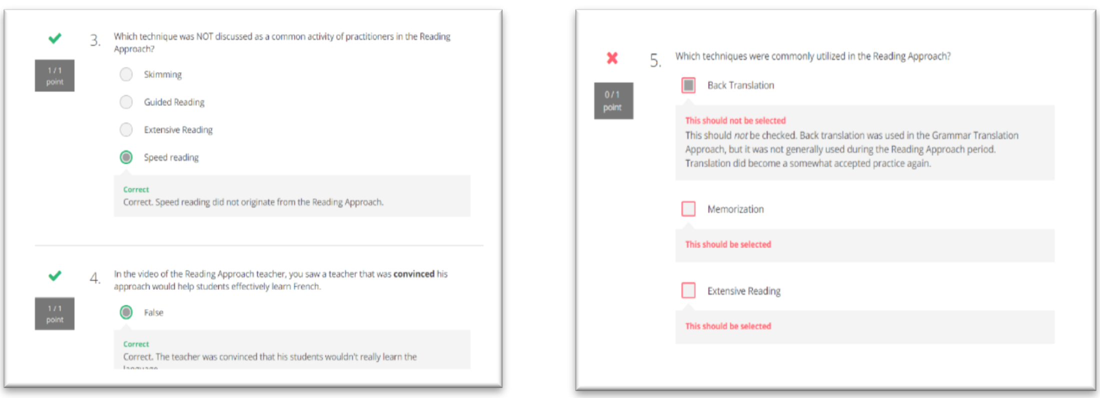

Figure 8. Example of immediate feedback in a MOOC.

In addition, MOOCs provide introductory videos to the course and navigational aids to journey through them. Providing clear navigation can reduce students' cognitive load on items unrelated to the topic, which enables participants to focus more time on content-related cognitive processes (see Figure 9).

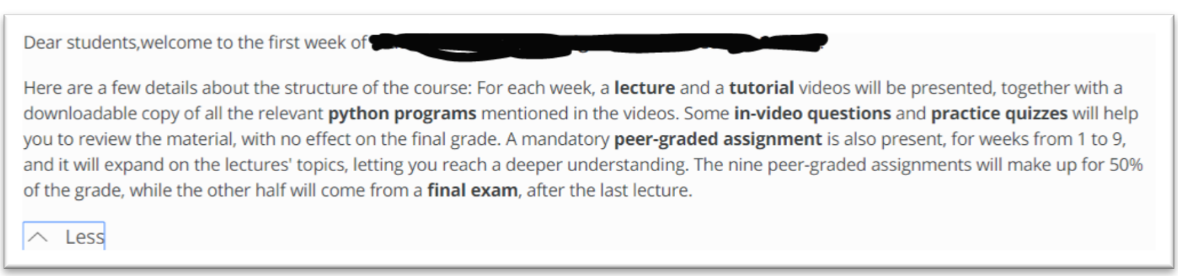

Figure 9. Introduction and navigation of a MOOC.

Besides motivating students, a progress bar helps learners to monitor their learning process and adopt appropriate learning strategies. Additionally, MOOC instructors provided optional reading materials to students (see Figure 10). When this occurs, students can monitor their own learning status and choose readings appropriate to their knowledge level to read.

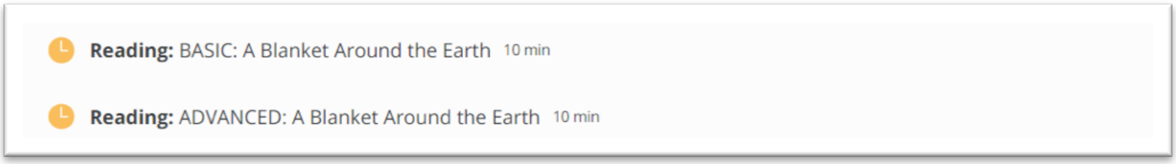

Figure 10. Introduction and navigation of a MOOC.

To help with metacognitive processing, the MOOC instructors encouraged students to reflect and share their thoughts in discussion forums and through building learning communities (see Figure 11).

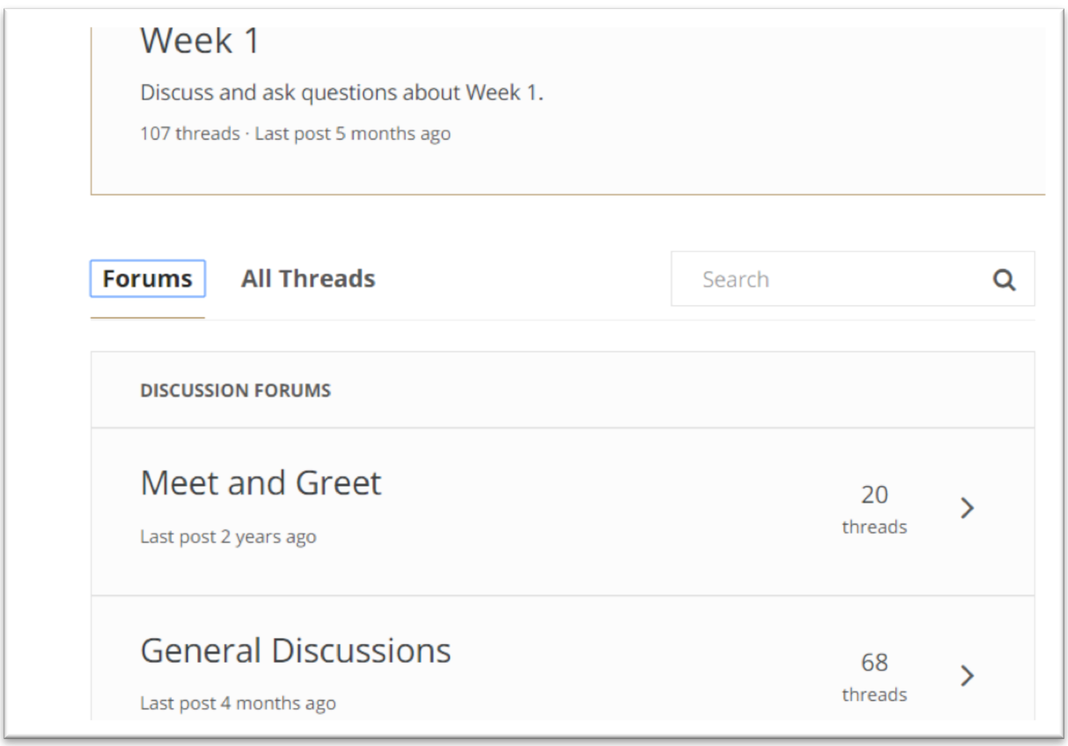

Figure 11. Discussion forum for learning community.

Provide external feedback to help students' self-monitoring. Aligned with interview results, this research investigation found that the MOOC instructors and TAs facilitated discussion forums. In these forums, they addressed students' questions and encouraged peers to provide feedback to each other (see Figure 12). By obtaining such external feedback, students might better monitor their own learning.

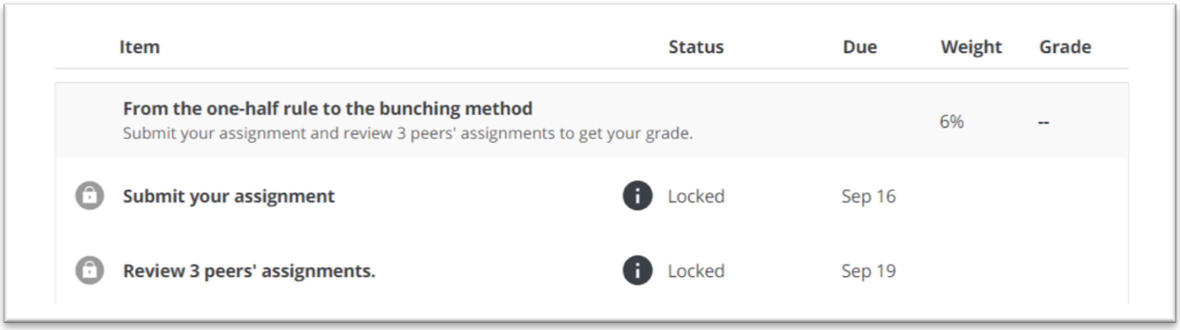

Figure 12. Peer assessment in MOOCs.

Research Question 2: How Are Technologies Used to Support Students' Self-Monitoring Skills for SDL in MOOCs?

Technologies play an important role in online learning environments, including MOOCs. Some technologies, such as a learning management system (LMS), can provide the learning context (Puzziferro, 2008) or serve as the communication tools (e.g., Google Hangouts). To facilitate student self-monitoring, MOOC instructors mentioned that a variety of technologies were used to facilitate students' self-monitoring, including synchronous communication technologies, asynchronous communication technologies, and feedback tools.

Synchronous Communication Technologies

MOOC instructors in this study revealed that they used synchronous technologies, such as Google Hangouts and YouTube Live, to host meetings with students. These instructors thought that using synchronous technologies could provide enhanced opportunities for social interaction between instructors and students, which might foster students' self-monitoring. For example, Hannah used Google Hangouts to conduct a weekly broadcast to connect with students as well as address their questions. Along these same lines, another MOOC instructor, Ashley, used YouTube Live to stream her lectures online and answer participant questions. As she noted,

> These are live events that we do us[ing] YouTube Live. I don't know if you've ever seen that. So, basically, the instructor talks and our learners can just go to YouTube link, and see what the instructors are saying. And also they can ask questions.

Asynchronous Communication Technologies

MOOC instructors reported that they used asynchronous communication technologies, such as discussion forums, Blog, Padlet, Slackbot, social media, Today's Meet, and Discourse (a discussion platform), to connect with MOOC students and attempt to build learning communities. Creating a social interaction environment can motivate students and help them self-monitor their learning. Most of the instructors used the discussion forum that was already provided by the platform. For instance, Joshua from the UK mentioned that,

> We use a lot of resources that already exist. And then we use the MOOC discussion board as a place to where they, kind of, point out and say, "I've seen this. And this is useful. Well, I use this, and this is good well. I created this."

Per the following quote, Henry from the UK used Padlet, a free collaboration tool, in his MOOCs, which might help student self-monitoring: “We have Padlet, which is a photo sharing platform, where people come up with their own photos and discuss them.”

Feedback Tools

As mentioned above, feedback is critical for student SDL. MOOC instructors used formative and summative assessment technologies to help students’ self-monitoring. Emily from the UK used progress bars in her MOOC to motivate students and help their self-monitoring. As she argued,

> I think features like that and along with the weekly structure, that is the progress bar, taking off each item say, “I’ve completed it.” They are all these little rewards as tiny as they are that helped to motivate you.

Andrew from the UK adopted learning analytics to monitor students’ learning and revise his MOOC. In his interview, he stated, “We looked at the learner analytics and we decided to change the rhythm of the MOOC on the second run.”

Discussion and Limitations

Several limitations of this study exist. First, participant information was collected from several key MOOC vendors’ websites, including Coursera, FutureLearn, and edX, while those not in English, like XuetangX, were excluded. In addition, while acceptable for an opt-in survey (Cho & LaRose, 1999), the survey completion rate was just 10%, though it was markedly higher, at 18.2%, when considering the number of email requests that were actually opened. Finally, this study only reported strategies MOOC instructors mentioned that they used to facilitate student self-monitoring; we could not verify whether the strategies that MOOC instructors reported were effective or not, nor could we confirm if they actually were utilized.

The first research question of this study focused on how instructors design and deliver MOOCs to facilitate students’ self-monitoring skills for SDL. Even though many participants in this study had limited MOOC design and teaching experiences, they drew ideas from their previous traditional classroom teaching experience as well as any blended or online experience to facilitate student self-monitoring in MOOCs. Importantly, this study found that MOOC instructors reported that they facilitated students’ self-monitoring by helping students with both internal feedback and external feedback. Students’ internal feedback refers to their cognitive and metacognitive processing, which includes monitoring their learning strategies and an ability to think about their thinking (Garrison, 1997). Schraw, Crippen, and Hartley (2006) defined cognitive skills as having three components: (1) cognitive strategies, (2) problem-solving strategies, and (3) critical thinking skills. They stated that cognitive strategies refer to skills used to improve learning. In contrast, they noted that problem-solving strategies are more focused on solving complex and authentic problems. Third, Schraw and his colleagues argued that critical thinking refers to skills such as identifying and analyzing information critically.

To facilitate learners’ cognitive learning processes, MOOC instructors reported that strategies such as quizzes for self-assessment, progress indicators, tutorials on technology use, learning tips, navigational aids for the course, instructional modeling, and various other resources and supports were used. MOOC instructors reported that self-assessment and progress indicators gave their participants a chance to review their work and monitor their learning process. Such results align with the findings of Kulkarni et al. (2013). Other scholars have claimed that self-assessment helps students reflect on their learning and achievement (Pintrich & Zusho, 2002; Zimmerman & Schunk, 2001) and offers students a learning opportunity that they could not obtain from external feedback (Dow et al., 2012).

In addition, instructional modeling was used in MOOCs to assist student cognitive processing reported by instructors in this study. Importantly, famed social learning psychologist Albert Bandura (1997) stated that modeling could possibly elevate one's level of self-efficacy. *Modeling* refers to students intentionally learning from others through observation (Schraw et al., 2006). Modeling has proven effective for decades (Bandura, 1997; Jonassen, 1999; Merrill & Gilbert, 2008), as it demonstrates new strategies that are potentially within reach of a learner. According to Schunk and Zimmerman (1996), modeling can be especially helpful for one's self-efficacy, especially if the model is of a similar ability level, such as one's peer. Such an alignment further helps student cognitive processing of the task or situation.

In terms of facilitating metacognitive processing, in the present study, MOOC instructors encouraged students to reflect and think critically by providing reflection questions, opportunities to reflect, and assistance in building a learning community. This finding aligns with insights from Parker et al. (1995), who found that encouraging reflection can improve student SDL skills. Similarly, Schraw (1998) argued that reflection plays a vital role in building student metacognitive knowledge and self-monitoring skills; reflection can be particularly effective when constant opportunities are provided to students (Kuhn, Schauble, & Garcia-Mila, 1992). Likewise, Boud, Keogh, and Walker (2013) also emphasized the importance of using reflection to transfer the learning experience to novel settings and situations.

External feedback can both motivate students and help with their self-monitoring. To foster students' self-monitoring via external feedback mechanisms, MOOC instructors, teaching assistants, and peers were involved in the learning process. The instructors we surveyed and interviewed revealed that MOOC instructor and TA feedback can help MOOC participants identify key places for learning improvement. In addition, research indicates that when peer-assessment mechanisms are adopted, they can be beneficial to both the learners who provide the feedback and the learners who receive it (Barak & Rafaeli, 2004; Dochy et al., 1999).

The second research question addressed the use of technology to facilitate self-monitoring. As mentioned in the current study findings, MOOC instructors leveraged a variety of technologies to facilitate self-monitoring for SDL. Such technologies included: (1) synchronous communication technologies, (2) asynchronous communication technologies, and (3) feedback tools.

These three types of technologies served different purposes. First, the data indicated that these technologies support building a community of learners. MOOC instructors reported that the synchronous technologies, such as Google Hangouts and YouTube Live, as well as asynchronous communication technologies, such as discussion forums, blogs, Padlet, Slackbot, and various social media (e.g., Facebook), were functioning as communication technologies that could support students' interaction and communication. Such results align with the findings of Blaschke (2012) and Junco, Heiberger, and Loken (2010), who found that using social media can support student SDL. These results are also backed up by decades of research on social learning theory from Bandura (1977) and his colleagues (e.g., Schunk & Zimmerman, 1996), which emphasizes that people learn from others through observation, imitation, and modeling. In addition, our findings support Candy's (1991) view that SDL is realized in collaboration and interaction; today, however, such collaborations and interactions are increasingly happening online.

Besides employing synchronous and asynchronous communications and conferencing technology to build a community of learners, commonly used feedback tools, such as progress bars and learning analytics, might help students with self-monitoring for SDL in MOOCs. In addition to using vendor-supported technology, many prior researchers have designed specific tools to support students SDL in MOOCs (e.g., Gutiérrez-Rojas, Alario-Hoyos, Pérez-Sanagustín, Leony, & Delgado-Kloos, 2014). It is increasingly clear that technology, whether purchased from a vendor or designed by the instructor, can play an important role in student self-monitoring for SDL. Given that previous studies have indicated that technology can predict student SDL (Rashid & Asghar, 2016) and engagement (Chen, Lambert, & Guidry, 2010; Clements, 2015), including self-monitoring, such a role is becoming vital to learner success in open and distance forms of learning today. Accordingly, MOOC instructors and instructional designers need to continue to explore and uncover ways to appropriately leverage technologies for self-monitoring for SDL.

Conclusions and Future Directions

This study offers insights into MOOC design and delivery to facilitate student self-monitoring for SDL. In addition, various technology tools and systems employed to facilitate self-monitoring were also revealed. The findings provide implications for instructors or instructional designers concerning the design of MOOCs for self-monitoring. Of course, the online surveys, interviews, and document reviews were just the first steps in the process. Thus, we are expanding the current research study with additional MOOC instructor participants to further inform the design of more effective and engaging MOOCs. We are also in the midst of a study of students' perceptions of effective self-monitoring strategies to verify the strategies emphatically emphasized and detailed as well as those more casually mentioned by the instructors.

Given the expansion of MOOCs and other forms of open education during the past decade to more than 100 million learners enrolling in over 11,000 MOOCs in 2018 alone (Shah, 2019), the time is ripe for investigating whether cognitive and metacognitive processes needed to succeed in MOOCs can be enhanced and whether such skill enhancements might transfer to other learning-related settings and situations. In effect, a goal of MOOC researchers engaged in these types of studies—as well as for MOOC educators—is for SDL skills to not only percolate, evolve, and thrive in MOOCs, but to become so ingrained in one's learning habits that they become part of one's approach to each and every learning task. As such, additional studies should investigate different direct and indirect feedback mechanisms and strategies, forms and types of instructional scaffolds, interaction and engagement features, modeling behaviors, and other mechanisms that can help in the design of MOOCs that facilitate participant self-monitoring for SDL.

References

Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice Hall.

Barak, M., & Rafaeli, S. (2004). On-line question-posing and peer-assessment as means for web-based knowledge sharing in learning. *International Journal of Human-Computer Studies, 61*(1), 84–103. https://doi.org/10.1016/j.ijhcs.2003.12.005

Beaven, T., Codreanu, T., & Creuzé, A. (2014). *Motivation in a language MOOC: Issues for course designers*. Retrieved from https://www.degruyter.com/downloadpdf/books/9783110422504/9783110422504.4/9783110422504.4.pdf

Blaschke, L. M. (2012). Heutagogy and lifelong learning: A review of heutagogical practice and self-determined learning. *The International Review of Research in Open and Distributed Learning, 13*(1), 56–71. doi:10.19173/irrodl.v13i1.1076

Bonk, C. J., Lee, M. M., Reeves, T. C., & Reynolds, T. H. (Eds.). (2015). *MOOCs and open education around the world*. New York: Routledge.

Bonk, C. J., Zhu, M., Kim, M., Xu, S., Sabir, N., & Sari, A. (2018). Pushing toward a more personalized MOOC: Exploring instructor selected activities, resources, and technologies for MOOC design and implementation. *The International Review of Research on Open and Distributed Learning* (IRRODL), *19*(4), 92–115. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/3439/4765

Boud, D., Keogh, R., & Walker, D. (2013). *Reflection: Turning experience into learning*. New York, NY: Routledge.

Brockett, R. G., & Hiemstra, R. (1991). *Self-direction in adult learning: Perspectives on theory, research, and practice* (Vol. 20). London: Routledge.

Candy, P. C. (1991). *Self-direction for lifelong learning. A comprehensive guide to theory and practice*. San Francisco, CA: Jossey-Bass.

Chang, M. M. (2007). Enhancing web-based language learning through self-monitoring. *Journal of Computer Assisted Learning, 23*(3), 187–196. doi:10.1111/j.1365-2729.2006.00203.x

Chen, P. S. D., Lambert, A. D., & Guidry, K. R. (2010). Engaging online learners: The impact of Web-based learning technology on college student engagement. *Computers & Education*, *54*(4), 1222–1232. https://doi.org/10.1016/j.compedu.2009.11.008

Cho, H., & LaRose, R. (1999). Privacy issues in Internet surveys. *Social Science Computer Review, 17*(4), 421–434. https://doi.org/10.1177/089443939901700402

Clements, J. C. (2015). Using Facebook to enhance independent student engagement: A case study of first-year undergraduates. *Higher Education Studies, 5*(4), 131–146. http://dx.doi.org/10.5539/hes.v5n4p131

Coleman M. C., & Webber J. (2002). *Emotional and behavioral disorders*. Boston, MA: Pearson Education Company.

Creswell, J. W., & Plano-Clark, V. L. (2017). *Designing and conducting mixed methods research* (3rd ed.). Thousand Oaks, CA: Sage.

Delclos, V. R., & Harrington, C. (1991). Effects of strategy monitoring and proactive instruction on children's problem-solving performance. *Journal of Educational Psychology, 83*(1), 35. Retrieved from https://psycnet.apa.org/buy/1991-19728-001

Dochy, F. J. R. C., Segers, M., & Sluijsmans, D. (1999). The use of self-, peer and co-assessment in higher education: A review. *Studies in Higher Education, 24*(3), 331–350. https://doi.org/10.1080/03075079912331379935

Dow, S., Kulkarni, A., Klemmer, S., & Hartmann, B. (2012, February). Shepherding the crowd yields better work. In *Proceedings of the ACM 2012 conference on computer supported cooperative work* (pp. 1013–1022). ACM. Retrieved from https://dl.acm.org/citation.cfm?id=2145355

Fischer, G. (2005). From reflective practitioners to reflective communities. In *Proceedings of the HCI international conference (HCII)*, Las Vegas. Retrieved from http://l3d.cs.colorado.edu/~gerhard/papers/reflective-communities-hcii-2005.pdf

Fischer, G., & Sugimoto, M. (2006). Supporting self-directed learners and learning communities with sociotechnical environments. *Research and Practice in Technology Enhanced Learning, 1*(1), 31–64. Retrieved from https://pdfs.semanticscholar.org/0ed6/e061fc277045f4cc5e711bc7f539c60ec4a5.pdf

Fisher, M. J., & King, J. (2010). The self-directed learning readiness scale for nursing education revisited: A confirmatory factor analysis. *Nurse Education Today, 30*(1), 44–48. doi:10.1016/j.nedt.2009.05.020

Fraenkel, J. R., & Wallen, N. E. (2009). The nature of qualitative research. *How to design and evaluate research in education* (7th ed., p. 420). Boston: McGraw-Hill.

Garrison, D. R. (1997). Self-directed learning: Toward a comprehensive model. *Adult Education Quarterly*, *48*(1), 18–33. Retrieved from http://journals.sagepub.com/doi/pdf/10.1177/074171369704800103

Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. *Field Methods, 18*(1), 59–82. doi:10.1177/1525822X05279903

Gutiérrez-Rojas, I., Alario-Hoyos, C., Pérez-Sanagustín, M., Leony, D., & Delgado-Kloos, C. (2014). Scaffolding self-learning in MOOCs. *Proceedings of the European MOOC Stakeholder Summit, 2014*, 43–49. Retrieved from http://educate.gast.it.uc3m.es/wp-content/uploads/2014/02/Scaffolding_self-learning_in_MOOCs.pdf

Haney, W., Russell, M., Gulek, C., & Fierros, E. (1998). Drawing on education: Using student drawings to promote middle school improvement. *Schools in the Middle, 7*(3), 38–43. Retrieved from https://eric.ed.gov/?id=EJ561666

Hewitt-Taylor, J. (2001). Self-directed learning: Views of teachers and students. *Journal of Advanced Nursing*, *36*(4), 496–504. https://doi.org/10.1046/j.1365-2648.2001.02001.x

Jonassen, D. (1999). Designing constructivist learning environments. In C. M. Reigeluth (Ed.), *Instructional-design theories and models* (Vol. II, pp. 215–239). Mahwah, NJ: Lawrence Erlbaum.

Junco, R., Heiberger, G., & Loken, E. (2011). The effect of Twitter on college student engagement and grades. *Journal of Computer Assisted Learning*, *27*(2), 119–132. doi:10.1111/j.13652729.2010.00387.x

Kell, C., & Deursen, R. V. (2002). Student learning preferences reflect curricular change. *Medical Teacher*, *24*(1), 32–40. doi:10.1080/00034980120103450

Kop, R., & Fournier, H. (2011). New dimensions to self-directed learning in an open networked learning environment. *International Journal for Self-Directed Learning, 7*(2), 1–19. Retrieved from https://docs.wixstatic.com/ugd/dfdeaf_b1740fab6ad144a980da1703639aeeb4.pdf

Kuhn, D., Schauble, L., & Garcia-Mila, M. (1992). Cross-domain development of scientific reasoning. *Cognition and Instruction, 9*(4), 285–327. https://doi.org/10.1207/s1532690xci0904_1

Kulkarni, C., Wei, K. P., Le, H., Chia, D., Papadopoulos, K., Cheng, J., … Klemmer, S. R. (2013). Peer and self-assessment in massive online classes. *ACM Transactions on Computer-Human Interaction (TOCHI), 20*(6), 33. http://dx.doi.org/10.1145/2505057

Leech, N. L., & Onwuegbuzie, A. J. (2007). An array of qualitative data analysis tools: A call for data analysis triangulation. *School Psychology Quarterly, 22*(4), 557. doi:10.1037/1045-3830.22.4.557

Loizzo, J., Ertmer, P. A., Watson, W. R., & Watson, S. L. (2017). Adult MOOC learners as self-directed: Perceptions of motivation, success, and completion. *Online Learning*, *21*(2). doi:10.24059/olj.v21i2.889

Lunyk-Child, O. I., Crooks, D., Ellis, P. J., Ofosu, C., & Rideout, E. (2001). Self-directed learning: Faculty and student perceptions. *Journal of Nursing Education*, *40*(3), 116–123. doi:10.3928/0148-4834-20010301-06

Maag, J. W., Rutherford, R. B., Jr., & Digangi, S. A. (1992). Effects of self-monitoring and contingent reinforcement on on-task behavior and academic productivity of learning disabled students: A social validation study. *Psychology in the Schools, 29*(2), 157–172. https://doi.org/10.1002/1520-6807(199204)29:2<157::AID-PITS2310290211>3.0.CO;2-F

Malone, L. D., & Mastropieri, M. A. (1991). Reading comprehension instruction: Summarization and self-monitoring training for students with learning disabilities. *Exceptional Children, 58*(3), 270–279. https://doi.org/10.1177/001440299105800309

Margaryan, A., Bianco, M., & Littlejohn, A. (2015). Instructional quality of massive open online courses (MOOCs). *Computers & Education*, *80*, 77–83. doi:10.1016/j.compedu.2014.08.005

Merriam, S. B. (1988). *Case study research in education: A qualitative approach*. San Francisco, CA: Jossey-Bass.

Merriam, S. B. (2001). Andragogy and self-directed learning: Pillars of adult learning theory. *New Directions for Adult and Continuing Education, 2001*(89), 3–14. doi:10.1002/ace.3

Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. San Francisco, CA: Jossey-Bass.

Merrill, M. D., & Gilbert, C. (2008). Effective peer interaction in a problem-centered instructional strategy. *Distance Education, 29*(2), 199–207. doi:10.1080/01587910802154996

Parker, D. L., Webb, J., & D'Souza, B. (1995). The value of critical incident analysis as an educational tool and its relationship to experiential learning. *Nurse Education Today, 15*(2), 111–116. doi: 10.1016/S0260-6917(95)80029-8

Patton, M. Q. (2002). Two decades of developments in qualitative inquiry: A personal, experiential perspective. *Qualitative Social Work*, *1*(3), 261–283. https://doi.org/10.1177/1473325002001003636

Pintrich, P. R., & Zusho, A. (2002). Student motivation and self-regulated learning in the college classroom. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (pp. 55–128). Springer, Dordrecht.

Prociuk, J. L. (1990). Self-directed learning and nursing orientation programs: Are they compatible? *The Journal of Continuing Education in Nursing*, *21*(6), 252–256. doi:10.3928/0022-0124-19901101-07

Puzziferro, M. (2008). Online technologies self-efficacy and self-regulated learning as predictors of final grade and satisfaction in college-level online courses. *The American Journal of Distance Education, 22*(2), 72–89. doi:10.1080/089236408020390

Rashid, T., & Asghar, H. M. (2016). Technology use, self-directed learning, student engagement and academic performance: Examining the interrelations. *Computers in Human Behavior, 63*, 604–612. https://doi.org/10.1016/j.chb.2016.05.084

Rohs, M., & Ganz, M. (2015). MOOCs and the claim of education for all: A disillusion by empirical data. *The International Review of Research in Open and Distributed Learning*, *16*(6). doi:10.19173/irrodl.v16i6.2033

Ross, J., Sinclair, C., Knox, J., & Macleod, H. (2014). Teacher experiences and academic identity: The missing components of MOOC pedagogy. *MERLOT Journal of Online Learning and Teaching*, *10*(1), 57. Retrieved from http://jolt.merlot.org/vol10no1/ross_0314.pdf

Schon, D. A. (1983). *The reflective practitioner: How professionals think in action*. New York: Basic Books.

Schraw, G. (1998). Promoting general metacognitive awareness. *Instructional Science, 26*(1-2), 113–125. Retrieved from https://link.springer.com/article/10.1023/A:1003044231033

Schraw, G., Crippen, K. J., & Hartley, K. (2006). Promoting self-regulation in science education: Metacognition as part of a broader perspective on learning. *Research in Science Education, 36*(1-2), 111–139. doi:10.1007/s11165-005-3917-8

Schunk, D. H. (1982). Progress self-monitoring: Effects on children's self-efficacy and achievement. *The Journal of Experimental Education, 51*(2), 89–93. https://doi.org/10.1080/00220973.1982.11011845

Schunk, D. H., & Zimmerman, B. J. (1996). Modeling and self-efficacy influences on children's development and self-regulation. In J. Juvonen & K. Wentzel (Eds.), S*ocial motivation: Understanding children's school adjustment* (pp. 154–180). Cambridge, England: Cambridge University Press.

Shah, D. (2017). MOOCs find their audience: Professional learners and universities. *Class Central*. Retrieved from https://www.classcentral.com/report/moocs-find-audience-professional-learners-universities/

Shah, D. (2019). Year of MOOC-based degrees: A review of MOOC stats and trends in 2018. *Class Central*. Retrieved from https://www.class-central.com/report/moocs-stats-and-trends-2018/

Sze-Yeng, F., & Hussain, R. M. R. (2010). Self-directed learning in a socioconstructivist learning environment. *Procedia-Social and Behavioral Sciences, 9,* 1913–1917. doi:10.1016/j.sbspro.2010.12.423

Terras, M. M., & Ramsay, J. (2015). Massive open online courses (MOOCs): Insights and challenges from a psychological perspective. *British Journal of Educational Technology*, *46*(3), 472–487. doi: 10.1111/bjet.12274

Watson, S. L., Loizzo, J., Watson, W. R., Mueller, C., Lim, J., & Ertmer, P. A. (2016). Instructional design, facilitation, and perceived learning outcomes: An exploratory case study of a human trafficking MOOC for attitudinal change. *Educational Technology Research and Development*, *64*(6), 1273–1300. doi:10.1007/s11423-016-9457-2

Williamson, S. N. (2007). Development of a self-rating scale of self-directed learning. *Nurse Researcher, 14*(2), 66–83. Retrieved from https://search.proquest.com/openview/c7980aea8ee20b570c57e9102cf5b9ea/1?pq-origsite=gscholar&cbl=33100

Zimmerman, B. J. (1999) Commentary: Toward a cyclically interactive view of self-regulated learning. *International Journal of Educational Research 31*, 545–551.

Zimmerman, B. J., & Paulsen, A. S. (1995). Self-monitoring during collegiate studying: An invaluable tool for academic self-regulation. *New Directions for Teaching and Learning, 1995*(63), 13–27. https://doi.org/10.1002/tl.37219956305

Zimmerman, B. J., & Schunk, D. H. (Eds.). (2001). *Self-regulated learning and academic achievement: Theoretical perspectives.* New York, NY: Routledge.

Zhu, M., Bonk, C. J., & Sari, A. R. (2018). Instructor experiences designing MOOCs in higher education: Pedagogical, resource, and logistical considerations and challenges. *Online Learning, 22*(4), 203–241. doi:10.24059/olj.v22i4.1495

Zhu, M., & Bonk, C. J. (2019). Designing MOOCs to facilitate participant self-directed learning: An analysis of instructor perspectives and practices. *International Journal of Self-Directed Learning, 16*(2), 39-60. Retrieved from http://publicationshare.com/pdfs/Designing-MOOCs-for-SDL.pdf

Appendix
Interview Protocol

<u>Instructor Background</u>

1. Could you please briefly introduce yourself?
2. What is your experience with designing MOOCs?

<u>Design and SDL</u>

3. What kinds of students do you think have taken/are taking/will be taking the MOOC?
4. What's your understanding about self-directed learning (SDL)?

Provide definition:

Based on Garrison's (1997) self-directed learning model, SDL has three overlapping aspects: (1) self-management (task control); (2) self-monitoring (cognitive responsibility); and (3) motivating (both entering motivation and task motivation).

Self-management is related to task control, such as the management of learning time, resources, and support.

Self-monitoring involves cognitive and metacognitive processes which includes monitoring the learning strategies and the ability to think about thinking. For example, learners know how to set up their learning goals and evaluate their learning.

Motivation can initiate and maintain the effort toward learning and realizing cognitive goals, such as learners' motivation of taking MOOCs, engagement in the course tasks.

5. What types of self-directed learning skills might prove beneficial when taking a MOOC?
6. What do you think of the responsibility of instructors to facilitate students' SDL skills in MOOCs?
7. How do you think the design and delivery of your MOOC can help develop students' **self-management skills such as time, resources, and support?** Could you please give me a specific example in designing or developing your MOOC that might have had a direct or indirect impact on these skills?
8. In the previous survey, you mentioned the design and delivery of your MOOC can help students to **set their own learning goals.** Could you please give me a specific example in designing or developing your MOOC that might have had a direct or indirect impact on these skills?
9. How do you think the design and delivery of your MOOC can help develop students' **self-control skills, such as monitoring learning strategies and learning paces**? Could you please give me a specific example in designing or developing your MOOC that might have had a direct or indirect impact on these skills?
10. In the previous survey, you mentioned the design and delivery of your MOOC can help students to **evaluate their own learning and performance**. Could you please give me a

specific example in designing or developing your MOOC that might have had a direct or indirect impact on these skills?

11. How do you think the design and delivery of your MOOC can **motivate students**? Could you please give me a specific example in designing or developing your MOOC that might have had a direct or indirect impact on these skills?
12. How is technology being used to help students' SDL skills?
13. What technology features or functions do you want to have to help students' SDL skills?
14. If a new MOOC instructor is going to design and teach a new MOOC, what suggestions do you have to help them to design and teach a MOOC that facilitate students' SDL skills?

Instructor Perceptions of Quality Learning in MOOCs They Teach

Jacob H. Askeroth and Jennifer C. Richardson
Purdue University

Abstract
Included in the discussions regarding the instructional and learning value of massive open online courses (MOOCs) is the question of whether MOOC learners gain much value, if any at all, and has been a continuing debate since MOOCs began. Skeptics argue that MOOCs lack academic rigor and are superficial, while proponents praise them as addressing important global issues of educational access and affordability, providing pathways to more substantial learning opportunities. An important viewpoint in this conversation that warrants consideration is that of the professors/instructors who teach MOOCs and how they perceive the quality of learning that takes place in their MOOCs. In this case study, we used semistructured qualitative interviews with three MOOC instructors in addition to course and document reviews to identify examples of their perceptions in practice. The findings from this case study suggest that instructors do believe that quality learning can take place within a MOOC and is often accomplished through social constructivism and self-regulated learning approaches. Discussions, dialogues, negotiations, and collaborations as well as learners accomplishing their intended goals in the course were all considered to be manifestations of quality learning in a MOOC. Implications of the findings for additional research and practice are also discussed.

Keywords: massive open online courses, MOOCs, social constructivism, self-regulated learning, online learning, case study

Askeroth, J.H., & Richardson, J.C. (2019). Instructor perceptions of quality learning in MOOCs they teach. *Online Learning, 23*(4), 135-159. doi:10.24059/olj.v23i4.2043

Instructor Perceptions of Quality Learning in MOOCs They Teach

Enrollments in, and diversification of, online learning contexts continue to grow (Seaman, Allen, & Seaman, 2018), especially as massive open online courses (commonly referred to as MOOCs) have begun to play a larger role in the online education industry (Palvia et al., 2018). MOOCs stem from a vision to provide free public access to education in large, open courses offered in an online format (Ferguson, Sharples, & Beale, 2015), which intends to address important global issues, such as educational access and affordability (Evans & Myrick, 2015; Ferguson & Clow, 2015; Friedman, 2013). As an emerging online learning context, MOOCs offer unique learning experiences for the learner (Littlejohn, Hood, Milligan, & Mustain, 2016), alter the role of the online instructor (Haavind & Sistek-Chandler, 2015; Ross, Sinclair, Knox, Bayne, & Macleod, 2014; Zheng, Wisniewski, Rosson, & Carroll, 2016), and tend to attract learners with diverse interests and goals (Walji, Deacon, Small, & Czerniewicz, 2016). Due to these referenced opportunities provided by MOOCs, many institutions and providers are finding new ways to utilize and package MOOCs as pathways toward degree programs and even offer full master's degrees on their platforms (Baker, Passmore, & Mulligan, 2018; Kurzweil, 2018; Reich & Ruipérez-Valiente, 2019).

Ongoing discussions regarding the instructional and learning value of MOOCs vary among scholarly and practitioner arenas (Brahimi & Sarirete, 2015; Czerniewicz, Deacon, Glover, & Walji, 2017; Haggard, Wang, & He, 2014; Honeychurch & Draper, 2013). For example, some correlate the overall low completion rates to poor instructional quality (Onah, Sinclair, & Boyatt, 2014), while others argue that course completion is an inaccurate indicator of MOOC success given the wide variety of reasons that bring learners to a MOOC (DeBoer, Ho, Stump, & Breslow, 2014; Ho et al., 2014; Liu, Kang, & McKelroy, 2015; Zelinski, Hicks, et al., 2017). Furthermore, some contend that instructional and learning quality are poor in most MOOCs (Margaryan, Bianco, & Littlejohn, 2015), and yet others claim it is feasible that MOOCs meet the standards of quality set for other online courses (Lowenthal & Hodges, 2015). These differing opinions on the uses for and direction of MOOCs warrant further discussion, yet there is a gap in the literature regarding the viewpoints of faculty and instructors of MOOCs (Evans & Myrick, 2015; Lowenthal, Snelson, & Perkins, 2018; Yengin, Karahoca, & Karahoca, 2011).

An instructor's direct contact and experience with course content, instructional design, and the learners in their MOOCs can greatly contribute to relevant literature, scholarship, and practice. The scarcity of instructor perspectives creates a compelling need for this area of the literature to be developed (Deng, Benckendorff, & Gannaway, 2017; Lowenthal et al., 2018). Thus, this case study explored the perceptions of MOOC instructors regarding quality learning in their courses, focusing particularly on learning through social interactions, or social constructivism.

Review of Literature

Social Constructivism in MOOCs

Social constructivism, or social learning, is an increasingly emerging topic in current MOOC research and will continue to be in future MOOC research, and it has become evident that learners prefer socialization in MOOCs (Gasevic, Kovanovic, Joksimovic, & Siemens, 2014). Social constructivism places emphasis on the importance of culture and context (McMahon, 1997) and views meaningful—or quality—learning as a social process that occurs when learners engage in social activities (Kim, 2001; Lave & Wenger, 1991; Vygotsky, 1978). More specifically, social constructivism focuses on how the environment and interactions with others, along with support and scaffolding in the instruction, can influence the individual learning process (Lave & Wenger, 1991; Toven-Lindsey, Rhoads, & Lozano, 2015). Also, social interactions are important in online learning contexts in terms of fostering "a sense of psychological connection that may lead to increased motivation and increased satisfaction with an educational experience" (Shearer, 2012, pp. 253–254). Thus, the principles of social constructivism—focusing on collaboration, dialogue, and social interaction among learners—are compatible with online learning and achievable through MOOCs (Toven-Lindsey et al., 2015), which can bring together learners of diverse backgrounds who "interact with others in the knowledge construction process" (Arbaugh & Benbunan-Fich, 2006, p. 438).

While MOOCs can provide and are providing educators with new ways to scale social learning within global and diverse groups, it is important to recognize that designing for learner engagement in a MOOC can be difficult given the scale and diversity of learners and motivations (Milligan, Littlejohn, & Margaryan, 2013). Walji et al.'s (2016) case study of MOOCs identified important aspects of social constructivism afforded in MOOCs, which included teacher presence, social learning, and peer learning. These aspects were connected to high-quality learning in MOOCs. Social learning, in particular, provides positive learning outcomes: "learners … benefit from engaging with others through conversations and interactions" (p. 215).

Toven-Lindsey et al. (2015) studied 24 university-level MOOCs from a range of disciplines and found that one third of them implemented or featured a "constructivist-group approach" activity—a dialogue on discussion boards, participation in organized discussion groups, live videoconferencing with the instructor, or peer-reviewed assignments. Their findings suggested that the "constructivist-group teaching approach encourages the highest level of collaboration and critical inquiry among participants" (p. 7) based on the higher level of participation and engagement in constructivist activities. These results, among other influences, are contributing to MOOCs and their platforms utilizing social constructivist approaches to foster quality learning.

Instructor Perceptions of Quality Learning in MOOCs

Research studies on learning in MOOCs focus heavily on understanding the outcomes and perspectives of the learners (Deng et al., 2017; Evans & Myrick, 2015; Xing, 2019, Zheng et al., 2016), highlighting their experiences, challenges, patterns of engagement (Milligan et al., 2013), outcomes, and motivations for taking the MOOC (Breslow, Pritchard, DeBoer, Stump, Ho, & Seaton, 2013; Emanuel et al., 2013; Liu et al., 2015; Park, Jung, & Reeves, 2015; Walji et al., 2016; Zutshi, O'Hare, & Rodafinos, 2013). General themes emerging from the literature include flexible learning design of MOOCs to accommodate the diverse needs and goals of learners (Park et al., 2015; Walji et al., 2016) and learner satisfaction (Liu et al., 2015). Fewer in number are the studies and articles that give voice to the perspectives of the instructors of the MOOCs (Czerniewicz et al., 2017; Lowenthal et al., 2018; Zelinski et al., 2017). For example, Veletsianos and Shepherdson (2016) reviewed the literature on MOOCs and found that of the 183 studies they reviewed, only 8.2% focused on topics that related to instructors and teaching.

Several studies in the literature to date have focused on MOOC instructors and do offer some helpful insights into their experience. These studies, however, focus on and articulate the experiences, motivations, and viewpoints of MOOC instructors in broad terms, highlighting the experiences and challenges of developing and teaching MOOCs (Haavind & Sistek-Chandler, 2015; Najafi et al., 2015; Zelinski et al., 2017; Zheng et al., 2016) as well as the opportunities to try new pedagogical approaches in a new platform (Evans & Myrick, 2015; Toven-Lindsey et al., 2015). Annaraud and Singh's (2017) study concluded that students and faculty have varying perceptions and enthusiasm regarding MOOCs; a potential cause of the disparity, they said, could have been the faculty members' deeper understanding of challenges to developing and teaching a MOOC. Another study by Haavind and Sistek-Chandler (2015) highlighted the struggles and challenges of a MOOC instructor, especially that of offering a personalized learning experience for the learner due to the large number of participants in MOOCs.

However, Lowenthal et al. (2018), using an explanatory mixed methods approach, surveyed a large number of previous MOOC instructors and then invited a smaller number from that sample to be interviewed from those who responded in the survey that they would be willing to teach a MOOC again. The researchers found that the majority of instructors believed that their own MOOCs provided high-quality learning experiences for learners. However, the same instructors thought that, overall, MOOCs would not be as good as face-to-face courses. Evans and Myrick's (2015) findings slightly differed in that the faculty member participants in their study "were mixed on the idea that MOOC students learned as well as students in face-to-face courses, perhaps showing how the novelty of the format increased apprehension about learning outcomes compared to online learning at large, where attitudes about student learning have grown more positive" (p. 308).

As MOOCs continue to proliferate and influence online education, understanding the value that they offer to institutions and to learners will be more and more important. Thus, augmenting the means through which the perspectives of MOOC instructors are shared will offer a valuable contribution to further research and scholarship as well as inform practice.

Methods

Using social constructivism (Kim, 2001) as the lens, the purpose of this exploratory case study was to determine instructors' perceptions of quality learning in MOOCs. Specifically, this study was guided by the following research questions:

1. What are MOOC instructors' perceptions of quality learning?
2. What factors do MOOC instructors believe influence or enable quality learning?
3. What aspects or affordances of MOOCs do MOOC instructors believe allow them to perceive quality learning?
4. How do instructors perceive social learning as influencing quality learning in a MOOC?

We utilized semistructured interviews with instructors as the primary source of data. Additionally, we used course document reviews as a secondary source to provide examples of their perceptions in practice as well as triangulation. Together these sources were developed into a multiple case study design, one based on exemplars as the basis of replication logic (Yin, 2014). With this type of multiple case study design it is customary to select the cases, conduct the case studies, write individual case reports, and draw cross-case conclusions (Yin, 2014). Given that this is an exploratory study, our analytic technique involved explanation building, with our goal being to develop themes and determine next steps in researching quality learning in MOOCs from a social-constructivist perspective (Yin, 2014).

Context

Access to participants (MOOC instructors) was possible through current working relationships with instructors who have taught at least one MOOC on our institution's MOOC partner's platform, FutureLearn. FutureLearn is based on social constructivism or social learning theory (Ferguson & Clow, 2015; Walji et al., 2016). According to FutureLearn (2016), social learning "enables learners to form online cohorts and communities of practice that support and enrich their learning" (p. 14). FutureLearn's social learning platform leverages the power of learner communities, "where learners can make immediate use of their newly acquired skills by sharing their knowledge with their peers" (FutureLearn, n.d.).

For each of these instructors, this was the first MOOC any of them had taught. Purposive sampling was used to identify and recruit MOOC instructors from this available pool. Specifically, our three participants were selected based on our criteria for being exemplars; their courses had higher than average scores in areas of total course enrollments, a higher than average number of learners who were actively engaged in the course, and/or a higher than average number of learners who opted to purchase a certificate of completion in the course (see Table 1).

Table 1 includes data that provides an additional depth to the MOOCs of the participating instructors and why they were selected as the case exemplars. Aside from basic information including the number of course runs, it also includes aspects such as total number and average number of active learners. FutureLearn defines “active learners” as learners who have completed at least one step at any time in any course week. Information related to certificate purchases is also included; in this case, in order to purchase a certificate of completion in the course, a learner is required to complete a minimum of 51% of the course activities and pay a minimal fee for a printed certificate of completion. These MOOCs were selected because they had higher averages in one or more of these areas than the institution’s MOOC average, which are also provided.

Table 1

Comparison of Participant MOOCs and Institutional MOOC Average Based on Enrollment and Evidence of Active Participation

MOOC	Number of runs	Total enrollment	Total active learners	Total certificates purchased	Average total enrollment across runs	Average active learners across runs	Average total certificates purchased across runs	Average certificate purchase percent of total enrollment
Institution MOOC Average					2,681	1,167	29	1.07%
Laura’s Course	6	25,626	14,048	111	4,271	2,341	19	0.45%
Jane’s Course	3	7,183	2,877	105	2,394	959	35	1.46%
Dave’s Course 1	4	8,240	3,176	89	2,060	794	30	1.18%
Dave’s Course 2	6	10,332	4,652	240	1,722	775	48	2.35%

Procedures and Data Analysis

To collect data for the study, we determined that semistructured interviews would be most appropriate in answering the stated research questions because they are “sufficiently structured to address specific topics related to the phenomenon of study, while leaving space for participants to offer new meanings to the study focus” (Galletta, 2013, p. 24). Semistructured interviews afford the ability to create consistency across multiple interviews and provide the researcher the opportunity to probe and ask clarifying questions. Moreover, the semistructured interviews allow important insights to be gained by developing an authentic narrative regarding the experience of MOOC instructors and what perceptions they have toward the learning in MOOCs.

The interviews all followed the same semistructured protocol (see Appendix A) with each instance having its own unique variation depending on the direction of the conversation between the participant and the first author (Galletta, 2013). The questions in the interview protocol focused on aspects of defining quality learning, social learning in MOOCs, MOOC affordances that influence learning, and overall experience teaching MOOCs. Each interview was approximately 60 minutes in length and recorded via an audio recording application. Each interview was then uploaded and stored in a secure, password-protected account and transcribed verbatim.

Transcripts from the interviews were analyzed through a combination of predefined (a priori) codes (see Appendix B) and emergent codes to categorize, summarize, and condense data (Saldana, 2013) into to themes. The a priori codes were developed and identified based on relevant literature on MOOCs and the selected theoretical framework, social constructivism. After coding, a streamlined codes-to-theory model (Saldana, 2013) was used to organize the coded segments into categories. Finally, the categories were reviewed and analyzed again to further identify and condense categories into themes based on conceptual overlap and then into broader themes that aligned with principles of social constructivism. Trends and patterns from the data were then developed dependent on the extent to which the themes answered the research questions.

The course document review looked specifically at the discussion threads of the MOOCs taught by participants. Documents, as defined by Yin (2014), are stable and can be viewed repeatedly, are unobtrusive, and can be specific or broad. As Yin (2014) explains, “the most important use of documents is to corroborate and augment evidence from other sources” (p. 107). The threads were reviewed to look for examples of potential social learning taking place; these were revealed through instances of interactions between instructors and students.

To help establish trustworthiness throughout this study, several steps were taken as per Lincoln and Guba’s (1985) criteria. For credibility, we triangulated the data, and member checking was conducted following the data analysis stage to allow participants to review and confirm our data and interpretations. Transferability was addressed through purposive sampling. An external audit of the research by faculty experts (N = 3) served to help with dependability. Finally, confirmability was established by ensuring research protocols were based in the literature.

Results

The following section presents three individual cases, one per each participating MOOC instructor, and will be outlined according to the previously stated research questions. Pseudonyms have been used in place of participants’ names. Each case will include a brief description of the course, relevant responses from the semistructured interviews with each instructor, and examples directly from their courses

Laura

Laura’s MOOC was a part of the inaugural group of four FutureLearn courses launched by this institution in April 2017. This was Laura’s first experience developing and teaching an online course. Support for the course development was provided to Laura in the form of an instructional designer and video production specialist to get the course ready for its first and subsequent runs on the FutureLearn platform. Since its launch, her MOOC has had six individual runs. Moreover, Laura’s MOOC has had the highest enrollment in a single run of any of the institution’s FutureLearn courses so far (see Table 1).

What factors do MOOC instructors believe influence or enable quality learning? In addition to this being the first MOOC she had ever taught, Laura's MOOC was also the first experience she had with teaching online. She had initial concerns about how learners in the MOOC would contribute to discussions under anonymous Internet profiles, though many learners used their full first name. However, she noticed that this aspect of a MOOC tended to make many learners more open to comment freely in discussions and share ideas in the discussion threads throughout the course, especially for students who might otherwise feel muted or less inclined to participate in a traditional classroom.

What aspects or affordances of MOOCs do MOOC instructors believe allow them to perceive quality learning? To Laura, the online discussion boards in her MOOC seem to make the learning more apparent because learners interact with one another by articulating their own independent thoughts, which can be an indicator of their conceptual knowledge and understanding of the content (Arbaugh & Benbunan-Finch, 2006). Additionally, Laura commented that the sharing of a wide variety of learner perspectives contributed to her being able to verify that learning was occurring: "Being able to see early principles and concepts of what I am teaching come out in students' comments in a bigger variety is a verification of learning." Laura also mentioned that the discussion features on the MOOC platform, such as giving learners the ability to immediately read through the comments of others or post their own thoughts alongside each course step, allowed learners to collaborate with one another and that it contributed to how learners looked at the content presented by the instructor. They were able to share variety of insights that allowed them to negotiate meaning for themselves and others.

How do instructors perceive social learning as influencing quality learning in a MOOC? Laura's perception of how social learning within her MOOC affected the quality of learning included learners' comments prompting discussions of additional, unplanned topics: "Some people will give each other references and links to other resources and then we talked about whether those resources are valid in the discussion." Figure 1 is an example of such an occasion, in which learners (all names have been changed to protect identity) in Laura's course shared or suggested additional resources with one another in one of the discussion threads. Laura was able to participate in the conversation and further facilitate the social learning of the course.

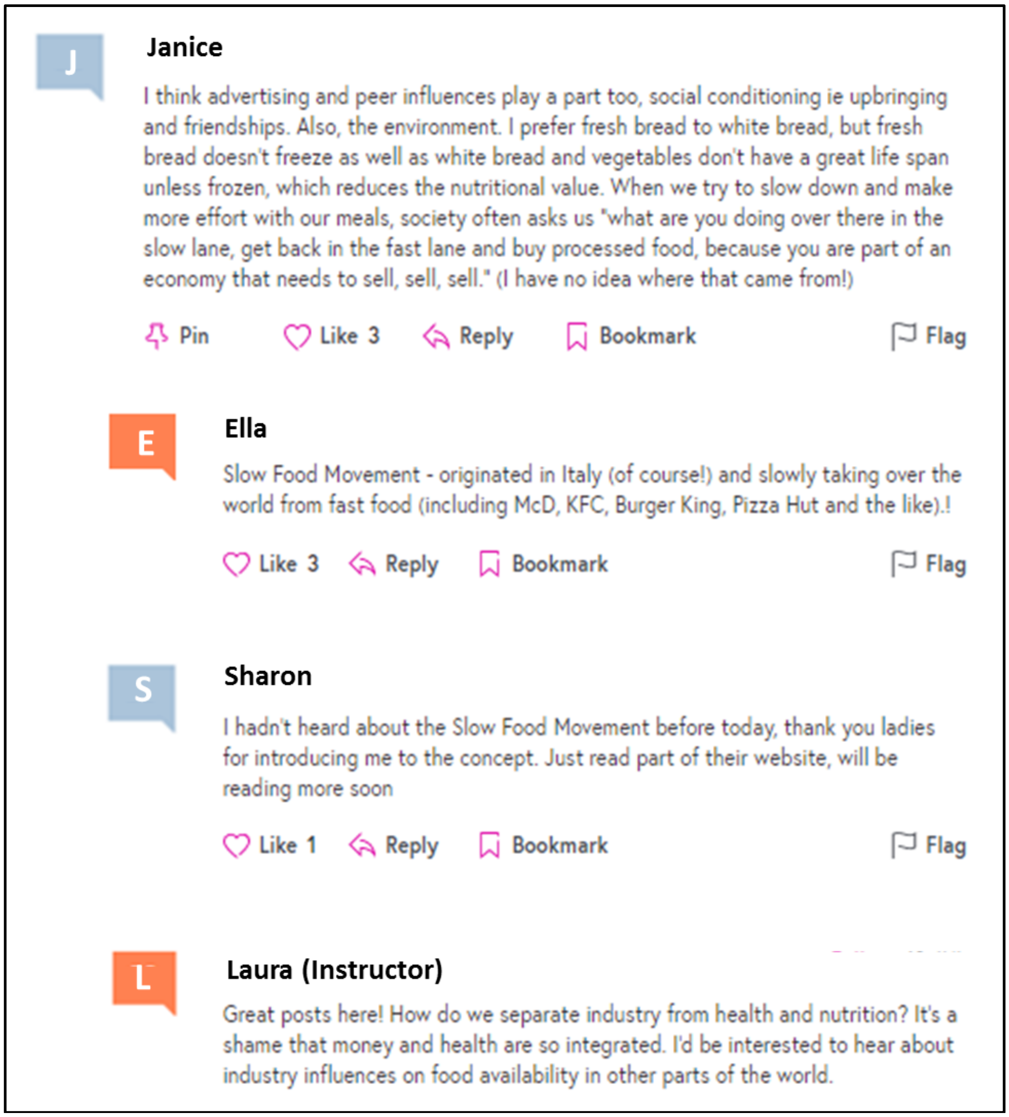

Figure 1. Example of discussion thread demonstrating shared resources from Laura's MOOC.

Laura additionally remarked on how social interaction in her MOOC has influenced her own learning: "I've actually learned from the people that participate because of all the different perspectives and backgrounds. There's been … things that have happened historically that have played into how food culture has evolved so it's been interesting to get a different history or background and that's been cool."

Jane

Jane's MOOC on the FutureLearn platform first launched in October 2017 and has since had three runs. While this was her first time teaching a MOOC, Jane had previous experience in teaching online courses. To develop her MOOC, Jane was able to work with the same instructional designer with whom she had worked on her previous online course. She also worked with a video production specialist to script, record, and edit videos for her MOOC.

What factors do MOOC instructors believe influence or enable quality learning? For Jane, the high number of enrollments typical in MOOCs as well as the group of learners that come with diverse backgrounds (e.g., interests, goals, and perspectives) were positive features that encouraged social learning that therefore affected the quality learning. She said, "I thought there would be more retired people but there are not as many. It was very spread out among ages of those who wanted to learn. It surprisingly included people of all ages." The wide range of learner perspectives, Jane continued, also prompted other learners to "think about things in a different way and it allows them (the learners) to express what they're thinking about, what they're feeling about. There has been some disagreements about ideas, which has been interesting, but they work it out." Figure 2 depicts an excerpt from a discussion thread from one of the runs of Jane's MOOC. Again, all names of learners have been changed.

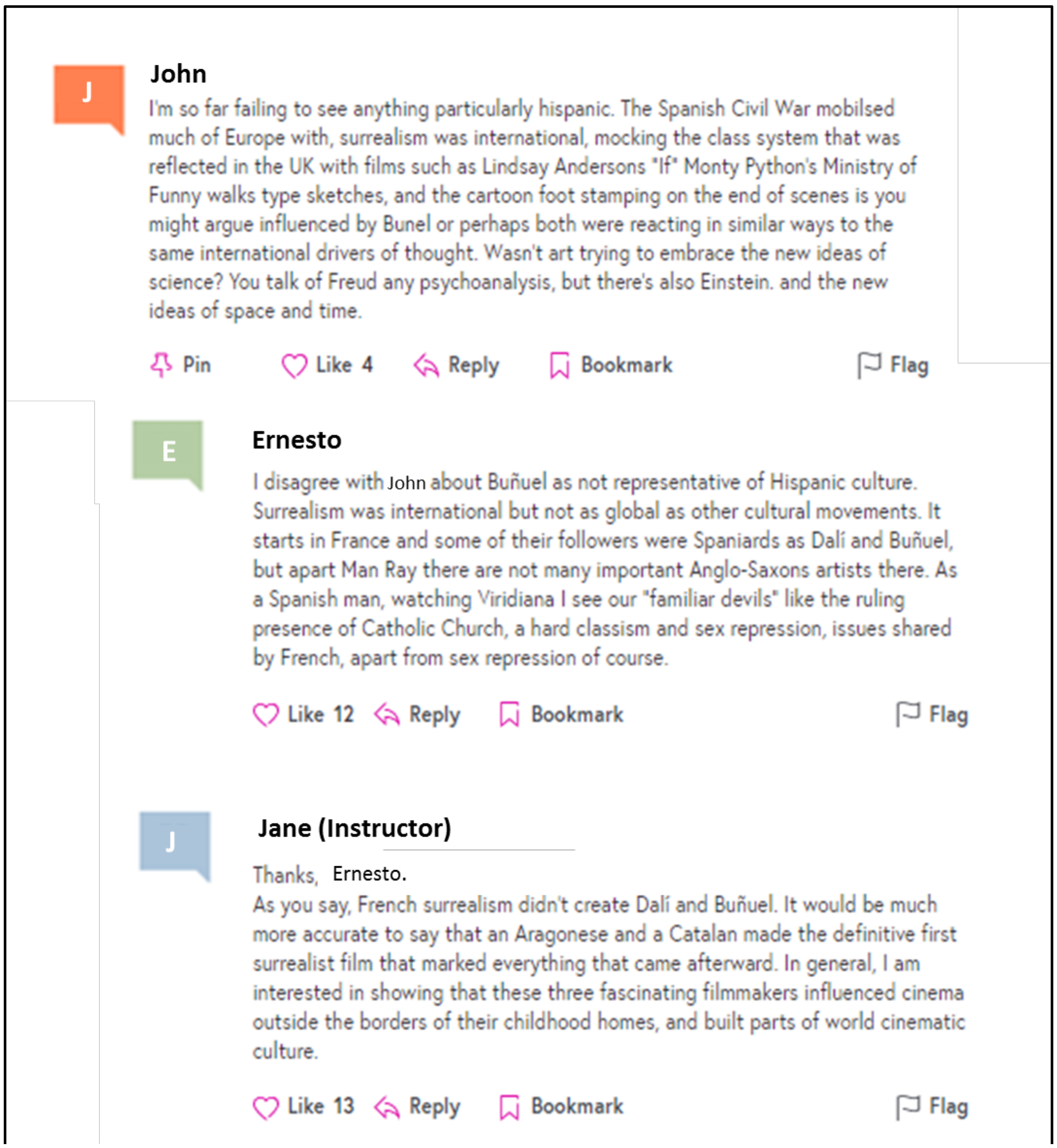

Figure 2. Example of discussion thread demonstrating varying perspectives from Jane's course.

What aspects or affordances of MOOCs do MOOC instructors believe allow them to perceive quality learning? Jane also believed that the structure of her MOOC, particularly the discussions that were connected to each activity, allowed her to perceive—or in her words, *evaluate*—learning:

> Each week they had articles to read and videos that they had to watch, and … on every one of these there was a discussion. So basically, they (the learners) discuss whatever they wanted about the question. Sometimes there are very specific questions with a quiz that leads into a final discussion. I guess you could say those were the ways they were evaluated. There was one quiz each week and then there were discussions all along the way.

Jane concluded that learning was taking place often based on the number of comments by learners in the discussions. In addition to this, she also looked at the number of views of course videos. She also interpreted these two analytics as an indicator of how her learners behaved or adjusted their engagement based on their individual interests and goals. She said,

> [Participation in discussions] was surprisingly high because people did it because they wanted to. If they didn't think something was interesting I could see that discussion participation was low. There were also some videos that got very low views and I could see that the subject was not very interesting to the students. And they did it for no other reward than because they were interested.

Intrinsic motivation to learn was very salient for Jane that has made teaching a MOOC a rewarding experience.

Dave

Like Jane's experience, Dave's MOOC teaching was not his first experience in developing and teaching in an online format. Like the other participants, Dave worked with an instructional designer and video production specialist for the development of his MOOCs on FutureLearn's platform. To date, Dave has been the institution's most prolific instructor on the FutureLearn platform, having taught multiple MOOCs with multiple runs. Additionally, one of his courses (Dave Course 2; see Table 1) has had the highest average percentage of its learners purchasing a certificate of completion at its conclusion.

How do instructors perceive social learning as influencing quality learning in a MOOC? During the interview, Dave readily recognized and pointed to the social learning affordances of MOOCs and considered them to be unique and as having a positive influence on learners:

> I think the unique thing with the MOOCs is the social learning and the fact that there are students from all over the world with very different perspectives. I have learners that are 70 and I have learners that are 18, and when they're participating and sharing their ideas with one another I think that really contributes to how everyone's looking at the information and helps them grow.

To this end, Dave saw that his own engagement in discussions not only affected the learning of learners but his own as well. He said,

> I really tried to get into more of the discussion with the learners this last time in the course. And I feel like I was energized by it and I would assume the learners maybe felt energized as well if they were participating.

Figure 3 depicts an excerpt from a discussion thread from one of the runs of Dave's MOOC. All names of learners have been changed.

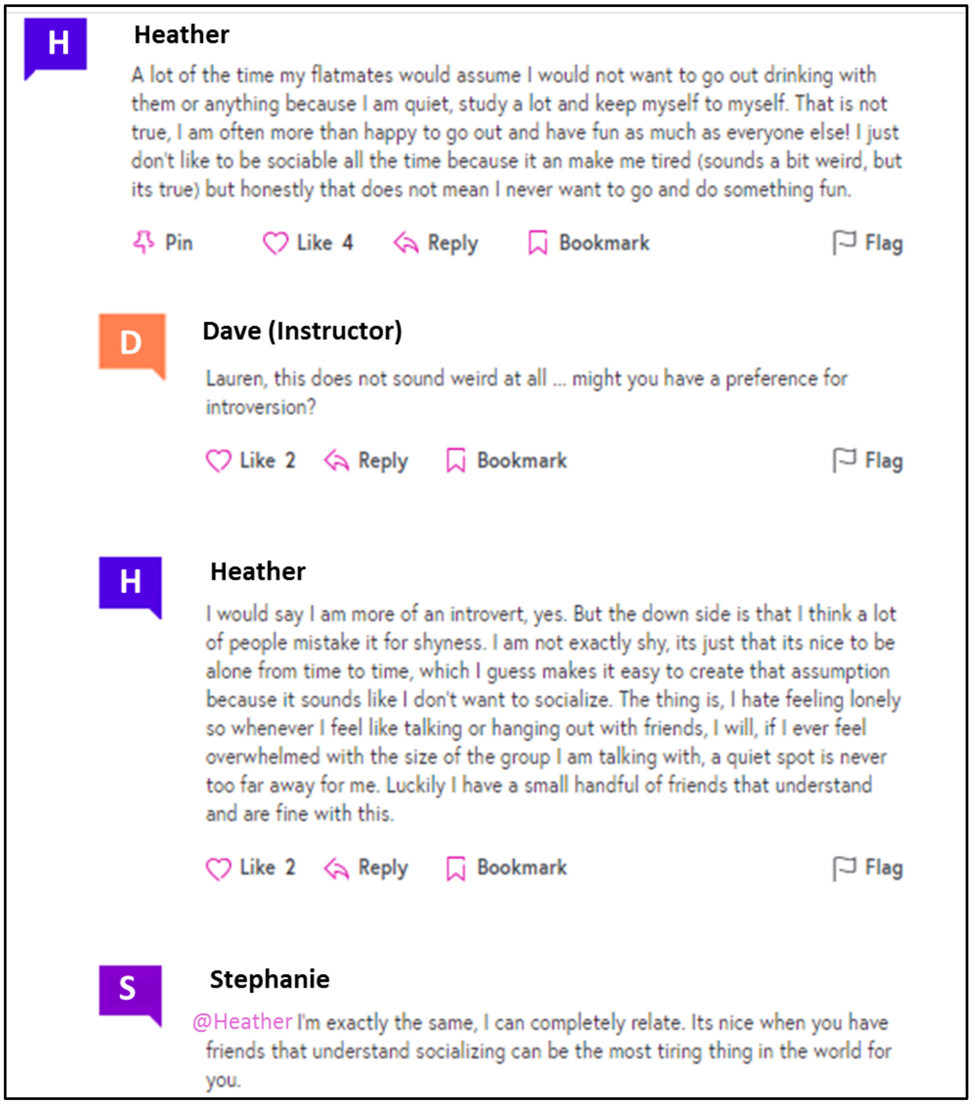

Figure 3. Example of discussion thread demonstrating differing perspectives from Dave's course.

What are MOOC instructors' perceptions of quality learning? What aspects or affordances of MOOCs do MOOC instructors believe allow them to perceive quality learning? To Dave, quality learning is linked to a learner's autonomy to self-direct or regulate his or her own learning. One way Dave defines quality learning in a MOOC is whether the learner has gotten out of the course what they had initially intended. He said,

> I think the MOOCs allow students to determine how much they're going to learn and I think a traditional class, whether a hybrid, blended, or a professor standing up lecturing them, giving five exams during the semester, is only forcing students to learn whatever level they (the faculty) want in terms of passing the course, earning an "A" or a "C." I don't consider that learning. I consider real learning to be allowing the student to get what they want to get out of the course. I think that can happen in a traditional class and I think it happens in a MOOC.

Cross-Case Synthesis

As previously mentioned, the authors utilized a cross-case synthesis after each individual case study was conducted. This was done in an effort to help provide a framework for the explanation-building process. This included an inductive process through which three themes emerged: (1) instructors perceive that social interactions in MOOCs can foster quality and meaningful learning experiences for both learners and instructors, (2) instructors perceive that learner goals and interests can ultimately influence their participation and learning in MOOCs, and (3) instructors perceive social learning in MOOCs through discussion boards. These three themes do share some overlap, which may or may not be apparent at times.

Social interactions in MOOCs foster quality learning. Social constructivist principles were among the most identified characteristics that demonstrated quality learning in a MOOC by the instructors participating in this case study. This was attributed to the unique features often inherently afforded by MOOCs to bring a wide range of diverse learners into one space. Moreover, the FutureLearn platform in particular allows for frequent and intuitive social interaction, in that each step or activity provides opportunities for learners to comment on and share what they are learning with peers along the way (FutureLearn, n.d.).

Each instructor recognized that inherent features of the MOOCs provided opportunities for both themselves and learners to experience and engage in social learning opportunities. The high number of enrollments typical in MOOCs as well as the group of learners that come from diverse backgrounds (e.g., interests, goals, and perspectives) were seen as positive features that encourage social learning that therefore impacted the quality learning available to learners. Multiple instructors commented on the role that social learning played in their own learning and the positive experience they had by way of interaction with learners within their MOOC.

The opportunity for social interaction among a large, diverse group afforded to both learners and instructors was viewed as an effective and valuable means to provide quality learning within these instructors' MOOCs. In addition to social interaction, the goals of learners (also diverse) can also influence the learning that occurs in MOOCs.

Learner goals can influence learning in MOOCs. As mentioned, the primary framework for this case study was social constructivism. However, unexpectedly a theme that emerged that could have also been used as another relevant framework for this case study was self-regulated learning (SRL). Many view SRL to be integral to learner behaviors in MOOCS, and many investigative studies that focus on self-regulated learning appear in MOOC literature (Lee, Watson, & Watson, 2017), with reasons being that a wide variety of learners enroll in MOOCs with varying and specific purposes or goals as to what they would like to obtain from the course. Furthermore, SRL provides some insight into learner behaviors and motivation (Kizilcec, Pérez-Sanagustín, & Maldonado, 2017).

Two of the participants spoke frequently about how a MOOC allows learners to come into the course and participate in only those areas or aspects that are of interest to them or fulfill their individual purpose for taking the course. Reponses from instructors on this topic seem to align with the first and third phases of Pintrich's (2000) model on self-regulated learning, which are goal setting and controlling and regulating the task, context, and self, respectively.

In Jane's MOOC, she noticed that there were some activities and videos in her MOOC that showed lower numbers of learners viewing the videos and lower accompanying discussion board participation on the given topic of the video or activity. However, some learners did watch the videos to the end and participate in the discussion prompted by the specific video. This might strongly suggest that SRL affordances in MOOCs, or the opportunity for a learner to engage in what is most relevant to them, can “positively affect a sense of academic achievement, as well as motivation and learner behaviours,” (Lee et al., 2017, p. 31). Similar to social learning, one way through which these MOOC instructors perceived or observed SRL in their MOOCs was through interactions on discussion boards.

Instructors perceive social learning through discussion boards. The instructors in this case study all remarked how participating in and reading the discussion boards allowed them to get a sense of the learning that was taking place in their MOOC. In particular, discussion boards gave these instructors insights into how learners were collaborating with one another, negotiating meaning, making connections with different areas of knowledge, and learning new perspectives from a diverse group of learners. To multiple instructors, the online discussion boards in their MOOCs, if designed well, seemed to provide a means through which learning could be perceived, because learners interact with one another by articulating their thoughts, which can be an indicator of their conceptual knowledge and understanding of the content (Arbaugh, & Benbunan-Finch, 2006). The discussion board features on the FutureLearn platform were also viewed to encourage and provide opportunity for social learning. All three of these participants also made a number of comments that suggest that social constructivism is a natural and inherent feature of MOOCs.

In summary, there were a number of similarities in each interview that informed the themes that emerged in the data analysis. Table 2 maps and illustrates the intersection of research questions and the main themes that emerged. Overall, each participant recognized that while there are certain challenges to verifying learning in MOOCs, such as scale, MOOCs that provide opportunities for learners to interact with peers and the instructor foster quality learning. Their perceptions of quality learning heavily involved the social interaction among a large, diverse group of learners common to MOOCs within the discussion boards on the course platform but was not solely limited to it. In addition to social interaction, individual learner goals and interests and their effect on learner engagement emerged as a theme; two instructors also perceived quality learning as entailing a learner achieving their intended goal in the course.

Table 2

Intersection of Research Questions and Main Themes

	Main Themes		
Research questions	Social interactions in MOOCs foster quality learning	Learner goals can influence learning in MOOCs	Instructors perceive social learning through discussion boards in MOOCs
RQ1 – What are MOOC instructors' perceptions of quality learning?	X	X	
RQ2 – What factors do MOOC instructors believe influence or enable quality learning?			X
RQ3 – What aspects or affordances of MOOCs do MOOC instructors believe allow them to perceive quality learning?	X		
RQ4 – How do instructors perceive social learning as influencing quality learning in MOOCs?	X		X

Discussion

This case study explored instructor perceptions of quality learning in MOOCs. There is still no universal agreement on many MOOC-related issues, including their rightful purpose and their effectiveness in offering meaningful or quality learning experiences (Evans & Myrick, 2015). The main themes that emerged in this case study contribute to discussions on how MOOCs can be used—despite their intended purpose at times—to foster quality learning for people from diverse backgrounds, experiences, and learning goals. The instructors' responses aligned the four research questions of this case study, their perceptions being that quality learning can and does occur in these courses, for both learner and instructor, largely through social learning constructivist components, such as dialogue and discussion, peer interaction, negotiating meaning, collaboration, and peer teaching.

Though similar studies in the literature have helped inform both further scholarship and practice, instructors and institutions consider the reasons for and challenges of developing and teaching MOOCs, this case study took a unique approach to specifically explore the faculty perceptions of learning through the lens of social constructivism. Social constructivism/social learning continues to emerge as a key topic in current MOOC research and will continue to do so in future MOOC research (Gasevic et al., 2014), and the unique different perspectives regarding how instructors think about and view their MOOCs and the extent of their effectiveness in fostering meaningful, quality learning opportunities supports the growing interest in these topics. Moreover, this additional understanding of how instructors perceive quality learning occurring in MOOCs can reinforce and inform instructional design (Najafi et al., 2015) of MOOCs to leverage the opportunities for learners to achieve their learning goals via collaborative, social learning on a global scale. The emergent themes from this case study can also contribute to a broader framework for evaluating the effectiveness of a MOOC (Zelinski et al., 2017).

In addition to social constructivism or social learning, these instructors also perceived self-regulated learning to be an influential factor to the quality learning in a MOOC, which is consistent with the literature (Lee et al., 2017). More specifically, the responses of these instructors aligned with phases of Pintrich's (2000) model of self-regulated learning in the forms of goal setting and regulation of participation in specific learning tasks. When learners got out of the MOOC what was most important to them, whatever it may have been, these instructors considered it to be a success, though there are limitations of MOOC platforms that inhibit instructors from assessing what the diverse goals of learners are (Douglas, Zielinski, Merzdorf, Diefes-Dux, & Bermel, 2019).

The MOOCs included in the case study were all what would be termed *cMOOCs*, which are heavily based in social constructivist learning design and differ from xMOOCs. Therefore, the instructors who developed and taught these courses all perceived that social interactions and learning played a significant role regarding how learners experienced quality learning in their MOOCs. Without this key component or feature, these instructors say that they would have been left to only utilizing multiple-choice quizzes and other automated assessment tools. These instructors appeared to consider the social learning outcomes to be of greater value in the MOOCs because they took advantage of the large and diverse learner population that enabled learners to connect with and learn from a wide range of individuals (Kop, 2011). It is interesting to compare this case study to Haavind and Sistek-Chandler's (2015) case study that concluded that whether in an cMOOC (focused on social interaction and collaboration) or an xMOOC (primarily using video-based lectures), the role of the instructor is the relatively the same, and real-time engagement with the learners has little effect on the learning that takes place. The study in this paper did not focus heavily on the instructor's role in and effect of interaction with the learners in the MOOC, which suggests that further inquiry on this subject could be beneficial.

Each instructor commented on how teaching their MOOC(s) changed their perspective on how they defined quality learning in terms of what is possible in online learning environments and, more specifically, MOOCs. This is similar to findings by Evan and Myrick (2015) that describe favorable attitudinal changes toward online learning in general, resulting in and increased acceptance and improved perspectives on the purpose of MOOCs.

Limitations

As with any study, various challenges or limitations exist that are worth considering as conclusions are developed and future research considered. For example, the instructors who participated in this case study utilized and were familiar with only one MOOC platform that is heavily based in social learning theory, and this might therefore skew their perspective. Moreover, participants' specific discipline or course topic may have influenced how they perceived quality learning in a MOOC. Additionally, this study had a small sample size of only three participants, all of whom are from a single institution, as were the instructional designers they worked with, meaning that a particular institutional design process or framework was potentially used, thereby not allowing for variability.

Conclusion

With little current literature that focuses on instructor perceptions in this specific topic, the findings from this case study help to fill a current gap in the MOOC literature. Furthermore, highlighting more viewpoints of instructors of MOOCs can be beneficial to the ongoing research, practice, and discussion regarding MOOCs as viable learning opportunities.

This case study merely scratches the service in exploring and understanding instructor perceptions of quality learning in MOOCs. Further research should follow similar approaches to, for example, compare instructor perceptions of quality learning through social interaction with quantitative data of the levels or patterns of learner engagement (Milligan et al., 2013) within social learning settings, such as MOOC discussion boards. It would also be insightful to include a larger sample to see if the perceptions expressed in this case study have broader application. Finally, it would be important and interesting in future research studies to also include other types of MOOC (e.g., xMOOCs) and MOOC instructors who do not employ social learning theories as a basis for their platforms or course instructional design to see whether they have similar perceptions of quality learning. Additionally, increased understanding of faculty perceptions toward MOOC learning can help inform the instructional design of MOOCs and how learners can learn in these unique online environments. Further research on this and other MOOC-related topics is important and needed because MOOCs can offer increased access to education and can, according to perceptions held by the instructors in this case study, provide meaningful learning opportunities and social connections for people all around the world.

Acknowledgments

We appreciate the willingness of the MOOC instructors to participate in the interviews in this case study and offer their candid responses.

References

Annaraud, K., & Singh, D. (2017). Perceptions of hospitality faculty and students of massive open online courses (MOOCs). *Journal of Hospitality & Tourism Education, 29*(2), 82–90. doi:10.1080/10963758.2017.1297714

Arbaugh, J. B., & Benbunan-Finch, R. (2006). An investigation of epistemological and social dimensions of teaching in online learning environments. *Academy of Management Learning & Education*, *5*(4), 435–447. doi:10.5465/amle.2006.23473204

Baker, R., Passmore, D. L., & Mulligan, B. M. (2018). Inclusivity instead of exclusivity: The role of MOOCs for college credit. In *Enhancing education through open degree programs and prior learning assessment* (pp. 109–127). IGI Global. doi:10.4018/978-1-5225-5255-0.ch00

Brahimi, T., & Sarirete, A. (2015). Learning outside the classroom through MOOCs. *Computers in Human Behavior*, *51*, 604–609. doi:10.1016/j.chb.2015.03.013

Breslow, L., Pritchard, D. E., DeBoer, J., Stump, G. S., Ho, A. D., & Seaton, D. T. (2013). Studying learning in the worldwide classroom research into edX’s first MOOC. *Research & Practice in Assessment*, *8*, 13–25.

Corbin, J. M., & Strauss, A. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative sociology*, *13*(1), 3–21. doi:10.1007/BF00988593

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (4th ed.). Upper Saddle River, NJ: Pearson.

Czerniewicz, L., Deacon, A., Glover, M., & Walji, S. (2017). MOOC—making and open educational practices. *Journal of Computing in Higher Education*, *29*(1), 81–97. doi:10.1007/s12528-016-9128-7

Daniel, J. (2012). Making sense of MOOCs: Musings in a maze of myth, paradox and possibility. *Journal of Interactive Media in Education*, *2012*(3). doi:10.5334/2012-18

DeBoer, J., Ho, A. D., Stump, G. S., & Breslow, L. (2014). Changing ‘course’: Reconceptualizing educational variables for massive open online courses. *Educational Researcher, 43*(2), 74–84. doi:10.3102/0013189X14523038

Deng, R., Benckendorff, P., & Gannaway, D. (2017, May). Understanding learning and teaching in MOOCs from the perspectives of students and instructors: A review of literature from 2014 to 2016. In *European Conference on Massive Open Online Courses,* 176–181. Springer, Cham. doi:10.1007/978-3-319-59044-8_20

Douglas, K., Zielinski, M., Merzdorf, H., Diefes-Dux, H., & Bermel, P. (2019). Meaningful learner information for MOOC instructors examined through a contextualized evaluation framework. *The International Review of Research in Open and Distributed Learning*, *20*(1). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/3717

Emanuel, E., Christensen, G., Steinmetz, A., Alcorn, B., Bennett, A., & Woods, D. (2013). Online education: MOOCs taken by educated few. *Nature*, *503*, 346. doi:10.1038/503342a

Evans, S., & Myrick, J. G. (2015). How MOOC instructors view the pedagogy and purposes of massive open online courses. *Distance Education*, *36*(3), 295–311. doi:10.1080/01587919.2015.1081736

Ferguson, R., & Clow, D. (2015). Examining engagement: Analysing learner subpopulations in massive open online courses (MOOCs). In *Proceedings of the Fifth International Conference on Learning Analytics and Knowledge*, 51–58. ACM. doi:10.1145/2723576.2723606

Ferguson, R., Sharples, M., & Beale, R. (2015). MOOCs 2030: A future for massive open online learning. Retrieved from http://oro.open.ac.uk/43541/3/MOOCs%202030%20revised.pdf

Fernandez, J. V., & Webster, S. (2014). From OCW to MOOC: Deployment of OERs in a massive open online course. The experience of Universidad Carlos III de Madrid (UC3M). *Open Praxis*, *6*(2), 145–158. doi:10.5944/openpraxis.6.2.115

Friedman, T. (2013, January 27). Revolution hits the universities. *The New York Times*. Retrieved from http://www.nytimes.com/2013/01/27/opinion/sunday/friedman-revolutionhits-the-universities.html

FutureLearn (n.d.). Learning on FutureLearn: An effective way to learn. Retrieved from https://www.futurelearn.com/using-futurelearn/why-it-works

FutureLearn. (2016). The future of learning in the workplace: The transformative power of collaborative social learning. Retrieved from https://ugc.futurelearn.com/other_assets/workplace-learning/the-future-of-learning-in-the-workplace.pdf

Galletta, A. (2013). *Mastering the semistructured interview and beyond: From research design to analysis and publication*. NYU press. doi:0.18574/nyu/9780814732939.001.0001

Gasevic, D., Kovanovic, V., Joksimovic, S., & Siemens, G. (2014). Where is research on massive open online courses headed? A data analysis of the MOOC Research Initiative. *The International Review of Research in Open and Distributed Learning*, *15*(5), 134–176. doi:10.19173/irrodl.v15i5.1954

Gast, A. (2013). Current trends in adult degree programs: How public universities respond to the needs of adult learners. *New Directions for Adult and Continuing Education*, *2013*(140), 17–25. doi:10.1002/ace.20070

Haavind, S., & Sistek-Chandler, C. (2015). The emergent role of the MOOC instructor: A qualitative study of trends toward improving future practice. *International Journal on E-learning*, *14*(3), 331–350. doi:10.1016/J.edurev.2014.05.001

Haggard, S., Wang, B. H., & He, X. L. (2014). The MOOC is maturing [J]. *Educational Research*, *5*(412), 92–112 doi:10.12973/eurasia.2017.01056a

Herrington, J., & Oliver, R. (1999). Using situated learning and multimedia to investigate higher-order thinking. *Journal of Interactive Learning Research*, *10*(1), 3–24. Retrieved from http://researchrepository.murdoch.edu.au/id/eprint/6962/1/using_situated_learning.pdf

Ho, A., Reich, J., Nesterko, S., Seaton, D., Mullaney, T., Waldo, J., & Chuang, I. (2014). HarvardX and MITx: The first year of open online courses, Fall 2012–Summer 2013 (HarvardX and MITx Working Paper No. 1). Retrieved from http://dspace.mit.edu/bitstream/handle/1721.1/96649/SSRN-id2381263.pdf;sequence=1

Honeychurch, S., & Draper, S. (2013). A first briefing on MOOCs. Glasgow: The University of Glasgow. Retrieved from http://eprints.gla.ac.uk/93069/1/93069.pdf

Kelly, A. P. (2014). Disruptor, distracter, or what? A policymaker's guide to massive open online courses (MOOCs). *Bellwether Education Partners*. Retrieved from https://files.eric.ed.gov/fulltext/ED553715.pdf

Kim, B. (2001). Social constructivism. *Emerging perspectives on learning, teaching, and technology*, *1*(1), 16.

Kizilcec, R. F., Pérez-Sanagustín, M., & Maldonado, J. J. (2017). Self-regulated learning strategies predict learner behavior and goal attainment in massive open online courses. *Computers & Education*, *104*, 18–33. doi:10.1016/j.compedu.2016.10.001

Kop, R. (2011). The challenges to connectivist learning on open online networks: Learning experiences during a massive open online course. *The International Review of Research in Open and Distributed Learning*, 12(3), 19–38. doi:10.19173/irrodl.v12i3.882

Kurzweil, M. (2018). Alternative postsecondary pathways: What we know, what we don't know, and why it matters. *Change: The Magazine of Higher Learning*, *50*(3-4), 154–157. doi:10.1080/00091383.2018.1509654

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation.* Cambridge, MA: Cambridge University Press. doi:10.1017/CBO9780511815355

Lee, D., Watson, S. L., & Watson, W. R. (2019). Systematic literature review on self-regulated learning in massive open online courses. *Australasian Journal of Educational Technology, 35*(1), 28–41. doi:10.14742/ajet.3749

Lincoln, Y. S., & Guba, E. G. (1985). Establishing trustworthiness. In *Naturalistic inquiry* (pp. 289–331). http://doi.org/10.1177/1473325006070288

Littlejohn, A., Hood, N., Milligan, C., & Mustain, P. (2016). Learning in MOOCs: Motivations and self-regulated learning. *The Internet and Higher Education, 29*, 40–48

Liu, M., Kang, J., & McKelroy, E. (2015). Examining learners' perspective of taking a MOOC: Reasons, excitement, and perception of usefulness. *Educational Media International*, *52*(2), 129–146. doi:10.1080/09523987.2015.1053289

Lowenthal, P., & Hodges, C. (2015). In search of quality: Using Quality Matters to analyze the quality of massive, open, online courses (MOOCs). *The International Review of Research in Open and Distributed Learning*, *16*(5). doi:10.19173/irrodl.v16i5.2348

Lowenthal, P., Snelson, C., & Perkins, R. (2018). Teaching massive, open, online, courses (MOOCs): Tales from the front line. *International Review of Research in Open and Distributed Learning*, *19*(3). doi:10.19173/irrodl.v19i3.3505

Margaryan, A., Bianco, M., & Littlejohn, A. (2015). Instructional quality of massive open online courses (MOOCs). *Computers & Education, 80*, 77–83. doi:10.1016/j.compedu.2014.08.005

McMahon, M. (1997). *Social constructivism and the World Wide Web-A paradigm for learning*. Paper presented at ASCILITE conference, Perth, Australia, p. 327.

Milligan, C., Littlejohn, A., & Margaryan, A. (2013). Patterns of engagement in connectivist MOOCs. *MERLOT Journal of Online Learning and Teaching*, *9*(2). doi:10.1007/s12186-010-9041-6

Najafi, H., Rolheiser, C., Harrison, L., & Håklev, S. (2015). University of Toronto instructors' experiences with developing MOOCs. *The International Review of Research in Open and Distributed Learning*, *16*(3). doi:10.19173/irrodl.v16i3.2073

Onah, D. F., Sinclair, J., & Boyatt, R. (2014). Dropout rates of massive open online courses: Behavioural patterns. *EDULEARN14 Proceedings*, 5825–5834. doi:10.13140/RG.2.1.2402.0009

Park, Y., Jung, I., & Reeves, T. C. (2015). Learning from MOOCs: A qualitative case study from the learners' perspectives. *Educational Media International*, *52*(2), 72–87. doi:10.1080/09523987.2015.1053286

Palvia, S., Aeron, P., Gupta, P., Mahapatra, D., Parida, R., Rosner, R., & Sindhi, S. (2018). Online education: Worldwide status, challenges, trends, and implications. *Journal of Global Information Technology Management, 21*(4), 233–241. doi:10.1080/1097198X.2018.1542262

Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning, In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 451–502). San Diego, CA: Academic. doi:10.1016/B978-012109890-2/50043-3

Reich, J., & Ruipérez-Valiente, J. A. (2019). The MOOC pivot. *Science*, *363*(6423), 130–131. doi:10.1126/science.aav7958

Ross, J., Sinclair, C., Knox, J., Bayne, S., & Macleod, H. (2014). Teacher experiences and academic identity: The missing components of MOOC pedagogy. *Journal of Online Learning and Teaching*, *10*(1), 57–69. doi:10.1080/02680930701754047

Saldana, J. (2013). *The coding manual for qualitative researchers* (2nd ed.). Thousand Oaks, CA: Sage.

Seaman, J. E., Allen, I. E., & Seaman, J. (2018). *Grade increase: Tracking distance education in the United States*. Babson Survey Research Group.

Shearer, R. L. (2012). Theory to practice in instructional design. In M. G. Moore (Ed.), *Handbook of distance education*. Retrieved from https://ebookcentral.proquest.com

Siemens, G. (2012). MOOCs are really a platform. *eLearnspace*.

Strauss, A., & Corbin, J. (1994). Grounded theory methodology. *Handbook of Qualitative Research*, *17*, 273–85.

Suen, H. K. (2014). Peer assessment for massive open online courses (MOOCs). *The International Review of Research in Open and Distributed Learning*, *15*(3). doi:10.19173/irrodl.v15i3.1680

Toven-Lindsey, B., Rhoads, R. A., & Lozano, J. B. (2015). Virtually unlimited classrooms: Pedagogical practices in massive open online courses. *The Internet and Higher Education*, *24*, 1–12. doi:0.1016/j.iheduc.2014.07.001

Veletsianos, G., & Shepherdson, P. (2016). A systematic analysis and synthesis of the empirical MOOC literature published in 2013–2015. *International Review of Research in Open and Distance Learning, 17*, 198–221. doi:10.19173/irrodl.v17i2.2448

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. doi:10.12691/education-5-5-8

Walji, S., Deacon, A., Small, J., & Czerniewicz, L. (2016). Learning through engagement: MOOCs as an emergent form of provision. *Distance Education*, *37*(2), 208–223. doi:10.1080/01587919.2016.1184400

Xing, W. (2019). Exploring the influences of MOOC design features on student performance and persistence. *Distance Education*, *40*(1), 98–113, doi:10.1080/01587919.2018.1553560

Yengin, I., Karahoca, A., & Karahoca, D. (2011). E-learning success model for instructors' satisfactions in perspective of interaction and usability outcomes. *Procedia Computer Science*, *3*, 1396–1403. doi:10.1016/j.procs.2011.01.021

Yin, R. K. (2014). *Case study research and applications: Design and methods*. SAGE.

Yousef, A. M. F., Chatti, M. A., Schroeder, U., Wosnitza, M., & Jakobs, H. (2014). A review of the state-of-the-art. *Proceedings of CSEDU*, 9–20.

Yuan, L., & Powell, S. (2013). MOOCs and open education: Implications for higher education (White paper). London: JISC CETIS. doi:10.13140/2.1.5072.8320

Zelinski, M., Hicks, N. M., Wang, S., Douglas, K. A., Bermel, P., Diefes-Dux, H. A., & Madhavan, K. (2017). Instructor outcomes of teaching a STEM MOOC. In *Frontiers in Education Conference (FIE)*, 1–7. IEEE. doi:0.1109/FIE.2017.8190590

Zheng, S., Wisniewski, P., Rosson, M. B., & Carroll, J. M. (2016). Ask the instructors: Motivations and challenges of teaching massive open online courses. In *Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing*, 206–221. New York, NY: Association for Computing Machinery (ACM). doi:10.1145/2818048.2820082

Zutshi, S., O'Hare, S., & Rodafinos, A. (2013). Experiences in MOOCs: The perspective of students. *American Journal of Distance Education*, *27*(4), 218–227.

Appendix A

Semistructured qualitative interview protocol

Participant name:____________________________ Date: ___________________

Interview start time:__________ Stop time:_______

Interview Protocol:

- How do you define quality learning?
- Given your specific topic or subject matter, how do you measure or verify learning?
- From your perspective as the professor, how do you determine that quality learning has occurred among learners in your MOOC?
    - (If needed for further clarification) What have you seen from learners in your course that you would consider evidence of their learning?
- What aspects or characteristics of MOOCs do you think contribute to or promote quality learning?
- Are there specific steps or activities in your MOOC that where you felt were conducive to quality learning? Why or why not?
- The MOOC platform that you used is designed to encourage social interaction to promote learning. From your perspective, do you think that this has an impact on the learning that occurs in your MOOC? Why or why not?
- How does the learning in your MOOC compare with other courses that you have taught?
- What limitations to learning, if any, do you see as being inherent in your MOOC?
- Could you describe or share your overall experience having taught a MOOC?
    - What impact, if any, has it had on your perspective as a professor?
    - What impact, if any, has it had on your perceptions of quality learning?
- (If time at end) Do you think that there is anything that could be implemented that would improve learning that takes place in the moves that you’ve taught?

Appendix B

A Priori Codes

Quality Learning

Code	Example/Definition	Cited Source(s)
Definition of quality online learning (QUAL_Def)	Definitions given by the participant on what a quality learning is or what it looks like	Kim (2001); Lave & Wenger (1991); Vygotsky (1978)
Determining or measuring quality learning in any course (QUAL_Measure_Gen)	Verbal examples of determining or measuring quality learning in any course or learning environment	Suen (2014); Toven-Lindsey, Rhoads, & Lozano, (2015)
Example(s) of quality learning in MOOC (QUAL_Examp_MOOC)	Verbal examples provided by the participant illustrating principles of quality learning in MOOC(s)	Walji, Deacon, Small, & Czerniewicz (2016)
Determining or measuring quality learning in MOOC (QUAL_Measure_MOOC)	Verbal examples of determining or measuring quality learning in MOOC(s)	Toven-Lindsey, Rhoads, & Lozano, (2015)

Social Constructivism/Social Learning

Code	Example	Cited Source(s)
Examples of evidence of social constructivism (SocL_Examp)	Verbal examples from participant in which he/she saw evidence of social constructivism/learning occur in MOOC	Herrington & Oliver (1999); Lave & Wenger (1991); Toven-Lindsey, Rhoads, & Lozano (2015)
Dialogue/Discussion (SocL_Dial_Disc)	Verbal example that indicates reference to dialogue or discussions among learners/instructors in the MOOC	Toven-Lindsey, Rhoads, & Lozano (2015)

Collaboration (SocL_Collab)	Verbal example that indicates reference to collaboration among learners in the MOOC	Toven-Lindsey, Rhoads, & Lozano (2015)
Negotiation of meaning (SocL_Negot)	Verbal example that indicates reference to negotiation of meaning among learners in the MOOC	Toven-Lindsey, Rhoads, & Lozano (2015)
Interaction (SocL_Interact)	Verbal example that indicates reference to any other interaction among learners in the MOOC	Toven-Lindsey, Rhoads, & Lozano (2015)

Relationship Between Social Learning and Quality Learning in MOOC

Code	Example	Cited Source(s)
Factors/characteristics that contribute to quality learning in MOOC (QUAL_Contrib_MOOC)	Verbal example of how a particular factor of MOOCs can influence the quality of learning	Arbaugh & Benbunan-Fich (2006)
Intentionality of use of social learning in MOOC (SocL_Intent)	Intentional use or application of Social Learning in MOOC	Gasevic, Kovanovic, Joksimovic, & Siemens (2014)
Examples of social learning in MOOC (SocL_Examp_MOOC)	Verbal examples provided by the participant illustrating principles or evidence of social learning in MOOC(s)	Toven-Lindsey, Rhoads, & Lozano (2015)
Social learning impact on quality learning in MOOC (SocL_Effect_QUAL)	Verbal examples of how social learning impacted the quality of learning in MOOC(s)	Toven-Lindsey, Rhoads, & Lozano (2015)

Perception

Code	Example	
Teaching a MOOC's impact on professor's perspective (PERSP_Change)	Insight given by participant on how their previous perception of quality learning changed after teaching MOOC	Evans & Myrick (2015); Deng, Benckendorff, & Gannaway (2017); Haavind & Sistek-Chandler (2015); Najafi, Rolheiser, Harrison, & Håklev (2015); Zelinski, Hicks, Wang, Douglas, Bermel, Diefes-Dux, & Madhavan (2017); Zheng, Wisniewski, Rosson, & Carroll (2016)
Strategy recommendations for improvement (IMPROVE_Recommend)	Recommendations by participants on improving quality learning in MOOCs	Evans & Myrick (2015); Haavind & Sistek-Chandler (2015); Najafi, Rolheiser, Harrison, & Håklev (2015); Zelinski, Hicks, Wang, Douglas, Bermel, Diefes-Dux, & Madhavan (2017)

Award-Winning Faculty Online Teaching Practices: Elements of Award-Winning Courses

Swapna Kumar
University of Florida

Florence Martin and Kiran Budhrani
University of North Carolina Charlotte

Albert Ritzhaupt
University of Florida

Abstract
The purpose of this study was to explore award-winning instructors' insights on elements of their course design that were award-winning and the differences between expert and novice online instructors. Interviews were conducted with eight award-winning online faculty members from across the United States who had received online teaching awards from one of three professional associations. The five main areas that emerged from the data analysis were (a) authentic and relevant course materials that connect to practice, (b) the use of multimedia resources, (c) student creation of digital content individually and collaboratively, (d) students' reflection on learning, and (e) the instructor's explanation of the purpose of activities, technologies, and assessments in the online course. Additionally, award-winning faculty emphasized the importance of using data and evaluation practices and reflecting on course offerings in the development of an excellent online course. Award-wining faculty described expert online instructors as being experienced and comfortable in the online environment, using a wide range of strategies, being willing to learn, using data and analytics, and engaging in continuous improvement. The findings add to the literature on best practices and what constitutes excellence in online courses.

Keywords: award-winning online faculty, online course design, online teaching practices, qualitative research

Kumar, S., Martin, F., Budhrani, K., & Ritzhaupt, A. (2019). Award-winning faculty online teaching practices: Elements of award-winning courses. *Online Learning,* 23(4), 160-180. doi:10.24059/olj.v23i4.2077

Award-Winning Faculty Online Teaching Practices: Elements of Award-Winning Courses

Over more than a decade, online education in the United States has experienced steady growth in the number of courses and programs offered at higher education institutions. Seaman, Allen, and Seaman (2018) report that approximately 31.6% of all students took an online course in fall 2016, an increase of 5.6% from fall 2015. As institutions increase their online offerings, they seek to continuously improve the design, implementation, and assessment of online courses and programs. Simultaneously, guidelines and frameworks have been developed at the local, state, and national levels to ensure the quality of online courses (Baldwin & Trespalacios, 2017; Baldwin, Ching, & Tsu, 2018; Brown, Lewis, & Toussaint, 2018), and awards for excellence in online course design and teaching have been instituted by established professional organizations. This paper focuses on the insights of experienced online faculty who have won such awards for exemplary online course design and teaching to identify what course elements contributed to winning an award, and to understand what distinguishes expert online instructors from novice online instructors.

Researchers have previously researched the practices of award-winning faculty in higher education (Dunkin & Precians, 1992; Kember & McNaught, 2007; Morris & Usher, 2011) and, more recently, in online education (Bailey, 2008; Martin, Ritzhaupt, Kumar, & Budhrani, 2019) in order to understand their successful online teaching and learning practices. In this study, we focus on the award-winning elements of course design and the distinctions between expert and novice online instructors as perceived by award-winning online faculty. Studying the online course design and teaching practices of award-winning faculty can serve as a model for other faculty and instructional designers aiming for excellence in online education, and can be used in faculty development efforts and readiness efforts (Baran & Correia, 2017; Gay, 2016). Further, award-winning online faculty expertise can provide a source of valid guidelines, standards, and best practices to extend the current state of online teaching and learning research and practice.

Review of Relevant Literature

Elements of Course Design

Online courses are structurally complex to design and develop because they contain a wide range of course elements, such as digital resources (R), activities (A), supports (S), and evaluations (E), and a model for design that focuses on these elements has been termed the RASE learning design model (Churchill, King, & Fox, 2013). *Digital resources* include the content, instructional materials, and tools that students use while working on activities. *Activities* are designed for students to engage in inquiry, problem-solving, projects, or collaborative work for achieving learning outcomes. *Supports* are in place to ensure students know where to seek help and who to seek help from. *Evaluation* is conducted to inform both students and faculty about progress toward expected learning outcomes. The RASE model was developed to assist faculty in designing for student-centered, technology-integrated learning environments. For such learning environments to be effective, all four elements are required, but the central focus must be on the design of learning activities rather than on the digital resources; resources should become mediating tools for faculty as they facilitate learning, provide support for learners, and evaluate learning outcomes (Churchill, 2017a, 2017b; Churchill, King, & Fox, 2013). Each element is further elaborated in the succeeding sections.

Digital resources (the R in RASE) for learning are best described as “technology-based multi-media content specifically designed for education and training purposes” (Churchill, 2017b, p. 2). The visual and interactive capabilities of educational technology have progressed significantly with the development of video architecture, mobile technologies, and software tools. Digital resources, such as e-books, Web content, educational videos, animation, simulations, interactive multimedia, podcasts, and open educational resources have become more user-friendly, and easier to find, access, and create (Miller, & CohenMiller, 2019; Ross, Volz, Lancaster, &

Divan, 2018). These offer opportunities to instructors and students to become curators of resources for a specific learning goal or topic (Correia & Jaramillo, 2016; Espiritu & Budhrani, 2019; Sharp & Hamil, 2018).

Instructors need to be intentional in creating and selecting digital resources according to their learning purpose, such as information display, presentation, practice, conceptual representation, or data display (Churchill, 2017b). Instructors also need to evaluate the instructional effectiveness and value of learning resources, ensuring those selected align to the given context, curriculum, and outcomes, and instructors must adjust materials based on credibility, clarity, validity, reliability, accuracy, currency, accessibility, usability, and quality of course resources (Varvel, 2007). Advanced interactive video assessment tools help shift passive learning into active knowledge construction, where students interact with video lectures through embedded question checks, and instructors track data on students' viewing and responses to questions (Chen & Wang, 2016; Giannakos, Krogstie, & Aalberg, 2016).

Learning activities (the A in RASE) need to be intentionally created or selected by instructors to provide experiences and opportunities for learners to construct and use knowledge from digital resources. Koohang, Paliszkiewicz, Klein, and Nord (2016) suggest that learning activities must be intentionally designed for deep knowledge construction and critical thinking in online courses, and such is only achievable with appropriate scaffolding of activities. Active learning methods and strategies, such as problem-based learning, cooperative learning, collaborative learning, and peer learning, can support individual or group activities online (Bishop & Verleger, 2013; Cundell & Sheepy, 2018). However, activity design cannot be static; instructors must be able to frequently modify activity instructions and tasks according to the number of persons involved in the learning activity, whether a whole class, a group, or an individual (Espiritu & Budhrani, 2019).

Academic and nonacademic support (the S in RASE) are essential for online learning students at the institutional, program, and course levels both to assure retention and avoid the feelings of isolation that can occur in online learning spaces (Mentzer, Black, & Spohn, 2015; Simpson, 2018). Supports for online learners are manifested in a multitude of ways following the traditional modes of interaction: student-to-student, student-to-content, and student-to-instructor (Moore, 1993). At the course level, online instructors should attempt to anticipate student needs and expectations as unforeseen circumstances emerge in the online learning space; such could be grasped with interactive communication tools, such as forums, email, chat, social media, or other synchronous or asynchronous tools (Churchill, 2017a).

Evaluation (the E in RASE) includes explicit evidence in the form of student feedback and evaluations, observations of classroom engagement/participation, and performance on assessment tasks, and it can personally validate and inform faculty design decisions (Bennett, Agostinho, & Lockyer, 2015; Markauskaite & Goodyear, 2014). Some faculty also utilize formal questionnaires or surveys to gather more accurate knowledge or feedback from students focused on problems identified during teaching. Finally, instructors may use research-informed or evidence-based teaching to analyze, explain, and reflect on their teaching, and ultimately, to help them make better informed course-design decisions (Bennett et al., 2015; Masterman, 2013).

Instructors are strongly guided by what they know about course design or teaching, especially by what they have experienced in the past. Their content expertise, design knowledge, prior experience, personal beliefs, and contextual constraints influence their course design. At the same time, they consider learner characteristics, institutional and departmental policies, available resources and materials, and curricular requirements. In addition, they design activities and lessons with considerations of time, rigor, student readiness, and distribution of workload (Bennett, Lockyer, & Agostinho, 2018; Markauskaite & Goodyear, 2014; Nguyen & Bower, 2018). Different decisions on course elements take time to assess depending on what needs to be created from scratch, modified, or reused from a previous iteration of the course.

Clarity and transparency of course design. In practice, researchers have found that students have increased academic confidence when instructors are transparent about the *purpose* of the course content and activities, the *tasks* that students have to complete (i.e., what to do and how to do it), and the *criteria* for success (i.e., what excellence looks like, criteria to help students to self-evaluate; Fisher, Kouyoumdjian, Roy, Talavera-Bustillos, & Willard, 2016; Musselman, Lock, Long, Loughran, & Saclolo, 2016). Examples of increased transparency include clarifying class goals, roles, and assignments for both students and instructors; providing detailed assignment instructions and rubrics for grading; including instructions explicitly linking the course learning outcomes; and providing samples of exemplary work for projects (Fisher et al., 2016; Musselman et al., 2016). Ralston-Berg, Buckenmeyer, Barczyk, and Hixon (2015) found that students placed great importance on the inclusion of clear instructions for getting started in a course and consistent and logical navigation; students also greatly value clearly articulated assessments and policies for grading.

It is important for instructors to make their intentions and decisions for each course element *visible* to students, explaining the learning rationale behind various teaching and learning approaches so that students understand why they are being asked to do something (Hattie, 2012). When students know the purpose behind activities, they are more likely to take an active role and greater responsibility in their learning. Transparency and visibility of relationships between online course elements are also reflected in several standards of the Quality Matters Rubric (Quality Matters, 2019).

Expert and novice online instructors. Prior research on expert and novice online faculty has mainly focused on studying expert, exemplary, or experienced instructors and their teaching practices (Hixon, Barczyk, Ralston-Berg, & Buckenmeyer, 2016). Lewis and Abdul-Hamid (2006) studied exemplary online faculty's teaching to find that they were organized, fostered interaction, provided timely feedback, facilitated learning, and maintained student enthusiasm. Exemplary online faculty studied by Edwards et al. (2011) were classified as challengers, affirmers, and influencers. Baran, Correia, and Thompson (2017) reported that exemplary faculty not only knew their content and their students but also knew how to design their online course, guide student learning, enhance student–teacher relationships, and maintain teacher presence. Additionally, exemplary online faculty formatively evaluated their online courses in order to make changes during the course. Watson, Koehler, Ertmer, Kim, and Rico (2018) found that expert instructors selected facilitation choices with course goals in mind and modeled the case analysis process, improving students' problem-solving. Further, experienced instructors considered the four characteristics of expert instructors to be (a) significant length and breadth of their online teaching experience; (b) personal characteristics such as curiosity, tenacity, and organization, and professional skills such as technical skills; (c) instructional design experience; and (d) effective teaching styles (McGree, Windes, & Torres, 2017). Martin, Budhrani, Kumar, and Ritzhaupt (2019) found that expert online faculty assume the roles of the designer, manager, subject-matter expert, facilitator, and mentor in online courses, while Bailey and Card (2009) discussed eight areas related to experienced online instructors—fostering relationships, engagement, timeliness, communication, organization, technology, flexibility, and high expectations.

Research Questions

The purpose of this study was to identify what constitutes excellence in online course design and what distinguishes expert online instructors. Thus, the following were our research questions:

1. What elements of their online courses did award-winning faculty perceive as award-winning?
2. What do award-winning online faculty perceive as the distinction between an expert and novice online instructor?

Method

A general qualitative approach was used in this study "to understand how people make sense of their experiences" (Merriam & Tisdell, 2016, p. 24). In order to sample award-winning faculty who could participate in this study, three awards were identified:

- The Crystal Online Teaching Award from the Association for Educational Communications and Technology (AECT). This award uses eight criteria to recognize innovative and outstanding multimedia-based distance learning courses. Innovation in course design, evidence of effectiveness, and a basis in scholarly literature are three of the criteria (AECT, 2018). AECT provides three crystal awards each year in the order of first place, second place, and third place.
- The Excellence and Innovation in Online Teaching Award from the Online Learning Consortium (OLC), for which applicants have to provide evidence of the effectiveness in achieving desired learning outcomes. This award requires that applicants should have designed and taught one or more online courses with well-designed course materials and instructional strategies, and demonstrated a rapport with learners (OLC, 2018). OLC provides one award each year.
- The Best Practices Awards for Excellence in Distance Learning Teaching from the United States Distance Learning Association that recognizes teaching that demonstrates extraordinary achievements on the part of an outstanding individual or team of individuals (USDLA, 2018). USDLA confers only one award each year.

Fifteen faculty who had won one of the three awards in the past 10 years (since 2015) were contacted by email. Eight of the 15 agreed to participate, of which six were female and two were male. Five had won OLC's Excellence and Innovation in Online Teaching, two had won the AECT's Crystal Award, and one had won the USDLA's Best Practice Award for Excellence in Distance Learning Teaching. Their teaching experience at a distance or online ranged from 5–42 years, and they had used many different learning management systems (LMS) in their blended and online courses (Table 1).

For common understanding, we adapted the OLC's recent definitions for blended and online courses (Sener, 2015). A blended (also called hybrid) online course is where "most course activity is done online, but there are some required face-to-face instructional activities" (Sener, 2015, para. 12). An online course is where all course activity is done online; there are no required face-to-face sessions within the course and no requirements for on-campus activity (Sener, 2015, para. 14).

Table 1

Demographics of Eight Award-Winning Faculty

ID	**Gender**	**Award**	**Years teaching in H.E.**	**Years teaching online**	**LMS experience**	**Modality**
1	F	Excellence in Online Teaching, OLC Award	20	15	Genzibar, WebCT, Desire2Learn, Canvas, Blackboard	Blend of asynchronous and synchronous
2	F	Excellence in Online Teaching, OLC Award	30	6	Blackboard	Asynchronous
3	F	Excellence in Online Teaching, OLC Award	14	12	Blackboard, Moodle, Canvas	Asynchronous
4	F	Crystal Award, AECT	23	5	WebCT, Blackboard, WordPress, WikiSpaces	Mostly asynchronous with some synchronous
5	F	Crystal Award, AECT	15	5	None identified	Blend of asynchronous and synchronous
6	M	Gold, Online Technology ~ Higher Education, Best Practices Awards for Excellence in Distance Learning Teaching	31	9	Blackboard	Mostly asynchronous with some synchronous
7	M	Excellence in Online Teaching, OLC Award	44	42	Blackboard	Asynchronous
8	F	Excellence in Online Teaching, OLC Award	18	15	CAD, Blackboard, InterLearn, Moodle	Asynchronous

Adapted from “Award-Winning Faculty Online Teaching Practices: Roles and Competencies,” by F. Martin, K. Budhrani, S. Kumar, & A. Ritzhaupt, 2019, *Online Learning, 23*(1), pp. 188–189. Copyright *Online Learning Journal*. Reproduced with permission.

Data Collection

After an extensive literature review, a semistructured interview protocol was created that focused on course design, facilitation, and evaluation. Fourteen open-ended questions were crafted with a focus on content, clarity, and sequencing (Patton, 1990). Care was taken to not use technical terms familiar to faculty in instructional design or educational technology but unfamiliar to faculty from other disciplines. The questions were reviewed by the research team consisting of four members with online teaching experience. This paper reports on course design and evaluation—namely, the questions in the interview guide that focused on what award-winning faculty perceived as design elements of their courses that were "award-winning," how they engaged in the evaluation of their courses, and what they perceived as the distinctions between novice and expert online instructors.

Web-based interviews were conducted with all eight online instructors using NetMeeting (Web-conferencing software) and digitally recorded with participant permission within the software. Each interview took about 30 minutes. The interview questions were displayed on the screen to assist the interviewees in staying focused and answering the questions during the interview. In addition to the open-ended interview questions from the semistructured interview protocol, several probes were used during the conversations to further clarify participants' statements.

Data Analysis

Following the transcription of the interviews, each interview was read by two researchers who checked that all the questions from the interview protocol had been asked. Next, they compiled the data from the eight interviews according to responses to each research question. Two members of the research team first coded all eight responses to one question using elemental coding methods. For credibility and dependability, they then discussed the descriptive, in vivo, and process codes (Saldana, 2015) in detail. The two researchers then coded the data for the remaining questions, discussed and reached agreement, and implemented axial coding. Categories were created by comparing and collapsing codes and then reviewing categories across questions before finalizing themes. Care was taken to retain details and examples from the raw data that represented the codes and that would be useful to online faculty or course designers aiming to create excellent online courses.

Results

The faculty in this study were asked to describe their award-winning course and what they felt made it award winning. The five main areas (Table 2) that emerged across the eight interviews were (a) authentic and relevant course materials that connect to practice; (b) the use of multimedia resources; (c) student creation of digital content individually and collaboratively; (d) students' reflection on learning; and (e) the instructor's explanation of the purpose of activities, technologies, and assessments in the online course. These "award-winning" elements are discussed in the first section of the results. Additionally, a sixth area emerged, discussed in the second section, that did not pertain to an element of the online course itself but to how the instructor used data and engaged in continuous improvement in the course. Finally, we present award-winning faculty's insights into what distinguishes an expert from a novice online instructor.

Table 2

The Five "Award-Winning" Elements in the Eight Interviews

Faculty	Authentic and relevant course materials that connect to practice	The use of multimedia resources	Student creation of digital content individually and collaboratively	Student reflection on learning	Instructor's explanation of purpose
1	X	X	X	X	X
2	X	X	X	X	X
3	X	X	X	X	X
4	X	X		X	X
5	X	X	X	X	X
6	X	X	X	X	
7	X	X	X	X	
8	X	X	X	X	X

Authentic and relevant course materials that connect to practice. All the faculty interviewed included innovative course materials that were authentic and that would be relevant to students' interests and professional contexts. One online instructor emphasized the value of such materials to experiential learning online. This instructor highlighted the importance of, "pulling in real-world problems, up to-date real-world problems into the classroom, applying new knowledge that you're acquiring every single week to that experiential learning and illustrating to yourself, your teacher, your stakeholders, your profession that you are capable of going out as problem solvers." Examples of such resources were

- snippets of recordings from a radio show aired weekly that was related to course topics, and which students were required to discuss in an online forum;
- videos from courtrooms and recorded interviews with prosecutors about specific aspects of legal cases in order to provide students with insight into the reality for their future profession, illustrate how things really work, and have them engage with "real" problems; and
- recorded podcasts with experts on the course topics to model their thinking and provide authentic material to the students.

A common theme that emerged among the faculty was the relevance of the materials and activities to students' future professions. An award-winning instructor explained,

> They were preparing to be science, social studies, and math teachers. … So I did a great deal of just general knowledge…like what is a math teacher going to be facing in a high school class? … I developed assignments, which I thought would be useful for those classes in the field.

Another online instructor believed in the value of providing students with the larger picture by using materials on different aspects of a case study. Learning activities described by this particular online instructor included student research for materials on the case study, following which this instructor provided authentic materials about real events and interviews with those related to the case study that were discussed by students.

Use of multimedia resources. The authentic and relevant materials that faculty included in their courses took the form of various media. Faculty used videos or songs available on YouTube and authentic interviews, podcasts, radio broadcasts, news articles, and media to provide students with real-world content. In addition to finding existing materials, they also created multimedia materials specifically for their courses. For example, they recorded screencasts, interviews with experts and professionals in the field, lectures, and podcasts. They also created multimedia presentations using various technologies. One instructor created interactive flowcharts that students could control and that would illustrate changes within a system. One online instructor used various types of technologies to address students' different learning styles, and another online instructor highlighted the value of using a variety of learning technologies, stating, "students have access to a tremendous amount of resources, articles, up-to-date best practices. But it's important especially in online learning that you have a variety of learning tools. You cannot simply just have text." One online instructor reflected on how much students appreciated such materials, stating,

> I'd been using VoiceThread, I've seen so much growth and community in the course and the ability for students to hear me and see me was like they were giving me this incredible feedback. … Then I had also started recording lectures as enhanced podcasts. … So those two things at that time were very, very new and again I was getting overwhelming feedback from students who'd go "this is so amazing!"

Student creation of digital content individually and collaboratively. In addition to integrating multimedia resources in their online courses, award-winning faculty required students to create different types of digital content and interact with each other using both synchronous and asynchronous technologies. Some online instructors provided students with options and allowed them to choose the technologies to create their digital content, whereas others required specific technologies. They reasoned that such activities were important for students to relate the course content to their own lives and contexts, and to demonstrate their learning.

Faculty provided several examples of such activities and how they contributed to student learning and to their winning of an award, as follows:

- Students created digital stories using technologies such as Photo Story or PowerPoint after choosing a topic of their choice that related to their subject-matter expertise and that connected course content to their lives. The online instructor reflected that, "the digital storytelling project also won some awards. I think because it was engaging, and because it was related to their lives."
- Students were required to read critical articles or text and create short (2–3 minute) presentations as podcasts. The award-winning instructor who used this strategy stated, "I think the review found my use of podcasts as a way to engage the students in an assignment as a unique thing."
- Students' major assignment was an electronic study guide that they could use with their future students, which consisted of a Web page with different tabs, and which distilled everything that they were learning in the online course. The online instructor considered it the award-winning aspect of the course.
- Students interviewed experts in the field and created audiovisual presentations that synthesized the interviews and course content.

- Students worked together with peers at another university in real-time sessions (using Zoom software) to gather information and create collaborative projects that they presented at the end of the course. The projects focused on the geographical regions of the two sets of students, helping them compare and discuss course topics in their contexts.
- Students created a digital presentation in which they applied and connected theories in the course to the responsibilities of a professional in their field.
- Students used Twitter to discuss course topics. They were required to tweet in three different ways each week about the content of the course that week. The online instructor described the tweets as "an informational tweet," "an attitudinal tweet," and a tweet with a link to a current resource. The course used a hashtag that helped curate tweets and facilitate student dialogue. The online instructor believed that this pushed students "out of the pure academic environment out into the social media environment where things are a little rougher. [They] got to watch their opinions and be smarter about things but students enjoyed it for the most part."
- Students had an online debate about benefits and drawbacks [of a course topic]. The online instructor explained, "It's experiential, it's holistic, connecting all the different parts. It provides engagement for the students."

Students' reflection on learning. In the online courses described by faculty in this study, student learning was assessed formatively and summatively using different activities, and students were also expected to demonstrate reflection on their learning. Faculty used a combination of weekly quizzes, discussion forums, student-created podcasts, blogs, VoiceThreads, presentations, artifacts (described in the previous section), self-assessments, peer assessments, position papers, final papers, and exams. All the online instructors used assignments in which students demonstrated what they had learned using either quizzes or digital technologies and then reflected on what they learned. For example, one award-winning online instructor created a screencast explaining answers in a quiz. Another award-winning instructor had students return to their answers in a quiz to reflect on their learning together, and a third had students reflect on their discussion posts (e.g., "how often did they post, what did they think of their posts, what did they learn?"). Another online instructor used an assessment rubric that students used to assess themselves and their interactions with their peers.

Online instructors described these activities as helping students understand their educational journey, understand "their own value of learning and how far that they have come," and help them "assess their learning and helping me understand the degree to which they have achieved learning outcomes in the class." A common theme that emerged across the interviews was the use of assessments that helped students assess their own learning and reflect on it. This also helped the online instructors identify individual and collective gaps in knowledge.

Explanation of purpose. The faculty in the study asserted that it was important to explain to students the purpose of the modules and content, the purpose of assessments, and the purpose of the technology that they used in their activities or assessments. At the beginning of each module within the online course, one instructor emphasized the importance of providing an explanation of what students were learning and why, stating, "It introduces them to the work, why it's included, what are we going to do with it." Likewise, an instructor explained to students how the course topics were connected within the field of study and related to the field and profession. Whenever technology was used within the course, one instructor found it important to communicate to students "why that technology makes sense for the learner." This was also the case with activities and assessments, where one instructor highlighted the value of communicating reasons for the assessments:

> The students need to understand what it is that they are reaching for and how we are going to get through, I provide a pathway for them. I explain why we are assessing certain types of learning, why are you taking this quiz? Why are you engaging in this debate, what is it that you should know as you go through this pathway and come out the other side.

Award-Winning Faculty's Use of Data in Online Courses

An important element in the development of an award-winning course was the way in which instructors had collected data on the course or engaged with existing evaluation data, reflected on how to improve the course, and made improvements. The eight award-winning instructors described various ways in which they and their institutions engaged in course evaluation for continuous improvement and quality management of a course. They used (a) student evaluations and surveys, (b) student achievement outcomes and analytics, (c) peer reviews and external reviews, and (d) reflection and course improvement.

Student evaluations and surveys. In addition to institutional student evaluations of online courses that focused on both course design and facilitation, online instructors created midsemester and end-of-semester surveys that they used to gather student feedback on various aspects of their online courses (e.g., to identify what was working or not). Online instructors stated that student evaluations often asked students about their perceptions (e.g., of the online instructor or whether the learning objectives of a course had been met) and measured student satisfaction. One online instructor reflected that over multiple offerings of a course, student surveys as well as evaluations provided feedback, "data," and "themes" that instructors could "build upon" during subsequent terms.

Student outcome achievements and analytics. Accreditation and larger program outcomes were a major course-quality consideration for four online instructors who perceived their online courses as part of program curricula with program goals. They described different ways in which student data, student feedback, and student work were used to assess whether student learning outcomes were being met in online courses or online programs. Two online instructors described the extensive use of rubrics to assess specific student-learning outcomes that were important for online courses or programs to be accredited or even just to maintain course quality at an institutional level. One online instructor explained,

> We work pretty closely with our institutional office. … They've utilized best practices and rubrics, and they give me … a kind of a bulleted list of their reading on what's happening within a particular course and based upon that, I will go back into the course and take a look at what we're doing and how we're doing it. It's actually been beneficial to me.

Two other online instructors described the analysis of data collected from learning management systems and assessments for comparison across semesters, across sections, or for relating to the national average. They stated that course quality and the meeting of learning objectives or "intended outcomes" at a program level were implemented at their institutions. One online instructor explained, "We do program assessment every year. … We are basically evaluating … are the students proficient in what we said they'd be proficient? We look at different assignments that were meant to speak to proficiencies, various outcomes."

Peer reviews and external reviews. Three online instructors described how peer reviews and external reviews were used to evaluate online courses at their institutions. One online instructor described the peer evaluation as follows: "The course owner, the course lead faculty will go in and observe the performance of the teaching faculty inside of the course in multiple ways. They fill out a rubric, they provide that feedback to the teaching faculty, and then we have a number of faculty development courses that we may recommend." Another online instructor described the use of an external review, where specific artifacts from courses were sent to third parties who are experts in the field to "evaluate those artifacts to determine if the students are indeed meeting the intended outcomes and at what level are they meeting those outcomes." This online instructor emphasized that unbiased input from external evaluators is "very useful" and it "pushed" him to make changes to courses.

Faculty reflection and course improvement. When online instructors discussed the different ways in which courses were evaluated, all of them emphasized that the final goal of that evaluation was online course improvement. Whether it was student evaluations, achievements, assessments, or peer/external reviews, they asserted that the value of these processes was course redesign, and improvements to alignment between objectives and outcomes. A theme that emerged was that award-winning faculty reflected on their online courses and used the results of evaluation processes to improve them. Three online instructors invested time in reviewing their online courses after they ran and assessed whether they were achieving what they had set out to do. One online instructor stated that he would review a major assignment every semester in the following manner:

> I have … notes saying here are the points that they [students] should take out of it and here's what they should have learned. And I use all the online arguments that they've presented as a being proof of did they get it or did they not get it. And then I go back and figure out why half this class missed this important point.

Distinction Between Novice and Expert Online Instructors

The award-winning faculty were asked how expert instructors differ from novice instructors who teach online. They stated that expert online instructors "know what works" based on experimentation, experience, understanding how online teaching differs from face-to-face teaching, and their analysis of student learning. They possess a wide range of strategies and are willing to learn. Expert online instructors have taught online for a while, which gives them "some confidence in what works and in what doesn't work." One online instructor stated, "It's about the third time you teach it that you know what really works and doesn't work." Experts are able to identify problems and realize that they have to approach things differently if they don't work, because they are able to see "here's what's going on, here's what should be going on, and here's how we go from there." Online teaching experience, according to the online instructors, also leads to an expert no longer thinking about or being limited by the technology. One online instructor stated, "I think the expert instructor is one that would no longer feel boxed in by the LMS, by the technology such as this, and feels free to express and does so."

Novice instructors, according to one online instructor, are focused on getting their courses into the LMS and are overwhelmed by the time taken by an online course, whereas expert instructors are constantly monitoring and tweaking and evaluating because they are beyond the initial stages. Another online instructor reflected that although novice instructors have subject-matter expertise,

> it's the design that falls short. They don't know how to organize their materials or set up a design that makes sense to move students in a progression towards course work. I think novice instructors sometimes, in my experience, fall short on some of the needed repetition of information that you need to provide students to keep them on track in that format.

Expert instructors recognize clear course design, effective pedagogy, and the struggles of students, and they take an experimental approach to instruction. One online instructor stated,

> You can't just take your material you've provided in class and put it online. The whole thing about being center stage, some people are when they lecture, that's completely out of the ballpark when you are teaching online. So, I think for me that's the greatest way they differ when you have someone new to online instruction.

Expert instructors also know how to adapt their materials to the online format, "what tools to use in which assignments, and what creates a good assignment." Furthermore, expert instructors are more likely to understand the need for "breadth versus depth" in an online course. The award-winning online faculty elaborated that expert instructors choose their content carefully and choose their actual activities to focus on the ones that are really important and drop those that are not. Table 3 summarizes key characteristics of expert and novice online instructors.

Table 3

Expert and Novice Instructors

Expert instructors	Novice instructors
• Know what works in the online format • Possess a wide range of strategies • Have confidence in online teaching • Are able to identify problems • Are not limited by technology • Know how to adapt materials for online format • Choose content and activities carefully • Constantly monitor, tweak, and evaluate the course	• Focus on getting the course on the LMS • Are overwhelmed with the time online teaching takes • Need support on course design • Are not comfortable with adapting materials for online format • Have subject-matter expertise but fall short of design

Discussion

This study was based on interviews with online instructors who had won one of three online education awards from professional organizations (AECT, OLC, USDLA). Their insights provide rich data that can contribute to our understanding of excellence in online course design and how expert online instructors are different from novice online instructors.

Award-Winning Course Design

Online course design elements valued by students have been documented in the literature and in quality standards (e.g., Quality Matters). Course announcements and reminders, course information documents (e.g., syllabus, schedules, outlines, grading procedures, and policies), and clarity on assignments are ranked as the top three course design elements for adult learners (Ausburn, 2004). Additionally, students value strong course organization, time-flexible feedback, the instructor's content ability and consistent support, and the relevance of both feedback and coursework (Fayer, 2014). While the literature focuses on these elements from the student perspective, the course design elements that emerged from this study represent faculty perspectives and add to what is known about excellence in online course design.

Authentic and relevant course materials that connect to practice. Award-winning instructors in our study emphasized the importance of using authentic online course materials (e.g., radio show recordings, courtroom videos), which help prepare students for future jobs. Authentic materials can impact student attitudes and alleviate student anxiety (Erbaggio, Gopalakrishnan, Hobbs, & Liu, 2016). Digital resources, such as case studies and videos, help deliver relevant online course material, such as content that demonstrates how to do something, and can increase students' motivation to learn (Herrington & Herrington, 2006).

Use of multimedia resources. Award-winning instructors in our study reported carefully selecting and using existing multimedia resources available online. They also created their own multimedia materials for their online courses by recording screencasts, lectures, podcasts, and interviews with experts or professionals in the field. Churchill (2017a) classified such types of digital resources as *content resources.* It was evident that award-winning instructors went beyond just using text-based materials to becoming curators and creators of content resources.

Researchers have examined the cognitive value of using multimedia in courses for several years (Moreno & Mayer, 2000). More recently, new media, such as simulations, augmented reality, and virtual reality, are being included in online courses. Multimedia in online courses can motivate students and support student learning and engagement (Mandernach, 2009; Sherer & Shea, 2011). Instructor-generated multimedia and instructor videos have been found to increase student engagement and social presence (Borup, West, & Graham, 2012; Mandernach, 2009).

Student creation of digital content individually and collaboratively. Learning activities designed by award-winning instructors also focused on students' creation of digital content in the form of digital stories, websites, podcasts, or audiovisual presentations both individually and collaboratively. The participants considered such learning activities as important to engaging and involving students in their learning process, and they often modified tasks or activities (Espiritu & Budhrani, 2019) based on formative feedback. Research has found that students also prefer the project-based application nature of activities and assignments, which help them create digital content (Heo, Lim, & Kim, 2010).

Students' reflection on learning. John Dewey (1933) stated, "We do not learn from experience. We learn from reflecting on experience" (p. 78). Award-winning faculty in this study subscribed to this view, using a variety of student-reflection activities, such as discussion posts, student-created presentations, podcasts, and blogs. They also required reflection on quizzes, final exams, and self-assessment of students' interactions with peers. Participants believed this reflection helped students identify the progress they made in their learning and promoted engagement in the learning process. Herrington and Oliver (2002) described reflection as both an individually mediated and socially mediated process that can be fully integrated into online courses and provide opportunities for the student to reflect as they complete various course activities. Online reflection strategies, such as individual journaling, online discussions, and creating mind maps, have previously been recommended by Martin and Ertzberger (2015).

Purpose of activities, assessments, and technology used in the online course. The fifth element that award-winning faculty found important to their online course design was their explanation of the purpose of activities, assessments, and technology used in the online courses. Quality Matters (2019) includes quality standards about the alignment between objectives, materials, activities, technologies, and assessments in online courses. Such explicit alignment assists online students in seeing the purpose of activities and assessments in relation to the objectives and instructional material in online courses. Participants in this study also referred to the importance of students seeing the "bigger picture," and the importance of using technologies that support the objectives, activities, and assessments in an online course. This finding reinforces prior research from the student point of view on clarity and transparency in course design (Fisher et al., 2016; Musselman et al., 2016; Ralston-Berg et al., 2015).

Faculty Use of Data in Online Courses

While the focus of our questions was the elements of award-winning courses, instructors in our study emphasized their use of data for continuous improvement as contributing to the award-winning nature of their online courses. They also underlined the importance of faculty reflection on course offerings to excellent course design. Their statements corresponded to literature on midsemester surveys as a helpful feedback tool (Sozer, Zeybekoglu, & Kaya, 2019) and the usefulness of such data for immediate and remedial action, unlike the end-of-semester data (Alderman, Towers, & Bannah, 2012). Our results also correspond to Baran, Correia, and Thompson's (2017) research that exemplary online faculty formatively evaluated their online courses in order to make changes during the course. While continuous improvement is emphasized in quality standards (e.g., Quality Matters), our study emphasizes the importance of (a) instructors' use of different types of data for reflection and for ongoing assessment and refinement of courses to excellence in online course design and (b) institutional support that assists instructors in their use of such data.

Expert Versus Novice Online Faculty

"Experts are not just those who have the wealth of experience from their years teaching online" (Martin et al., 2019, p. 40) but have the "fluency of teaching and learning with technology, not just with technology, itself" (Jacobsen, Clifford, & Friesen, 2002, p. 44). The award-winning instructors in our study characterized expert online faculty as instructors who (a) had adapted and were comfortable teaching in the online environment, (b) used a wide range of strategies, (c) were willing to learn, (d) used analytics and stayed engaged in the course, and (e) reflected on what works and knowing what works in online courses.

Faculty in our study believed that novice instructors' creation of online courses is restricted to including instructional materials in the LMS, whereas expert online faculty have learned to adapt or create materials and activities for the online learning environment. They emphasized the differences in online teaching compared to face-to-face teaching and that different strategies were needed to design and teach an online course. Several of their insights corresponded to Baran et al.'s (2017) description of exemplary faculty whose expertise went beyond content to various facets of the online course. Our participants asserted that expert online instructors use a variety of strategies to design and facilitate online courses and that no matter how experienced they are, expert online faculty are willing to learn new strategies and technologies for online course design and teaching. Their insights correspond to Outlaw and Rice's (2015) findings from interviews that it is important for online faculty to be open-minded and willing to try new tools and online teaching concepts. An important point made by our participants is that of expert online instructors not being restricted by technology but using it for their goals. The participants in our study modeled such use in their course design, and also in the ways in which they used data for decision-making, supporting the students, and making online course improvements.

Limitations

While the present study resulted in several interesting and relevant findings, this research is not without limitations. First, the participants had won online education awards from particular professional organizations (AECT, OLC, USDLA), and other professional organizations or awards were not included in this study. Of the 15 instructors contacted, though only eight participants ultimately participated in the research, all of these participants shared the status of an award-winning online instructor and had deep experiences with online teaching and learning. This was a purposeful sample of participants and, thus, the participants were relatively homogeneous on the key criterion used for recruitment. Second, the participants received their awards in different years and from different professional associations selected for inclusion in the study. Consequently, the participants may not have been able to fully account for all aspects of the award-winning course designs since their responses were based on memory and personal accounts. Finally, we did not use all possible methods of rigor for qualitative research, such as triangulation (e.g., observing the award-winning courses or reviewing their course syllabi), peer debriefing (e.g., participants did not review coding and interpretations), or prolonged engagement (e.g., participants were interviewed in one session). Employing additional methods of rigor would have augmented the credibility and trustworthiness of our findings.

Future Research

Growing online course offerings and expectations of faculty to teach online have created a need for effective models and best practices, and further investigation of what constitutes excellence in online course design and teaching. This is particularly important as emerging technologies (e.g., augmented or virtual reality), motivational strategies (e.g., gamification), and additional opportunities (e.g., badges) are integrated into online course design. Future research on award-winning instructors could dig deeper into the learning design of how instructors conceptualize, design, and use specific course elements; this can be done through a content analysis of actual award-winning course shells or syllabi, or by focusing on more specific research questions related to digital resources, activities, supports, and evaluations. Additionally, future research might also account for the multiple stakeholders involved in online learning, including instructional designers, faculty, administrators, multimedia developers, and ultimately, the primary users of these courses—the students. Online course design and development is no longer done in isolation by faculty tinkering with an LMS. Many stakeholders are involved in the full life cycle of online learning. Although expectations for quality online courses have been defined in the past, our study contributes to the literature on award-winning online instructors and elements of course design that represent excellence. These findings should continue to spur dialogue in both the online learning research and practice community.

References

Alderman, L., Towers, S., & Bannah, S. (2012). Student feedback systems in higher education: A focused literature review and environmental scan. *Quality in Higher Education*, *18*(3), 261–280.

Association for Educational Communications and Technology Distance Learning Awards. (2018). Retrieved from https://mms.aect.org/members/project_content.php?content_id=446931&org_id=AECT

Ausburn, L. J. (2004). Course design elements most valued by adult learners in blended online education environments: An American perspective. *Educational Media International*, *41*(4), 327–337.

Bailey, C. J. (2008). *Best practices for online teaching: Perceptions of South Dakota award-winning online university faculty*. University of South Dakota.

Bailey, C. J., & Card, K. A. (2009). Effective pedagogical practices for online teaching: Perception of experienced instructors. *The Internet and Higher Education*, *12*(3-4), 152–155.

Baldwin, S., Ching, Y. H., & Hsu, Y. C. (2018). Online course design in higher education: A review of national and statewide evaluation instruments. *TechTrends, 62*(1), 46–57.

Baldwin, S. J., & Trespalacios, J. (2017). Evaluation instruments and good practices in online education. *Online Learning 21*(2). doi:10.24059/olj.v21i2.913

Baran, E., & Correia, A. P. (2014). A professional development framework for online teaching. *TechTrends, 58*(5), 95–101.

Baran, E., & Correia, A. P. (2017). What motivates exemplary online teachers? A multiple-case study. *Learning, Design, and Technology: An International Compendium of Theory, Research, Practice, and Policy*, 1–17.

Baran, E., Correia, A. P., & Thompson, A. (2013). Tracing successful online teaching in higher education: Voices of exemplary online teachers. *Teachers College Record*, *115*(3), 1–41.

Bennett, S., Agostinho, S., & Lockyer, L. (2015). Technology tools to support learning design: Implications derived from an investigation of university teachers' design practices. *Computers & Education*, *81*, 211–220.

Bennett, S., Lockyer, L., & Agostinho, S. (2018). Towards sustainable technology-enhanced innovation in higher education: Advancing learning design by understanding and supporting teacher design practice. *British Journal of Educational Technology*, *49*(6), 1014–1026. https://doi.org/10.1111/bjet.12683

Bishop, J. L., & Verleger, M. A. (2013). *The flipped classroom: A survey of the research*. *30*, 1–18.

Borup, J., West, R. E., & Graham, C. R. (2012). Improving online social presence through asynchronous video. *The Internet and Higher Education*, *15*(3), 195–203.

Brown, V. S., Lewis, D., & Toussaint, M. (2018). Students' perceptions of quality across four course development modules. *Online Learning, 22*(2), 173–195. doi:10.24059/olj.v22i2.1213

Chen, H.-L., & Wang, S. (2016). Turning passive watching to active learning: Engaging online learners through interactive video assessment tools. *39th Annual Convention of the Association for Educational Communications and Technology*, *1*, 15–20.

Churchill, D. (2017a). Using digital resources for learning in a learning activity. In *Springer texts in education*. *Digital resources for learning* (pp. 133–158). Singapore: Springer Nature Singapore Pte Ltd.

Churchill, D. (2017b). Educational reforms, learning-centred education and digital resources for learning. In *Springer texts in education*. *Digital resources for learning* (pp. 1–17). Singapore: Springer Nature Singapore Pte Ltd.

Churchill, D., King, M., & Fox, B. (2013). Learning design for science education in the 21st century. *Zbornik Instituta Za Pedagoška Istrazivanja/Journal of the Institute of Educational Research*, *45*(2).

Correia, A.-P., & Jaramillo, N. (2016). Strengthening learner participation in online courses: The role of digital content curation. *39th Annual Convention of the Association for Educational Communications and Technology*, *1*, 21–23.

Cundell, A., & Sheepy, E. (2018). Student perceptions of the most effective and engaging online learning activities in a blended graduate seminar. *Online Learning*, *22*(3), 87–102.

Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the educative process*. DC Heath.

Dunkin, M. J., & Precians, R. P. (1992). Award-winning university teachers' concepts of teaching. *Higher Education*, *24*(4), 483–502.

Edwards, M., Perry, B., & Janzen, K. (2011). The making of an exemplary online educator. *Distance Education*, *32*(1), 101–118.

Erbaggio, P., Gopalakrishnan, S., Hobbs, S., & Liu, H. (2016). Enhancing student engagement through online authentic materials. *IALLT Journal of Language Learning Technologies*, *42*(2).

Espiritu, J. L., & Budhrani, K. (2019). Cultivating an elearning culture. *Scientia Pedagogica Experimentalis*, *56*(1), 3–32.

Fayer, L. (2014). A multi-case study of student perceptions of online course design elements and success. *International Journal for the Scholarship of Teaching and Learning*, *8*(1), 13.

Fisher, K., Kouyoumdjian, C., Roy, B., Talavera-Bustillos, V., & Willard, M. (2016). Building a culture of transparency. *Peer Review*, *18*(1/2), 8.

Gay, G. H. (2016). An assessment of online instructor e-learning readiness before, during, and after course delivery. *Journal of Computing in Higher Education, 28*(2), 199–220.

Giannakos, M. N., Krogstie, J., & Aalberg, T. (2016). Video-based learning ecosystem to support active learning: Application to an introductory computer science course. *Smart Learning Environments*, *3*(1).

Hattie, J. (2012). *Visible learning for teachers: Maximizing impact on learning*. London: Routledge.

Herrington, A., & Herrington, J. (2006). What is an authentic learning environment? In A. Herrington & J. Herrington (Eds.), *Authentic learning environments in higher education* (pp. 1–13). Hershey: Information Science Publishing.

Herrington, J., & Oliver, R. (2002). *Designing for reflection in online courses.* In HERDSA 2002 Quality Conversations, 7–10 July 2002, Perth, Western Australia (pp. 313–319).

Heo, H., Lim, K. Y., & Kim, Y. (2010). Exploratory study on the patterns of online interaction and knowledge co-construction in project-based learning. *Computers & Education*, *55*(3), 1383–1392.

Hixon, E., Barczyk, C., Ralston-Berg, P., & Buckenmeyer, J. (2016). The impact of previous online course experience on students' perceptions of quality. *Online Learning*, *20*(1), 25–40.

Kember, D., & McNaught, C. (2007). Enhancing university teaching: Lessons from research into award-winning teachers. Routledge.

Koohang, A., Paliszkiewicz, J., Klein, D., & Nord, J. H. (2016). The importance of active learning elements in the design of online courses. *Online Journal of Applied Knowledge Management, 4*(2), 17–28.

Lewis, C. C., & Abdul-Hamid, H. (2006). Implementing effective online teaching practices: Voices of exemplary faculty. *Innovative Higher Education*, *31*(2), 83–98.

Mandernach, B. J. (2009). Effect of instructor-personalized multimedia in the online classroom. *The International Review of Research in Open and Distributed Learning*, *10*(3).

Markauskaite, L., & Goodyear, P. (2014). Tapping into the mental resources of teachers' working knowledge: Insights into the generative power of intuitive pedagogy. *Learning, Culture and Social Interaction*, *3*(4), 237–251.

Martin, F., Budhrani, K., Kumar, S., & Ritzhaupt, A. (2019). Award-winning faculty online teaching practices: Roles and competencies. *Online Learning, 23*(1), 184–205.

Martin, F., & Ertzberger, J. (2016). Effects of reflection type in the here and now mobile learning environment. *British Journal of Educational Technology, 47*(5), 932–944

Martin, F., Ritzhaupt, A., Kumar, S., & Budhrani, K. (2019). Award-winning faculty online teaching practices: Course design, assessment and evaluation, and facilitation. *The Internet and Higher Education*, *42*, 34–43.

Masterman, E. (2013). The challenge of teachers' design practice. In H. Beetham & R. Sharpe (Eds.), *Rethinking pedagogy for a digital age: Designing for 21st century learning* (2nd ed.). New York, NY: Routledge.

McGee, P., Windes, D., & Torres, M. (2017). Experienced online instructors: Beliefs and preferred supports regarding online teaching. *Journal of Computing in Higher Education*, *29*(2), 331–352.

Mentzer, B., Black, E. L., & Spohn, R. T. (2015). An analysis of supports for persistence for the military student population. *Online Learning*, *19*(1), 31–47.

Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research* [Kindle edition]. San Francisco, CA: Josey Bass.

Miller, M. V., & CohenMiller, A. S. (2019). Open video repositories for college instruction: A guide to the social sciences. *Online Learning Journal, 23*(2), 40–66.

Moore, M. G. (1993). Theory of transactional distance. In D. Keegan (Ed.), *Theoretical principles of distance education*. New York: Routledge.

Moreno, R., & Mayer, R. (2000). A learner-centered approach to multimedia explanations: Deriving instructional design principles from cognitive theory. *Interactive Multimedia Journal of Computer Enhanced Learning*, *2*(2).

Morris, D. B., & Usher, E. L. (2011). Developing teaching self-efficacy in research institutions: A study of award-winning professors. *Contemporary Educational Psychology, 36*(3), 232–245.

Musselman, J. G., Lock, C., Long, C., Loughran, S., & Saclolo, M. P. (2016). Design and implementation: Transparency and problem-based learning at St. Edwards University. *Peer Review*, *18*(1/2), 28–30.

Nguyen, G. N. H., & Bower, M. (2018). Novice teacher technology-enhanced learning design practices: The case of the silent pedagogy. *British Journal of Educational Technology*, *49*(6), 1027–1043. https://doi.org/10.1111/bjet.12681

Online Learning Consortium. (2018). Retrieved from https://onlinelearningconsortium.org/about/olc-awards/

Outlaw, V., & Rice, M. (2015). Best practices: Implementing an online course development & delivery model. *Online Journal of Distance Learning Administration*, *18*(3), 1–10.

Patton, M. Q. (2002). *Qualitative research and evaluation methods.* Thousand Oaks, CA: Sage Publications Ltd.

Quality Matters. (2019). Specific review standards from the QM higher education rubric (6th ed.) Retrieved from https://www.qualitymatters.org/sites/default/files/PDFs/StandardsfromtheQMHigherEducationRubric.pdf

Ralston-Berg, P., Buckenmeyer, J., Barczyk, C., & Hixon, E. (2015). Students' perceptions of online course quality: How do they measure up to the research? *Internet Learning*, *4*(1), 3.

Ross, S. R. P-J., Volz, V., Lancaster, M. K., & Divan, A. (2018). A generalizable framework for multi-scale auditing of digital learning provision in higher education. *Online Learning, 22*(2), 249–270. doi:10.24059/olj.v22i2.1229

Saldaña, J. (2015). *The coding manual for qualitative researchers*. Thousand Oaks, CA: Sage.

Seaman, J. E., Allen, I. E., & Seaman, J. (2018). Grade increase: Tracking distance education in the United States. *Babson Survey Research Group*.

Sener, J. (2015, July 7). Updated e-learning definitions. Retrieved from https://onlinelearningconsortium.org/updated-e-learning-definitions-2/

Sharp, L. A., & Hamil, M. (2018). Impact of a Web-based adaptive supplemental digital resource on student mathematics performance. *Online Learning*, *22*(1), 81–92.

Sherer, P., & Shea, T. (2011). Using online video to support student learning and engagement. *College Teaching*, *59*(2), 56–59.

Simpson, O. (2018). *Supporting students in online, open and distance learning*. Routledge.

Sozer, E. M., Zeybekoglu, Z., & Kaya, M. (2019). Using mid-semester course evaluation as a feedback tool for improving learning and teaching in higher education. *Assessment & Evaluation in Higher Education*, *44*(7), 1003–1016.

United States Distance Learning Association Awards. (2018). Retrieved from https://usdla.org/awards/

Varvel, V. E. (2007). Master online teacher competencies. *Online Journal of Distance Learning Administration*, *10*(1), 1–41

Watson, S. L., Koehler, A. A., Ertmer, P., Kim, W., & Rico, R. (2018). An expert instructor's use of social congruence, cognitive congruence, and expertise in an online case-based instructional design course. *Interdisciplinary Journal of Problem-Based Learning*, *12*(1), 3.

Appendix

Award-winning faculty interview questionnaire

DEMOGRAPHICS

1. Describe your current job title/position.
2. Gender
3. Ethnicity
4. How long have you been teaching in higher education?
5. How long have you been teaching online?
6. What learning management systems have you used to design and teach online?
7. How would you describe your online class structure?
    a. Fully online (80-100% is offered online)
    b. Hybrid/blended (less than 80% is offered online)
8. How would you describe the approach to your online course?
    a. 100% asynchronous
    b. 100% synchronous
    c. Mostly asynchronous with some synchronous
    d. Mostly synchronous with some asynchronous
    e. Blend of both asynchronous and synchronous

ROLES, RESPONSIBILITIES, TASKS

9. What are the various roles instructors take on in online learning?
10. What do you feel are your responsibilities as an online instructor?
11. What would you describe as the common tasks you implement when designing and teaching an online course?
12. For each of the roles identified, what competencies do online instructors need to teach online?

DESIGN, SUPPORT, ASSESSMENT, EVALUATION & FACILITATION

13. Please describe for us your award-winning online course.
14. How do you organize your online courses?
15. Could you describe to us how you design your course?
16. Do you seek any assistance from specialists (e.g., graphics designers, instructional designers, etc.)?
17. Could you describe to us how you teach your course (e.g., the day-to-day work)?
18. Could you describe to us how you assess your students (e.g., quizzes, discussions, etc.)?
19. How do you evaluate whether your course is meeting your intended outcomes?

TECHNICAL COMPETENCIES, EXPERT/NOVICE INSTRUCTORS

20. What technical competencies do online instructors need to teach online?
21. How do expert instructors differ from novice instructors who teach online?
22. What should novice online instructors do to acquire strong competencies to be successful in online learning?

Faculty Perspectives on Online Learning: The Instructor's Role in Creating Community

Sharla Berry
California Lutheran University

Abstract
In this qualitative case study, the researcher followed up on a previous study on community in an online program. Focusing on faculty perspectives, findings suggest that while online students' sense of community was influenced by their interactions in class, in study groups, and at in-person social events, online faculty saw their role in cultivating community as limited to the classroom. Professional and personal obligations as well as the academic reward structure limited faculty engagement in the online community. Findings have implications for developing distance programs that support both student and faculty needs.

Keywords: online learning, community, faculty

Berry, S. (2019). Faculty perspectives on online learning: The instructor's role in creating community. *Online Learning, 23*(4), 181-191. doi:10.24059/olj.v23i4.2038

Faculty Perspectives on Online Learning: The Instructor's Role in Creating Community

Over the past decade, universities have continued to expand their distance offerings. Nearly 30% of American college students have taken an online course (Allen, Seaman, Poulin, & Straut, 2016). Online programs have particularly grown at the graduate level, with 26% of graduate students being enrolled in an online program (U.S. Department of Education, 2018). Despite progress in enrollment, online programs face challenges in engaging and retaining students. Helping students cultivate a sense of community can help promote student success in an online program (Rovai, 2003; Tirrell & Quick, 2012). Given that instructors play a vital role in students' experiences, this paper explores instructors' perspectives on cultivating community in an online program. The findings have important implications for researchers and practitioners in online environments.

Review of Literature

Researchers have long held that the nature of interactions in learning environments impacts students' sense of closeness and community. Social presence theory emerged to explain interpersonal connections within virtual environments (Short, Williams, & Christie, 1976). Social presence theory suggests that the ways individuals interact in computer-mediated contexts impacts their degree of closeness. For example, when individuals respond quickly and use written and textual cues to communicate intimacy, feelings of connection are increased in a virtual environment (Short, Williams, & Christie, 1976). Researchers have identified several strategies to increase social presence, including incorporating welcoming messages into the start of a course, encouraging the use of humor, developing profiles to share information about individuals, and using emoticons to express emotion (Aragon, 2007; Tu, 2000).

When social presence is high, a sense of community can form within the learning environment (Garrison, Anderson, & Archer, 2010). Communities are characterized by feelings of membership, belonging, support, and trust (McMillan & Chavis, 1986). In a learning community, students develop these feelings through collaborative work in a trusting environment (Rovai, 2003). Drawing mostly on data from students, scholars have begun to explore how community is constructed in online programs. Rovai (2007) writes that instructors can structure courses in ways that help students connect. In a review of the literature on the topic, Rovai (2007) found that students were more likely to develop community in classrooms where they could engage whole-group and small-group discussion. In a case study of 20 instructors, Waycott, Sheard, Thompson, and Clerehan (2013) found that peer knowledge-sharing activities, including blogs and discussion boards, can also help students develop a sense of closeness with peers in virtual environments. Practitioners are also increasingly experimenting with a number of different modes of communication, including breakout groups, class presentations, and the flipped classroom, to encourage interactivity in distance classes (Knapp, 2018). Garrison and Cleveland-Innes (2005) found that courses that were interactive and highly structured contributed to distance learners' sense of community.

The structure of an academic program as a whole can contribute to students' sense of community as well. In a multiyear study of online students, Conrad (2005) found that cohorts were important for distance learners. In a cohort, students can develop a sense of belonging within a supportive group (Berry, 2017b; Conrad, 2005). While students' relationships within this group may change, the cohort provides a powerful frame for community (Berry, 2017a). Outside of the classroom, faculty, program administrators, and student affairs staff can design a range of cocurricular programs to help students develop social relationships (Crawley, 2012). Orientations can provide online students with vital information about the culture and expectations of the academic program (Berry, 2018). Additionally, orientation can provide an opportunity for online students to learn more about their peers (Berry, 2018). Brindley (2014) writes that while student support services for distance learners are "essential," they are also "evolving," as programs continue to learn how to leverage technology to provide academic, psychological, and social support to distance learners. Bailey and Brown (2016) identify a range of areas for online programs to consider in strengthening their student support services, including counseling and disability support.

Despite the importance of community to online students' engagement, there is a dearth of research on faculty perceptions of community in online programs. In a survey of 344 faculty at land-grant and research-intensive institutions, Bolliger, Shepherd, and Bryant (2019) discovered that faculty found students' sense of community to be key to engagement and satisfaction in online programs. Eighty-eight percent strongly agreed that community was important. Sixty-six percent said community extends beyond classes. However, only 37% said that there was a system in place at their institution to help online students build community. Given that faculty are the primary point of contact for online students, learning more about their perceptions of online community is critical for supporting online students' success.

Research Question

This study was driven by the following research question: According to faculty in one online doctoral program, what role should instructors play in helping online students develop a sense of community?

Conceptual Framework

The conceptual framework informing this study is White and Nonnamaker's (2008) doctoral student community of influence model. The authors argue that for doctoral students, academic community can be understood as occurring in five overlapping spheres—the discipline or professional field, the institution, the department, the lab, and the advisor–student relationship (White & Nonnamaker, 2008). While students can experience community in a range of spaces, their sense of community is based significantly on where they are in relationship to any of the aforementioned groups. In a previous study, I used White and Nonnamaker's (2008) theoretical framework to identify the spaces where online doctoral students experience community (Berry, 2017b). In that study, students attributed their sense of community to interactions in four spaces—the cohort, the classroom, small groups of friends in the program, and peer study groups.

Understanding community as something that can occur as multiple spheres is important. First, it moves researchers away from conceptualizing online community as simply present or absent. By pushing away from understanding community as a binary, researchers are able to see the nuance within community. Second, understanding the overlapping spheres of community allows for a more thorough exploration of where community occurs. Research on online learning has tended to focus on community as a classroom-based phenomenon (Garrison, Anderson, & Archer, 2010). Using a framework that focuses on connectedness in multiple spaces creates a possibility for understanding online communities in new ways.

Setting

The study took place at an online doctorate program at a large Research 1 institution, which will be referred to by the pseudonym "University of the West." Over the past 8 years, the institution has received a number of academic and industry awards for its well-ranked, large online masters and doctoral programs. The courses were delivered in a synchronous format. Using Web conference software, students met weekly in a virtual classroom, where they could see their peers and each other. Students were also required to attend an in-person orientation at the start of each school year.

Methods

This project was a qualitative case study, where the case was the online doctoral program. Case study methods are appropriate for descriptive analyses of unique contexts (Merriam, 2009). Many studies of online programs rely on survey data (Berry, 2017a). In using qualitative methods, the researcher is able to paint a descriptive picture of the unique context of the online program. This study is a follow-up to a study on online students' sense of community. That study occurred in 2016, when the program was in its second year. In that study, I conducted 10 interviews with first-year students and 10 interviews with second-year students (Berry, 2017a). Through that study, I explored how online students defined and experienced community. The follow-up study took place in 2017. I interviewed faculty in the same online program. Thirteen instructors were interviewed, including six full-time and seven adjunct faculty. Faculty interviewed had, on average, 4.7 years of experience teaching in online programs. These faculty represent 25% of faculty teaching in the spring semester. The faculty interviews were semistructured, occurred by phone, and lasted approximately 45 minutes. The interviews focused on three areas—definitions of community, faculty's role in community, and strategies for creating community.

Data Analysis

Interviews were conducted via phone, recorded using Google Voice, and transcribed via an online transcription service. To analyze the transcripts, I created a coding scheme aligned to the conceptual framework. The coding scheme included Rovai's (2003) definitions of community, McMillan and Chavis's (1986) aspects of community (i.e., membership, influence, fulfillment of needs, and shared emotional connection) and White and Nonnamaker's (2008) spheres of community (i.e., the discipline or professional field, the institution, the department, the lab, and the advisor–student relationship). The coding scheme also included sites identified as sources of community in previous research on online doctoral students—the cohort, the classroom, study groups, and extracurricular/in-person group meetings (Berry, 2017b). In the interviews with faculty, new codes emerged, including orientation and adjunct. I reanalyzed the data using these codes. After coding the data with theoretical and emergent codes, the case study was produced.

In developing this case study, it was important to attend to issues of trustworthiness. Lincoln and Guba (1985) argued that trustworthiness in qualitative research can be achieved by attending to issues of credibility, transferability, dependability, and confirmability. Credibility is achieved when researchers assess their perceived findings against their interpretations. In the coding process, I defined and operationalized my codes. As I coded, I tested for the extent to which coded data fit with defined codes. In that way, I increased credibility. Transferability refers to the extent to which the case can be transferred to other contexts. By creating thick description via participant quotes, readers and researchers can make judgements regarding transferability. Dependability refers to how the methods are clearly documented, so that they can be retraced. By providing the interview protocol in Appendix A, I have increased dependability. Confirmability occurs when credibility, transferability, and dependability are achieved (Nowell, Norris, White, & Moules, 2017).

Results

Cultivating Community—The Classroom

For faculty in the online program, the classroom was the most important site of community. It was the space where they had most of their interactions with students and the place where they felt most responsible for taking an active role in engaging the students, facilitating connections between peers, and providing social and emotional support for students. Jane, a part-time faculty member, focused on using the classroom as a space to develop community by cultivating a sense of belonging:

> I think that the instructor can play a pivotal part in that and I think their role is really important because I think you kind of establish that sense of belonging in your class. So, you have those two and a half hours with them each week. I think it is important to make students feel welcomed, like their perspectives and experiences are important and that they add value. I think that's incredibly important. I think you set the tone, as the instructor, for that, for their experience. Not only in your class, but moving forward, you want to set that

> foundation for them. I think any time you're in education and you're creating this environment of learning and safety, you play a pivotal role in creating that community.

As Jane's quote illustrates, faculty felt that it was important to help students in the online program feel comfortable expressing themselves in the online class. Other faculty members were focused on using the classroom as a space where students could feel comfortable connecting with each other. Ashley, a part-time faculty member, saw the classroom as a space to develop a foundation for community. She hoped that, with her support, students would develop a sense of rapport that would develop throughout the program:

> I have the students for one semester, but they are with each other for the entire three years together. I think my role is, to the best of my ability, help them to make connections with each other, and to see each other as resources that can be leveraged. My role is to help them see that as a cohort, they can make it through together and pull each other up when things get tough. I think that is a gift I can give my students. I think I do that through modeling and providing the space and structure for them to engage in those kinds of meaningful, reflective activities like peer review. Ideally it will become natural for them to connect and support each other, and they'll continue it without my structure.

Instructors saw their role as modeling peer support in the class, with the hopes that students would be more accustomed to interacting with each other inside and outside of class. Marty also felt that class activities, particularly discussions, could help students work together outside of the classroom:

> I think it's incumbent upon the professor (in an online program) to provide those opportunities for students to get to know one another, to work together. As the facilitator, you have the ability to create groups and breakout rooms and discussion groups, yourself. I strategically group students together. I can tell pretty quickly who knows who really well. And I try to give them opportunities to work with others to build that sense of community, and to deepen their capacity as students but also as co-collaborators as well.

In the spirit of fostering community, faculty would promote formal and informal discussions around a variety of topics in the synchronous class sessions. While many discussions would focus squarely on course content, some discussions centered on students' personal and professional lives. However, some instructors felt that it was not always appropriate to use the classroom as a space for building community. Kara, a full-time faculty member, described it this way:

> I think we just need to figure out ways to really maximize that time so that students do have the ability to connect. Because some students don't necessarily, even if they live really close together, they don't necessarily have the time to go together and hang out as if that was really good. But from a faculty perspective, it's hard to do that in a course. Because a course has content that needs to get covered and the most that we could do is create community by creating rapport, and by opening it up as a safe space for conversation and all of that. But I think the social interactions has to be done elsewhere, it can't be in classes.

However, at the same time, faculty noticed that when they were not intentional about helping students connect in the classroom, students were dissatisfied. Marie, a full-time faculty member, describes a time when she tried to reduce the social interaction in her class:

> My first class with the students, I started by saying, "You all know each other because you've been in class together. I'm not going to ask you to bore each with your dissertation topics. What I'd like you do is write them in a chat for me so I know your questions and your data collection methods." And at the end of class, one of my students said, "I haven't been attending class on Thursday nights, so I'm not familiar with everybody in the room and I would have appreciated an opportunity for us to go around and introduce ourselves." So, I said, "my mistake." The following week I started by saying, "Let's go around the room and let's take a minute and introduce ourselves. And if you know each other, then say something that you might think that you don't know about somebody or that people might not know about you." My thought was that I didn't want to put them in the position of having to spend 25 minutes of our first class on something that they've done 1,000 times. However, students appreciated the chance to get to know more about their peers.

Kara and Marie's perspectives reflect the tensions faculty faced in building community in the online classroom. While it was important to use a variety of strategies to promote peer interaction, such as discussion groups, peer review, and informal discussions about students' personal and professional lives, faculty also had an obligation to teach the curriculum. Social interactions were important, but it was the students' responsibility to do the bulk of their relationship-building outside of class. Faculty were reluctant to cede too much time to community-building activities. Toward that end, some faculty in the online program sought to make connections with students apart from class hours. Javier, a part-time instructor, spoke out being available to students to discuss academic and professional concerns:

> I make myself available to them for questions and ongoing concerns. They all have my mobile number. And I encourage them to call me whenever they have a question or they need talk about a schedule conflict or something like that. And many students do in fact call me. It's informal office hours. But I do also schedule office hours, specifically to address certain curricular challenges that students might be facing at specific points in the course, where I know that they are going to struggle or they have struggled. I can't say that I do much else.

While Michael, a full-time instructor, did not hold formal meetings with students, he did make it a point to connect students to people in his professional network:

> I've had a couple students contact me, and one of them talked to me about educational technology. I had a student from Microsoft who had some questions for me. I had another student that asked me to do a training workshop for one of the big accounting companies. And then, occasionally, I will send emails to students if there's something that I discover out in the open market or the open world that I say, "Hey, this might be interesting to that student." But my communication with a student has been mostly within the confines of the class.

Michael and Javier's perspectives represent a general consensus online faculty had about building connections with students outside of class. While faculty were generally interested in connecting with students out of class, the ways in which they did so were highly unstructured and contingent on the needs and interests of students.

Fostering Community Outside of the Class—Orientation

One area where online faculty did engage with students in a structured way outside of class was at orientation. While the program was fully online, students were required to participate in a three-day, residential orientation before the start of each school year. The orientation was held on the main campus and included training on how to use the LMS, an overview of program requirements, and a group lunch and dinner. Administrators in the program strongly encouraged but did not require faculty to participate in the program.

Vanessa, an adjunct faculty member, had not participated in orientation, but said that she would do so if she could contribute positively to students' sense of community:

> I had just started at University of the West in January and they either had it around that time or shortly thereafter, but interestingly, one of the questions that I always ask the students is, "How can we improve the program? How can we improve this class?" And that's when we got into the discussion of, "We really want to connect with more people." And some of the students expressed a little bit of a disappointment because they even said, "Hey, we want to connect with professors as well," and there weren't many professors at our immersion center. And I thought, "Well, that's a missed opportunity," and I said, "I'm sorry. I'll be there next time." Even if it's on my dime, I'll be there, because these are my students. It's an opportunity for me to connect with them, and to again, be physically present to help connect them to each other.

Like many adjuncts in the program, Vanessa spent time and financial resources to travel to the main campus to attend orientation. For her, participating in the orientation provided an opportunity to support her students and was beneficial to her professional practice. However, other faculty were less eager about participating in orientation. Aaron, another adjunct in the program, said this:

> If it's not needed, then to be candid, I don't feel like I need to do it because I'm already putting in way, way more time into this than can be justified by the amount of pay I get. The benefit of teaching this class is, it really has nothing to do with the pay because it's so small. It has to do with my learning something and developing a new skill. I've got a job and I've got wife and two children and so if it's not really necessary for me to participate in this activity, then I'm likely to opt out of it.

For full-time faculty, particularly those with more responsibilities in the program, the orientation was an important opportunity for them to interact with students. Michael, a full-time faculty member and one of the course leads, was able to use the orientation to help students get familiar with the course:

> I was teaching one of the first-year courses. They basically spent the first part of the orientation with me. We had mini class sessions. And then we played games related to the course, and we debriefed them. I think that was a helpful thing because everybody got to know each other. In the evening we went out to dinners. I did not go, because I have an infant son, and you can't do dinners like that with a small kid.

Like Aaron, Michael had to contend with issues of work–life balance. Kara, a full-time faculty member, felt that such a balance was difficult for faculty across the board:

> From the faculty perspective, there are two opportunities every single semester to go and meet students in the program physically. But again, they're Thursday, Friday, Saturday,

> for the most part those are the days that... Their social hour. Thursday night for dinner, Friday night for dinner. Friday, I think for lunch. Saturday for breakfast, lunch and dinner. I think those are the options. So faculty can go to those, but that’s a weekend. And for a faculty member who’s taught... Some Thursdays I can’t go because I teach on a Thursday. But if I teach on a Thursday, it’s very hard for me to convince my family that I need to go for a Friday, too, Friday night. So, I go to as many of those as I can because I know that it’s important both as a faculty member but also to my students. But I can’t go to every single orientation or activity every single semester. It’s just too much, too much for me as a faculty member. And it isn’t incentivized in a way that I think could encourage more faculty to go.

Kara also noted that participating in extracurricular activities was not a part of how she was evaluated or compensated. Therefore, it was hard to expect her to participate in these activities:

> While it’s important to engage with the students outside of class, it’s hard. It’s taxing on faculty. I would love it if we were somehow incentivized to go to the orientation because I think it would help students to hang out with each other as peers, but also to get hang out with faculty and to get to know faculty, too. If I’m teaching that semester, it is beneficial for me to go to the orientation. It’s a nice way to see people in person and physically get to know them. I think that if you don’t have to go, if you’re not a Chair or you’re not teaching, there isn’t as much incentive to be there. But I know that students appreciate when faculty are there. So, I don’t know what can be an incentive, but if there’s a way for the program to incentivize faculty going besides, obviously, giving us free dinner.

Outside of the classroom, orientation was the space where most online faculty connected with students and sought to build community. However, not all faculty could participate in this extracurricular activity. Balancing a teaching load and personal commitments with work outside of the classroom was difficult. Further, this labor was not compensated, making it difficult for some faculty to justify. While faculty felt that extracurricular participation was important to faculty, time and compensation were barriers to doing so.

Discussion and Recommendations

This study explores faculty perceptions of their role in creating community in an online doctoral program. A core finding of this work is that faculty were not active in many of the spheres of influence that online doctoral students found to be important to their learning community. Whereas students felt that interactions in the cohort, the classroom, small friend groups, and at social events were important to their feelings of connection within the online program (Berry, 2017b), faculty were primarily active only in the classroom community. For their part, many faculty members interviewed were intentional about building rapport with students and helping them connect with each other in the classroom. Faculty employed a number of strategies to help online students connect. However, some faculty had mixed feelings about using class time to facilitate connections.

The study raises important questions about how community should be cultivated in an online program. While it is important to protect instructional time, some students may have a hard time remaining engaged without social support (Ke & Hoadley, 2009). Instructors have to be mindful of balancing students’ academic needs with their desires for social support and interaction.

At the classroom level, instructors might consider using asynchronous tools to provide opportunities for students to get to know each other. Discussion boards and other tools can be used to promote peer interaction and information sharing without cutting into class time.

At the program level, institutions might develop more programming to help online students connect. In the previous study, students indicated that they took initiative to develop their own extracurricular programs. Students organized meetups, including a trip to the campus to attend a football game. However, such effort depends on student interest, skill, and capacity in coordinating events. Additionally, some students suggested that they would prefer that the program take a larger role in planning extracurricular activities. For their part, faculty, particularly in teaching-intensive positions, indicated that extracurricular involvement would be difficult for them. Findings suggest that support from a third source, such as a division of student affairs, would be important in helping support online students' in extracurricular engagement. For many institutions, this is an emerging area for student support, and there is widespread variation in how institutions support online students (Brindley, 2014; Fontaine & Cook, 2014). For some institutions, extracurricular support for online students is largely "uncharted territory" (Cabellon & Junco, 2015). However, data from this study suggests that institutions must take a more active role in learning about how student affairs divisions might support distance learners. Findings suggest that some online faculty do not have the bandwidth to attend, let alone plan, extracurricular programs. As faculty and students focus on delivering and receiving the curriculum, institutions must devote additional fiscal and human resources toward supporting online students.

As institutions increase their support for online students, they must build faculty capacity to engage outside of the classroom. Faculty involvement outside of the classroom, particularly in events like orientation, can help distance learners feel a greater sense of engagement and connection to the academic program (Berry, 2018). As institutions encourage online faculty to participate in events like orientation, it is important to acknowledge the barriers that faculty face in doing so. Time, distance, and lack of financial support all impair distance faculty's ability to participate in extracurricular programs. Institutions should take these factors into consideration and design extracurricular programs that meet both student and faculty needs.

Conclusion

This qualitative case study describes how faculty in one online doctoral program understood their role in cultivating students' sense of community. Faculty felt that their role was primarily to help students make connections to peers during class sessions. They used a number of strategies to do this, including allowing time for students to discuss the curriculum and share personal and professional updates. However, faculty also were reluctant to cede too much class time to social interaction. Some faculty took efforts to connect with students out of class, through office hours, but few had a clear, consistent method for interaction outside of the class. One space where some faculty were active was at the required three-day orientation for new students, which occurred annually. However, faculty experienced many barriers in participating in this event, including lack of time and personal demands. In an online program, faculty engagement with students can support retention. If programs want to strengthen the experience for distance learners, they would do well to consider how to support faculty in engaging with students outside of the classroom.

References

Allen, I. E., Seaman, J., Poulin, R., & Straut, T. T. (2016). *Online report card: Tracking online education in the United States*. Babson Park, MA: Babson Survey Research Group and Quahog Research Group, LLC.

Angelino, L. M., Williams, F. K., & Natvig, D. (2007). Strategies to engage online students and reduce attrition rates. *Journal of Educators Online*, *4*(2), n2.

Bailey, T. L., & Brown, A. (2016). Online student services: Current practices and recommendations for implementation. *Journal of Educational Technology Systems*, *44*(4), 450–462.

Barak, M., & Rafaeli, S. (2004). On-line question-posing and peer-assessment as means for web-based knowledge sharing in learning. *International Journal of Human-Computer Studies*, *61*(1), 84–103.

Berry, S. (2017a). *Exploring community in an online doctoral program – A digital case study*. Retrieved from Proquest.

Berry, S. (2017b). Student support networks in online doctoral programs: Exploring nested communities. *International Journal of Doctoral Studies*, *12*, 33–48. Retrieved from http://www.informingscience.org/Publications/3676

Berry, S. (2018). Building community in an online graduate program: Exploring the role of an in-person orientation. *The Qualitative Report.*

Bolliger, D. U., Shepherd, C. E., & Bryant, H. V. (2019). Faculty members' perceptions of online program community and their efforts to sustain it. *British Journal of Educational Technology*.

Brindley, J. E. (2014). Learner support in online distance education: Essential and evolving. In O. Zawacki-Richter and T. Anderson, *Online distance education: Towards a research agenda* (pp. 287–310).

Cabellon, E. T., & Junco, R. (2015). The digital age of student affairs. *New Directions for Student Services, 2015*(151), 49–61.

Conrad, D. (2005). Building and maintaining community in cohort-based online learning. *Journal of Distance Education*, *20*(1), 1–20.

Crawley, A. (2012). *Supporting online students: A practical guide to planning, implementing, and evaluating services*. San Francisco, CA: John Wiley & Sons.

Fontaine, S. J., & Cook, S. M. (2014). Co-curricular engagement for non-traditional online learners. *Online Journal of Distance Learning Administration, 17*(3).

Garrison, D. R., Anderson, T., & Archer, W. (2010). The first decade of the community of inquiry framework: A retrospective. *The Internet and Higher Education*, *13*(1), 5–9.

Garrison, D. R., & Cleveland-Innes, M. (2005). Facilitating cognitive presence in online learning: Interaction is not enough. *The American Journal of Distance Education*, *19*(3), 133–148.

Jaggars, S., & Bailey, T. (2010). Effectiveness of fully online courses for college students: Response to a department of education meta-analysis. New York, NY: Community College Research Center.

Ke, F., & Hoadley, C. (2009). Evaluating online learning communities. *Educational Technology Research and Development*, *57*(4), 487.

Knapp, N. F. (2018). Increasing interaction in a flipped online classroom through video conferencing, *62*, 618. https://doi.org/10.1007/s11528-018-0336-z

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, Calif: Sage Publications.

McMillan, D. W., & Chavis, D. M. (1986). Sense of community: A definition and theory. *Journal of Community Psychology*, *14*(1), 6–23.

Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. San Francisco, CA: Jossey-Bass.

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods*, *16*(1).

Rovai, A. P. (2003). In search of higher persistence rates in distance education online programs. *The Internet and Higher Education*, *6*(1), 1–16.

Rovai, A. P. (2007). Facilitating online discussions effectively. *The Internet and Higher Education*, *10*(1), 77–88.

Tirrell, T., & Quick, D. (2012). Chickering's seven principles of good practice: Student attrition in community college online courses. *Community College Journal of Research and Practice*, *36*(8), 580–590.

U.S. Department of Education, National Center for Education Statistics. (2018). *Digest of education statistics, 2016* (NCES 2017-094), Table 311.15. Retrieved from https://nces.ed.gov/programs/digest/d16/tables/dt16_311.15.asp?current=yes

Waycott, J., Sheard, J., Thompson, C., & Clerehan, R. (2013). Making students' work visible on the social web: A blessing or a curse? *Computers & Education*, *68*, 86–95.

White, J., & Nonnamaker, J. (2008). Belonging and mattering: How doctoral students experience community. *Journal of Student Affairs Research and Practice, 45*(3), 676–698.

The Impact of the Cooperative Mentorship Model on Faculty Preparedness to Develop Online Courses

Larisa Olesova and Susan Campbell
George Mason University

Abstract
The *2017 Survey of Faculty Attitudes on Technology* conducted by Insider Higher Ed reported on the low percentage of partnerships between university faculty and instructional designers in online course development. Experts were unsurprised because instructional designers (IDs) are underutilized, and their role in higher education is still not clear (Richardson et al., 2019). This qualitative study examined the faculty members' perceptions (*n*=11) about their mentorship relationships with IDs when they designed and developed asynchronous online courses together. This study also explored factors that may lead to successful mentorship relationships in which IDs are mentors and faculty members are mentees. The results of this study found that faculty perceived that working cooperatively with IDs was effective because they were able to align resources and instructional strategies with learning outcomes; they used time efficiently; and they were also able to apply acquired skills to the development of online courses. Based on semistructured interviews with the university faculty, this study revealed that motivation, open-mindedness, and working relations were the major factors that affected the cooperative mentorship relationships between faculty and IDs to produce and teach an online course of high quality. These results support findings in previous studies on the effectiveness of collaboration between faculty and IDs in higher education. Moreover, this study found evidence that cooperative mentorship relationships between university faculty and IDs can lead to the development of online courses of high quality. Higher education administration, university faculty, and IDs will benefit from the results of this study.

Keywords: mentorship, instructional design, asynchronous online teaching and learning

Olesova, L., & Campbell, S. (2019). The impact of the cooperative mentorship model on faculty preparedness to develop online courses. *Online Learning, 23*(4), 192-213. doi:10.24059/olj.v23i4.2089

The Impact of the Cooperative Mentorship Model on Faculty Preparedness to Develop Online Courses

University faculty increasingly need new skills and knowledge to design, develop, and implement high-quality online instruction as online programs and courses become more and more popular in higher education (Allen & Seaman, 2015). Partnerships with instructional designers (IDs) could be one way to help them learn and acquire needed skills and knowledge (Kumar & Ritzhaupt, 2017; Richardson et al., 2019). However, as Richardson et al. (2019) stated, building successful partnerships is difficult as it demands considerable time, and faculty may experience some anxiety or frustration over time management, even though IDs can guide and help them to implement new approaches in their teaching practices. In addition to time management, successful partnerships between university faculty and IDs also require communication skills, as discussed in recent studies (Kumar & Ritzhaupt, 2017; Richardson et al., 2019). Clear and trustful communication is key to establishing open dialogue between partners, understanding the reasons behind suggestions, and relying on each other's competence to improve teaching practices (Richardson et al., 2019). Even though studies have already found evidence of the importance of communication skills for IDs as part of their professional competency (Campbell, Schwier, & Kenny, 2007; Pan, Deets, Phillips, & Cornell, 2003), still little is known about faculty perceptions on how these communication skills impact the development of effective partnerships (Richardson et al., 2019). In this study, we suggest that development of trustful and successful relationships between university faculty and IDs can be achieved when both partners are engaged in social reciprocal interactions through a learning process situated in an authentic problem-solving context, such as the course design and development process (Glazer & Hannafin, 2006). Further, these reciprocal interactions between faculty and IDs should be situated in the context of a mutual and equal partnership to promote truly collaborative efforts in higher education. One of the ways to create a sustainable and equal partnership environment is to engage both partners in mentoring relations (Barczyk, Buckenmeyer, Feldman, & Hixon, 2011; Glazer & Hannafin, 2006). Mentoring in higher education has various purposes, including psychological development and career development, junior faculty mentoring, peer mentoring, and mentoring using technology in teaching. Successful mentorship includes the roles and characteristics of mentor and mentee, the stages of the mentoring relationship, and mentoring activities and structures (Gabriel & Kaufield, 2008). This study defines *mentorship* as a relationship between a more skilled or experienced person and a lesser skilled or experienced person that has fostered mutual individual growth and the development of specific competencies. These relationships may be long-term or short-term, structured or unstructured, formal or informal, or planned or spontaneous (Barczyk et al., 2011; Gabriel & Kaufield, 2008). Both the mentor and mentee engaged with and equally contributed to the mentoring partnership in this study. Each brought their own knowledge and experiences: The mentor brought instructional design and technology skills, while the mentee brought teaching experience and subject content knowledge.

Literature has widely examined mentoring for K-12 teachers as an effective approach to improve teaching. However, mentoring is still a newly developing area in higher education. It can be explained by the fact that university faculty are quite independent, highly educated in their disciplines, and entrepreneurial in their work (Barczyk et al., 2011). Most university faculty are trained in a more traditional approach through the use of lectures, papers, and assignments. They generally lack formal education in instructional design to develop and deliver high-quality instruction, specifically in the online environment (Barczyk et al., 2011).

To fill this gap, this study examined faculty perceptions about factors that can lead to successful mentorship relationships with IDs on the design, development, and implementation of high-quality asynchronous online courses.

The Cooperative Mentorship Model

This study examined mentorship of university faculty using principles of instructional design and online instructional methods to improve the quality of their online courses. The Cooperative Mentorship Model was developed by IDs at a large public university in the mid-Atlantic region of the United States. It is based on the principles of mentorship where the ID (the mentor) mentors the university faculty (the mentee) who is new to asynchronous online course design, development, and teaching. The concept of mentorship reflects the process where people learn new skills, values, and culture directly from others whom they respect and admire. People usually model the behavior of others, especially if the behavior is rewarded (Bandura, 1986). The concept of mentorship is also based on motivation when people look for relationships to engage in competence-seeking behavior. They need mentor relationships because of their inherent feelings of belongingness (Maslow, 1970). A mentorship is one of the ways to satisfy those needs for connectedness and career achievement. In an industrial society, the employer and employee or workers and managers need to unite and share the same values and beliefs to survive. Both need strong leadership and quality. Organizations view mentorship as a low-cost strategy for their employees to master new knowledge and skills (Murray & Owen, 1991).

Use of the term *cooperative* reflects the structured and planned process of dividing the four main phases between mentor and mentee. The four phases include (1) planning, (2) production, (3) implementation, and (4) portfolio assessment. Planning is the phase when the mentor introduces the mentee to the instructional design planning process (i.e., needs analysis and aligning learning outcomes and assessments). Production is the phase when the mentor guides the mentee through the design and development process. In this model, the mentee usually completes the planning and production tasks while the mentor facilitates their completion through coaching, scaffolding, and tutoring. The production phase also includes members of the online course network, such as the multimedia specialist, liaison librarian, distance education librarian, registrar's office, assistive technology initiative office, copyright resources office, media services librarian, and Blackboard administrators. Implementation is the phase when the mentor coaches the mentee through a real teaching process in a semester-long, piloted online course. Portfolio assessment is the final phase when the mentee masters teaching skills after finishing piloting the online course and becomes a mentor himself/herself. By the end of this phase, an assessment specialist usually reviews portfolio materials submitted by the mentee. The portfolio includes a teaching reflection, course materials, and the results of the end-of-semester student evaluations.

Review of Literature

Instructional Designers in Higher Education

Studies have examined the role of IDs in higher education (Campbell et al., 2007; Dooley et al., 2007; Kenny, Zhang, Schwier, & Campbell, 2005; Kumar & Ritzhaupt, 2017; Pan et al., 2003; Richardson et al., 2019) and concluded that the ID's role varies depending on the type of institution. The major role of IDs in any higher education institution is course development and faculty support through a systematic, research-based approach to applying teaching and learning strategies to any subject (Reiser & Dempsey, 2011). However, the majority of university faculty still do not know what IDs can do because their roles are misinterpreted, and they are sometimes referred to as the "best kept secret" in higher education (Dimeo, 2017). There are still misconceptions, such as when academic institutions perceive IDs as "tech" people, "techies," or part of the information technology (IT) department (Ritzhaupt & Kumar, 2015). This lack of understanding may be the result of limited institutional efforts or support to communicate what IDs can do. Moreover, if institutions do not promote innovative teaching, it may also create concerns regarding the roles of IDs and their contributions to the improvement of teaching and learning. On the other hand, when institutions support faculty in their desire to learn new approaches to improve their teaching practices, they are usually open and highly motivated to work with IDs. Studies show that different types of grants, course releases, funding, and other types of administrative support promote faculty readiness to learn new instructional strategies and collaborate with IDs. Faculty who work closely with IDs on their course improvements usually spread the word about their value and how they can help solve instructional problems. As Kumar and Ritzhaupt (2017) stated, IDs serve as the bridge between teaching and learning needs and technical implementation of those needs. Therefore, in this study, we define instructional design as a systematic process to enhance learning and apply instructional principles to solve real-world problems (Reiser & Dempsey, 2011).

Mentoring University Faculty

Previous studies have extensively examined the effectiveness of mentoring university faculty on online teaching and learning in higher education (Barczyk, Buckenmeyer, & Feldman, 2010; Dittmar & McCracken, 2012; Drouin, Stewart, & Van Gorder, 2015; Gabriel & Kaufield, 2008; Gunawardena et al., 2004; McNaught, 2003; Vaill & Testori, 2012). The studies have examined different approaches to help faculty develop, teach and/or redesign online courses, including the Learning Technology Mentor Program (LTM; McNaught, 2003); Final Outcome Centered Around Learner (FOCAL) model (Gunawardena et al., 2004); the Mentoring, Engagement, Technology, and Assessment (META) model (Dittmar & McCracken, 2012); the Online Student Success Project (Drouin et al., 2015); and the Distance Education Mentoring Program (Barczyk et al., 2010).

The mentorship approaches varied by the type of delivery and the role of mentor and mentee within each program. Some models utilized a one-on-one mentoring approach while others were based on cohort learning. Some models used technology to enhance mentorship relations while others focused on traditional face-to-face interactions. For example, McNaught (2003) reported on launching the LTM where mentors, called experienced learning technology mentors (ELTMs), were selected from trained academic staff ranging from teaching or research positions to academic administrative positions. The ELTMs signed a formal contract in which they described the online courses they would be developing alone and with colleagues. The program reported on the benefits for mentors, including publications, opportunities for presentations, professional growth, professional status, and improved IT skills.

The FOCAL model, within the WisCom design model, was designed to utilize the network capabilities of the Internet to develop online "thought communities." The FOCAL model was created to serve as a guide for IDs to design active learning environments in which learners engage in reflective dialogue and collaborative learning (Gunawardena et al., 2004; Gunawardena et al., 2006). Mentoring aided in supporting new members and recognizing people in the community who served as mentors. Both mentors and mentees indicated positive learning gains and knowledge transformation across the community as well as successful implementation for most of the conditions of learning (Gunawardena et al., 2004).

Gabriel and Kaufield (2008) have implemented a reciprocal model of mentoring where a mentor, experienced with online course delivery and pedagogy, worked with six online instructors. The reciprocal model was designed to build a collaborative learning relationship which would benefit both mentor and mentee. The mentoring was scheduled on a just-in-time basis in response to each online instructor's needs during the research project. Both mentor and mentees moved through the stages of initiating the relationship, planning learning opportunities, further developing the relationship, and finally closing and separating at the end of the research study. In this mentoring project, both mentor and mentees benefited. For example, the mentor developed an understanding of the process of the postsecondary course development process, while mentees benefited from consistent communication with their mentor on their online teaching.

The Distance Education Mentoring Program developed by a Purdue University Calumet (PUC) team is a four-stage model for mentoring university faculty in higher education to deliver high-quality online instruction (Barczyk et al., 2010; Barczyk et al., 2011; Hixon, Barczyk, Buckenmeyer, & Feldman, 2011; Buckenmeyer, Hixon, Barczyk, & Feldman, 2013). The model consists of the learning stage, the teaching stage, the evaluation stage, and the acknowledgement stage (Barczyk et al., 2011, p. 11). The mentors were chosen from qualified faculty members with successful prior experience developing online courses. They were also required to participate in the Quality Matters (QM) online training program to become certified for peer mentoring and quality online course development (MarylandOnline, 2006). Mentees from university faculty applied for admission to the mentorship program, and then they were assigned to mentors. There were several identified benefits for both mentors and mentees in this program. Mentors benefited from an enhanced sense of self-esteem, fulfillment of their own developmental needs, creativity generated by issues and ideas contributed by someone younger or newer, understanding of instructional design and online course development, updated knowledge of new and emerging technologies, and improved teaching by seeing the variety of applications of online course design (Barczyk et al., 2010). Further, a semester-long faculty-to-faculty peer mentorship project called the Online Student Success Project was launched at the same institution. The project aimed at increasing students' passing rates in online courses. Mentors and mentees determined their own timelines and received a monetary incentive (Drouin et al., 2017). The project was effective, as both mentors and mentees felt the mentees' online courses had improved.

Dittmar and McCracken's (2012) META model (Mentoring, Engagement, Technology, and Assessment) is a department-specific model designed to consistently engage and train a large group of geographically dispersed faculty teaching entirely online. Mentoring is provided to all new instructors, instructors identified as needing assistance refining their teaching practices, and to veteran faculty members upon their request. Mentors are appointed through consultation with the departmental chair on the basis of consistent evidence of exemplary skills and abilities in instructional practices, documented student learning outcomes, and technology use.

Vaill and Testori (2012) described the Excellence in Online Education Initiative, the college's three-tiered approach to online faculty development. This initiative combined orientation, mentoring, and ongoing support offered at other institutions. Faculty worked with IDs during orientation. They were then connected to experienced online instructors through the mentoring stage. Mentors were experienced colleagues who shared their online teaching experience success, methodologies, strategies, and tips. Faculty members were satisfied with the mentoring approach because it assisted with course design and increased their preparedness to teach online (Vaill & Testori, 2012).

Overall, all reviewed studies found that mentorship provided a positive experience for both mentors and mentees. Both learned new approaches, improved their own practices, and benefited from learning emerging technologies. However, the literature in the field of mentorship in higher education examined mostly faculty-to-faculty mentorship in the development and teaching of online courses; it has not identified any studies or conceptual works on ID-to-university-faculty mentoring relationships. This study is an attempt to fill this gap by providing evidence on the effectiveness of instructional designers mentoring faculty members to design, develop, and teach online courses based on the principles of the Cooperative Mentorship Model.

Methods

Research Design

A phenomenological approach was used to understand a phenomenon by describing faculty members' perceptions of their experiences working cooperatively with IDs as their mentors in this study. The phenomenological research design explored faculty experiences from their own point of view to determine the differences and similarities between their perceived experiences working with their assigned IDs (Patton, 2002).

The research questions included the following:

1. What were the faculty perceptions about the effectiveness of working cooperatively with IDs?
2. What factors impacted the cooperative mentorships between university faculty and IDs to produce and teach asynchronous online courses of high quality?

To answer the two research questions, this study used an interpretive phenomenological analysis (IPA) to conduct an in-depth exploration of a limited number of cases. In such an analysis, participants should represent a homogeneous group to examine similarities and differences between the cases (Smith, Flowers, & Larkin, 2009).

Instructional Designers

We researchers for this study are two IDs who were trained and certified in instructional design and helped university faculty develop an asynchronous online course. One ID received an advanced degree in instructional design from a highly ranked higher education institution in the United States. In addition to training in instructional design, this ID also had teaching experience both in face-to-face and online learning environments for both graduate and undergraduate students. This ID also conducted extensive research on the effectiveness of instructional strategies in asynchronous online courses and had multiple publications in research journals. The second ID had over 30 years of experience working with university faculty providing guidance on designing learning activities and incorporating technology. This took place both in the classroom and online across disciplines for both undergraduate and graduate courses.

Participants and Context

The study was conducted between the spring semester of 2015 and the spring semester of 2017 at a large public university in the mid-Atlantic region of the United States. This IPA study used purposeful sampling (Patton, 2002) because the research goal aimed at examining particular experiences from particular participants. Eleven faculty members across different disciplines, such as communication (n = 2), engineering (n = 1), linguistics (n = 1), bioinformatics (n = 1), conflict analysis and resolution (n = 3), religious studies (n = 1), public policy (n = 1), and education (n = 1), who completed the program through the Cooperative Mentorship Model were selected and interviewed on their perceptions working with IDs as their mentors (Table 1).

Table 1

Participant Overview

Participant	Position	Leadership	Overall teaching experience	Previous online course development and/or online teaching experience
1. Betty	Adjunct faculty	No	Since 2007	No
2. Christine	Associate professor	No	Since 2004	Yes
3. Eric	Adjunct faculty	No	Since 2008	Yes
4. Kyle	Professor	No	Since 2004	No
5. Lance	Associate professor	Yes	Since 1992	No
6. Mary	Adjunct professor	No	Since 2012	Yes
7. Mike	Instructor	Yes	Since 1999	Yes
8. Rob	Professor	Yes	Since 1978	No
9. Susan	Assistant professor	Yes	Since 2007	No
10. Sam	Instructor	Yes	Since 1994	No
11. Will	Associate professor	Yes	Since 1989	Yes

Note. $N = 11$

Data Collection

The qualitative data were collected from semistructured interviews. This study used an IPA, which is applicable for the analysis of relatively small sample sizes (Smith et al., 2009). IPA helped examine the convergence and divergence within the sample in some detail (Smith et al., 2009). A set of 10 questions was developed for semistructured interviews. In addition to being the researchers for this study, we were the IDs who worked with the interviewed faculty. To remain unbiased, we interviewed each other's mentees. Each 60-minute interview was recorded and transcribed verbatim.

The interview protocol (see Appendix A) was created to address the four phases of the model to examine faculty perceptions and the factors that impacted the effectiveness of working cooperatively with IDs as their mentors. The questions asked about faculty expectations before they began to work with their mentors; how designing and developing planning materials impacted their vision of their future online course; how the mentorship helped them decide on the approach to use for the activities and assignments; and how the mentorship impacted their technology skills. Other questions focused on organizational issues, including meeting arrangements, availability of the resources, and the average time they spent on the course design and development. Finally, the questions asked whether they were confident in terms of independently developing another online course.

Data Analysis

The data analysis was guided by the domains and factors for reciprocal interactions reviewed and identified by Glazer and Hannafin in 2006 (see Appendix B). Glazer and Hannafin's

(2006) reciprocal interactions are influenced by affect, beliefs, environment, culture, cognition, and personality.

We transcribed and coded 11 interviews to find agreement for the developed content categories based on the domains by Glazer and Hannafin (2006). Out of six domains by Glazer and Hannafin (2006), the following domains received the highest frequency: affect, beliefs, environment, and personality. Then, we analyzed the most frequently coded factors within each domain: (1) affect—caring, patience and sensitivity, respect; (2) beliefs—teaching, learning, instructional design, and self-efficacy; (3) environment—shared time and individual time; (4) personality—motivation and open-mindedness. Finally, each identified factor was aligned with the research questions to develop codes in this study to understand the mentorship relationships phenomenon when IDs mentor university faculty.

We agreed to each transcribe and initially code the interviews. Interrater reliability was established using a consensus approach for coding the interview transcripts. After each researcher completed individual coding, we held extensive discussions to clarify interpretations and come to consensus. After reviewing the codes and looking for common codes or codes that could be collapsed, we generated a list of general categories and used them to recode the interviews. Based on general categories, we organized the codes to support the two research questions. In the end, we re-coded data again based on research questions, and this allowed us to look both within and across interviews. First, based on the codes created, the emerging themes were developed. Second, because the primary interest was in the mentees' perceptions of the effectiveness of working cooperatively with their mentors, the portions of the interviews concerning these issues were isolated. Data files were created for each mentee, and interviews were copied and pasted into relevant cells regarding elements of relevance to the research questions. The themes were continually revised until they captured all portions of the data set. Next, the emerging themes were examined by each of the two mentees and compared to finalize themes. The 11 cases were explored and we found that the faculty members represented a homogeneous group based on the criteria we had identified. The use of two researchers to examine the data, first individually and then collaboratively, helped control for simple error and thereby increased the reliability of the results.

Trustworthiness

This study implemented strategies to be trustworthy using Lincoln and Guba's (1985) four criteria for qualitative studies (Table 2).

Table 2

Four Criteria for Trustworthiness

Criteria	**Strategies implemented**
Credibility	Prolonged engagement of IDs, who are the researchers of this study, with interviewed faculty members during more than one academic year
	Persistent observation of a mentorship process by the IDs, who are the researchers of this study
	Peer debriefing to provide an opportunity to clear the mind of emotions and feelings and make good judgments
Transferability	Purposive sampling representing faculty who completed the mentorship phases successfully
	Thick description of the phenomenon
Dependability	Interview protocol development based on previous studies on mentorship and collaboration of IDs with university faculty
	Coding by two researchers to justify the accuracy of code interpretation and meaning
Confirmability	Researchers interviewed faculty with whom they did not develop mentorship relations to remove biases
	Audio recordings of all the interviews were electronically archived and saved

Results

The results indicated that the faculty had positive perceptions about the effectiveness of cooperative mentorship. They said they improved not only their skills to develop online courses but also their teaching strategies. The interviewed faculty also shared that they perceived the IDs as their coaches, similar to what Salinas recommended by saying, "Instructional designers have to understand [that the instructor takes on a lot of risk if a course fails] and … coach them through the process" (as quoted by Dimeo, 2017). The themes of relevancy, efficiency, and competence emerged to answer the first research question. The themes of motivation, open-mindedness, and working relations emerged to answer the second question. Supporting quotes are included from all participating faculty as applicable.

Relevancy

We defined *relevancy* as faculty ability to align resources and instructional strategies with learning outcomes based on the nature of the courses. The majority of the faculty had similar perceptions on how mentorship helped them become more focused and organized with the online course structure. They used the words "clear outcomes," "clearly organized," "clear connection between the outcome and skills," "clearer picture," and "very structured" when they explained the process of aligning course learning outcomes with the course vision. When they explained how clarity in their online courses was achieved, they always referred to the structure of their online courses. For example, they perceived that the module-based course structure that an ID recommended was very helpful in matching course learning outcomes with weekly activities. They used the words “layout,” “matched structure,” “line up,” “best format,” and “bite-size weekly sections.” They perceived resources the IDs recommended, such as the tutorial “How to Write Measurable Objectives” or examples of what other faculty had done, as very helpful to understanding how to match learning outcomes with course activities and assignments. Moreover, faculty also shared their reciprocal interaction experience with their IDs when they discussed future course layout. For example, Kyle said,

> I wanted to make this sort of closer to the real experience as possible because many of [my undergraduate students] are going to their work place and start doing something on their own. [My instructional designer] designed this [experience] and I said I can’t predict they will learn certain things [but] they will be equipped with skills … I think eventually I am using it as a template and I can implement this in other courses. I knew how to do it and [my instructional designer] taught me. This was extremely useful.

Almost all the interviewed faculty members shared that they implemented the same course outline in their other courses, both online and face-to-face. In addition, Susan and Sam shared that it is still challenging to “tie” what they are “doing in the class to specific learning outcomes.” Will and Lance openly shared that they never used explicitly related learning outcomes, but designing online courses during mentorship made them rethink “what they are doing.” Now, they are using learning outcomes in face-to-face classes as well “so students know what to expect.”

Efficiency

We defined *efficiency* as the best use of time related to the tasks that need to be completed during mentorship. Even though all the faculty members shared different perspectives (e.g., on technology, resources, and collaboration), they all expressed that the time spent during mentorship was valuable because of learning opportunities despite the amount of time and work required to complete the online course. The faculty members shared that IDs were equipped with learning principles, and they knew how learning happens. Three faculty members, Mike, Lance and Eric, shared interesting views on their experiences working with their assigned IDs. They explained that none of them had previously received formal teaching training to understand pedagogy and that they were self-taught, mostly modeling others’ teaching styles or previous experience as students. All expressed similar concerns that high school and middle school teachers have to be accredited and know “pedagogical things” but not in higher education. But they appreciated the teaching guidance they received during mentorship, including using Bloom’s taxonomy to “differentiate levels of knowing” starting from “the basic and then … intermediate and higher level.” For example, Eric said,

> Some of the classrooms I taught were not very good as far as the layout. It was really hard to teach in [them]. And then I went to distance and learned so much … and so a lot of these things that learning philosophy that I had, I never paid any attention or even thought about before. I can see things I should have done differently.

In addition, Kyle explained that the time spent during mentorship was useful and efficient to find better solutions for the course interactivity. He said,

> Probably [I] can learn through the manual but I know this [is] much more efficient for [a] fact based on my own experience that [my ID] quickly taught me how to use Blackboard and I [concentrated] on the content. It was very efficient. That technical assistance from [the ID] simply saved a lot of time for me. … The process of the course implementation [would have been] much slower.

Similarly, Sam echoed that having an ID who understands the online environment for an academic program was crucial and beneficial. Sam perceived that he learned a lot of new technology during mentorship, including a new platform, webcam, and different types of software. Lance continued that "the intensity of the efforts which took place in the summer" was significant because he could adjust the samples provided by the ID for his class. He also realized that he should have started development sooner, as he did not realize how much time it would take. Mary and Susan shared a similar perception that looking at other courses provided by an ID was helpful and "sped up" learning; it also improved skills, as both wanted to "learn as much as possible."

Competence

In this study, *competence* refers to the mentees' ability to apply newly acquired skills to the development of online courses. This was the most frequent code that emerged. All the faculty members shared different types of skills they were able to apply during and after mentorship. Among frequently coded skills were technology skills, which is not surprising, as instructional design is the field where faculty learn how to align technology with learning goals. Some of the faculty members did not have technology skills, while others had some—for example, placing items in Blackboard learning management system or creating videos. But during mentorship they all learned new technology skills, such as using Camtasia, Screencast-O-Matic or Adobe Premiere, to record and edit instructional videos; Blackboard Collaborate to facilitate synchronous sessions; Audacity to record audio feedback; or Respondus Lockdown Browser to proctor exams.

Surprisingly, however, in addition to technology skills, the faculty members also shared that they learned skills like online community building, creating online presence, creating inquiry-based learning including application of the Community of Inquiry (CoI) framework, facilitation skills, and creating and implementing online interaction through online discussions and group work activities. The faculty members did not separate course development skills and online course teaching skills, as they envisioned both as mutually interrelated skills.

Some faculty focused more on finding solutions to their challenges, such as designing and properly assessing an interactive and engaging online environment similar to their face-to-face class environment. They all shared that they were not sure how new things (solutions) would work, but all were happy that "everything went well." All the solutions had been discussed through reciprocal interactions where both partners played equal roles. For example, Mike said,

> The first thing we did was … an icebreaker. It might have come from the book, I cannot remember who it was who found several nice icebreaker items. It feels like a long time ago but I still use the same icebreaker that the mentor provided.

Kyle shared similar memories of his work with an ID when both were brainstorming solutions to recreate a student interaction experience similar to a face-to-face environment. Kyle designed the new online course in bioinformatics. Kyle said,

> One important thing and I do not remember whether it was [the ID's] idea or it was my idea but we jointly decided that it is important that students not just only attend online

> discussions as part of the syllabus but they were required to ask questions. They should not just simply present and listen but they should actively participate in this [synchronous online discussion session].

Sam designed his first online course and was worried about finding solutions to "challenge students" with real-world situations. Sam designed the course in communication, where he envisioned that students would get leadership experience managing a media business. Sam was happy to find the right solution in collaboration with his ID. They both decided to place students in role-based online discussions where they reflected on weekly prompts as future leaders in the media business. However, designing role-based discussions caused an assessment challenge. Sam said,

> [The ID] gave me chances to think about how to challenge the students in this environment … where I would grade them on different types of posts. … That was another new challenge that I'd never graded in an online environment like this. I was satisfied with the challenge students had. … I am very confident that I have this skill. So, I am going to use those same techniques in the near future.

To answer the second research question on the factors impacted by the cooperative mentorship on the faculty member's ability to produce and teach asynchronous online course of high quality, we found the following factors: faculty motivation to participate in mentorship, faculty open-mindness to create an online course of high quality, and faculty building trust through working relationships with an ID.

Motivation

In this study, *motivation* refers to the reason for participating in and completing the mentorship (e.g., expectations, funding, departmental goals, and personal interest). To find out the reasons these faculty members continued and completed the mentorship, we asked about their expectations when they were assigned to an ID. Some faculty did not have a clear understanding of the ID role in this process. They were sure their assigned ID would be in charge of technology. Some faculty underestimated the differences between designing a traditional course and an online course. They thought it was going to "be a lot easier than it turned out to be." Some faculty were resistant and skeptical. They did not believe that "getting online could duplicate the in-class experience." However, among other reasons, such as "to increase course enrollment" or "to get out-of-state students to come to the program," the reasons to "learn something new," "sharpen thinking about teaching," "improve teaching skills" or to "get ideas on best practices" had the highest frequency in this study. We believe that when faculty engaged in the design and development process and found the process helpful, they continued with the mentorship. They described their experience as "blood, sweat, and tears to get through," "figure out how hard can this be," or "the creation itself was difficult." Despite all of these challenges, all the faculty had positive responses, such as "really got a lot from it and … very proud of what we [mentor and mentee] created," "there was a lot of learning," and "we [group of instructors] didn't think we would get much out of this process but we've turned ourselves around on this."

Open-Mindedness

In this study, *open-mindedness* refers to the mentees' willingness to consider options outside of their current practice. Even though the faculty members we interviewed for this study wanted to learn how to improve their current teaching practice, we also looked at whether they were ready to change their practice and whether they were able to think outside of the box to change their current practice. We found that when faculty were involved in reciprocal interactions with their IDs and they both had equal roles, they were open to new ideas. For example, Kyle explicitly shared his approach to mentorship relations with his ID:

> I think it is also important … to come with [an] open mind, and I am talking about myself because I see potential where you need to adjust yourself. Because in my case I taught this course before. I simply [tried] to mimic or reproduce the same approaches or the same way of how to teach the course in online and this [was] wrong. I think I was very lucky that [the ID] immediately explained you have to think differently. That was very useful for me.

Sam and Mike shared similar perceptions on open-mindness:

> I had the note, I had the questions, I was all ready to go … I was going to be having an open mind on how to develop this course not only to keep the curriculum the same as if it were in a classroom but to make it challenging. (Sam)

> I think there [was] some talk among colleagues that [online course development] is a whole different world and the process would be quite different and time consuming. So, it was more of a warning [but] I was open to the process. I think it is really important because if you start resisting you're missing out on opportunities. I would say [faculty] need to be open to change and I guess I'm trying to do that. (Mike)

The results also revealed that even though the faculty were open to new ideas, the design process itself was not clear for them. For example, Susan said,

> I really didn't have any idea what [course design] was gonna look like but it turned into a really structured course. Things that I could adapt or modify were really helpful.

Further, the results revealed that open-mindness also helped implement new approaches. For example, when Eric reflected on the changes in his course, he said,

> Sometimes I've had to come up with alternative things … and then an ID found a couple of nice things from Harvard Business School and [suggested implementing] a Skype interview [activity].

Lance echoed Eric's reflection on new approaches in his online course:

> I wasn't sure how I was gonna do that [online collaborative activity] and I've never seen it. … The first time I ever saw it I said wow that's pretty cool. … I added it to some of the things that I taught. Well everything that I did … all of those different things I didn't even know … I had never even accepted online submissions and [online tests].

Working Relations

Working relations can be described as the building of trust between the mentor and mentee. When we coded working relations items, we also looked at what factors built trust and what ID's skills and competence impacted on building trust in these relationships. As all interviewed faculty successfully completed this mentorship, they all went through the process of building trust with their assigned IDs. As previously stated, faculty members mentioned that they were not clear on what the mentorship process would look like and what they would be able to get out of this process. However, everyone agreed that the outcomes of this mentorship were surprising and rewarding for them.

In this mentorship model, both IDs used a flexible approach to working with faculty members on the design and development of high-quality online courses. This was one of the most important factors that impacted on building trust in relationships. IDs were available through face-to-face meetings, phone, online conference tools, and email. Some faculty prefered face-to-face meetings for opportunities to work on creative elements for their courses, such as new activities and assignments. For example, Betty designed an online course based on a situated learning approach where students met with people who practitice religions (e.g., monks or Buddhists). Though Betty appreciated online communication with her mentor, she emphasized the importance of face-to-face meetings for their flexibility to create activities. On the contrary, Susan found effectiveness in Skype meetings. Susan said that Skype meetings helped her not to "fall off" and to "stay going." She continued that when "something came up" and she "couldn't be on campus this day," flexibility was "really key in keeping continuity." Sam expressed the importance of flexibility in terms of helping him to finish the course development while teaching five classes. He mentioned that he "was able to work around and coordinate everything."

In addition to flexibility, some faculty emphazed an ID's degree, experience, and competence. For example, Rob said,

> I did not know who my ID was going to be but it turned out there couldn't have been a better one than [my ID]. She was right. She is very qualified and got a PhD in this area and her book came out. I tend to be a little bit bold and brassy and she wouldn't let me get away with anything, which was great. That's what I just needed.

Another factor that built trust between mentor and mentee was help and support. For example, when Lance realized that he had started late to develop the course and did not have enough time to complete the full development before the semester, his ID helped with extra things, such as submitting instructional videos for closed-captioning. Lance appreciated the help:

> I would send them over where [videos] would be done and put them in and [the ID] took care of all of that.

Another factor that built trust in mentorship relationships was learning curve. For example, Mary said,

> We had a lot of meetings [at the] beginning, and then later on when I became more proficient with Blackboard we had less meetings. We only met when I had some questions and when I really need to discuss the key issues. We had a very good relationship and [the ID] was always responsible [for] assisting me with the issue.

Learning curve or scaffolding during mentorship was very important, as the faculty were able to learn at their own pace and based on their needs. This impacted tremendously on building trust between the mentor and mentee. When the faculty member saw that solutions worked based on their level of proficiency and skills, they became more open to accepting advice from their IDs. For example, Mike and Rob shared that their ID gave them "homework to do," and it helped them progress in the course development. For example, Rob said,

> I was able to do the things the way I wish to. I felt completely confident because I had been trained well. I worked pretty hard too because [my ID] gave an assignment every week to do. I think I did it pretty much and we talked and we got mutual respect. I felt very comfortable because of the training.

Discussion

Following previous studies (Kumar & Ritzhaupt, 2017; Richardson et al., 2019; Ritzhaupt & Martin, 2014), this study found evidence of the importance IDs' soft skills in building trust or gaining "buy-in" (Ritzhaupt & Kumar, 2015) with university faculty during mentorship relationships. Moreover, when IDs have strong persuasive skills, relationship-building skills, and communication skills (Ritzhaupt & Kumar, 2015), they can help faculty members become successful in teaching high-quality online courses. When working with university faculty who are new to online course design and development, it is very important that IDs are equipped with strong skills to teach them and are able to explain complex learning design elements (Ritzhaupt & Kumar, 2015). In addition, the relationships that are built on mutual respect and trust where both mentor and mentee bring something to the table can open the door to faculty creativity, open-mindedness, and willingness to learn (Pan et al., 2003; Richardson et al., 2019).

Similar to previous studies (Pan et al., 2003; Richardson et al., 2019; Ritzhaupt & Kumar, 2015), the faculty in this study also had misconceptions about the role of IDs in this mentorship process. IDs were perceived as technical personnel in charge of technology and placing the course content online. However, during the mentorship, IDs' competence on learning theories and overall knowledge of how people learn promoted a better understanding of what IDs can do and helped faculty understand the benefits working with them to create a new online course. In this study, all the faculty perceived that working with IDs helped them develop competence needed for successful online teaching (Martin, Budhrani, Kumar, & Ritzhaupt, 2019). In addition to the development of technical skills, faculty perceived that the mentorship helped them become successful facilitators who were able to build collaborative online communities through a variety of group work activities and online discussions.

The study indicated that motivated faculty are more likely to build strong working relations with their IDs—their mentors. Similar to Glazer and Hannafin (2006), this study indicated that factors such as faculty motivation and open-mindedness are strong indicators of successful mentorship relationships. These factors are valuable components showing faculty's ability to develop a high-quality online course. The results of this study also revealed that when IDs provide accommodations for faculty members, this greatly impacts the formation of faculty competence to develop the necessary skills to build an online course. These findings support previous research where mentors provided professional development and psychological support to establish good rapport and trust with their mentees (Barczyk et al., 2011). Similar to the study conducted by Buckenmeyer et al. (2013), this study also revealed the quality factors deemed most important to performance. In this study, the mentees were competent in their abilities to select relevant instructional strategies and tools to teach an online course. Also, the interview data indicate that participation in the mentorship positively impacted the way they designed, developed, and taught their courses (Buckenmeyer et al., 2013). Overall, the mentees reported high satisfaction working cooperatively with their mentors, felt their teaching improved, and were able to apply what they learned during mentoring to their teaching more broadly (Buckenmeyer et al., 2013; Richardson et al., 2019).

Conclusion

The scholarly significance of this study is an attempt to fill the gap in the literature by providing evidence on successful mentorship relationships between IDs and faculty members to develop and teach online courses. The results in this study revealed the Cooperative Mentorship Model based on reciprocal interactions can be an effective model where the ID mentors the university faculty member who is new to asynchronous online course design, development, and teaching. The model promotes faculty professional development and encourages IDs to serve as models and coaches of strategies and ideas aimed at improving online instruction.

Future Research

More research is needed to explore how mentorship relationships can be successfully developed based on different institutional structures and approaches to support IDs in their work with university faculty. Moreover, more examination is needed on the factors that contribute to faculty failure to complete mentorship despite institutional support (a grant, in our case). Finally, more research should be conducted on how mentorship can help experienced online faculty and how the model should be different to support this type of university faculty.

Limitations

This study has some limitations. The first limitation relates to the generalizability of findings due to the sample being from a single university. Findings from other universities may be different due to the models of how IDs collaborate with university faculty. For example, IDs can consult university faculty using an ad hoc model, where development of long-term relationships is not the major goal. Another limitation of this study is the analysis of a single data set (i.e., semistructured interviews). More data sets, such as reflective journals during mentorship, student evaluations before and after mentorship, and students' interviews, should be included to understand the phenomenon of mentorship where IDs are mentors helping university faculty design, develop, and teach an asynchronous online course.

References

Allen, I. E., & Seaman, J. (2015). *Grade level: Tracking online education in the United States.* Retrieved from http://www.onlinelearningsurvey.com/reports/gradelevel.pdf

Bandura, A. (1986). *Social foundations of thought and action.* Englewood Cliffs, NJ: Prentice-Hall.

Barczyk, C., Buckenmeyer, J., & Feldman, L. (2010). Mentoring professors: A model for developing quality online instructors and courses in higher education. *International Journal on E-Learning, 9*(1), 7–26.

Barczyk, C., Buckenmeyer, J., Feldman, J., & Hixon, L. (2011). Assessment of a university-based distance education-mentoring program from a quality management perspective. *Mentoring & Tutoring: Partnership in Learning, 19*(1), 5–24. doi:10.1080/13611267.2011.543567

Buckenmeyer, J., Hixon, E., Barczyk, C., & Feldman, L. (2013). Does participation in a faculty distance education mentoring program comprehensively improve teaching methods? *International Journal on E-Learning, 12*(2), 139–152.

Campbell, K., Schwier, R. A., & Kenny, R. F. (2007). The critical, relational practice of instructional design in higher education: An emerging model of change agency. *Educational Technology Research and Development, 57*(5), 645–663.

Dimeo, J. (2017, November 1). Why instructional designers are underutilized. Retrieved from https://www.insidehighered.com/digital-learning/article/2017/11/01/reasons-why-faculty-members-dont-collaborate-instructional#.WmplM4F5D09.facebook

Dittmar, E., & McCracken, H. (2012). Promoting continuous quality improvement in online teaching: The META model. *Journal of Asynchronous Learning Networks, 16*, 163–175. Retrieved from http://files.eric.ed.gov/fulltext/EJ971050.pdf

Dooley, K., Lindner, J., Telg, R., Irani, T., Moore, L., & Lundy, L. (2007). Roadmap to measuring distance education instructional design competencies. *Quarterly Review of Distance Education, 8*(2), 151–159.

Drouin, M., Stewart, J., & Van Gorder, K. (2015). Using methodological triangulation to examine the effectiveness of a mentoring program for online instructors. *Distance Education, 36*(3), 400–418. doi:10.1080/01587919.2015.1081735

Gabriel, M. A., & Kaufield, K. J. (2008). Reciprocal mentorship: An effective support for online instructors. *Mentoring & Tutoring: Partnership in Learning, 16,* 311–327. doi:10.1080/13611260802233480

Glazer, E. M., & Hannafin, M. J. (2006). The collaborative apprenticeship model: Situated professional development within school settings. *Teacher & Teacher Education: An International Journal of Research and Studies, 22*, 179–193.

Gunawardena, C. N., Jennings, B., Ortegano-Layne, L. C., Frechette, C., Carabajal, K., Lindemann, K., & Mummert, J. (2004). Building an online wisdom community: A transformational design model. *Journal of Computing in Higher Education, 15*, 40–62. doi:10.1007/BF02940929

Gunawardena, C. N., Ortegano-Layne, L., Carabajal, K., Frechette, C., Lindemann, K., & Jennings, B. (2006). New model, new strategies: Instructional design for building online wisdom communities. *Distance Education, 27*, 217–232. doi:10.1080/01587910600789613

Hixon, E., Barczyk, C., Buckenmeyer, J., & Feldman, L. (2011). Mentoring university faculty to become high quality online educators: A program evaluation. *Online Journal of Distance Learning Administration, 14*(4). Retrieved from http://www.westga.edu/~distance/ojdla/

Kenny, R. F., Zhang, Z., Schwier, R. A., & Campbell, K. (2005). A review of what instructional designers do: Questions answered and questions not asked. *Canadian Journal of Learning and Technology, La Revue Canadienne De L'Apprentissage Et De La Technologie, 31*(1). Retrieved from http://www.cjlt.ca/index.php/cjlt/article/view/147/140

Kumar, S., & Ritzhaupt, A. (2017). What do instructional designers in higher education really do? *International Journal on E-Learning, 16*(4), 371–393

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage Publications.

Maslow, A. H. (1970). *Motivation and personality* (2nd ed.). New York: Harper and Row.

Martin, F., Budhrani, K., Kumar, S., & Ritzhaupt, A. (2019). Award-winning faculty online teaching practices: Roles and competencies. *Online Learning, 23*(1), 184–205.

Maryland Online. (2006). *Quality Matters: Inter-institutional quality assurance in online learning.* Retrieved from http://www.qualitymatters.org

McNaught, C. (2003). The effectiveness of an institution-wide mentoring program for improving online teaching and learning. *Journal of Computing in Higher Education, 15*, 27–45. doi:10.1007/BF02940851

Murray, M., & Owen, M. A. (1991). *Beyond the myths and magic of mentoring: How to facilitate an effective mentoring program.* San Francisco: Jossey-Bass.

Pan, C. C., Deets, J., Phillips, W., & Cornell, R. (2003). Pulling tigers' teeth without getting bitten: Instructional designers and faculty. *Quarterly Review of Distance Education, 4*(3), 289–302.

Patton, M. Q. (2002). *Qualitative research & evaluation methods*. Thousand Oaks, CA: Sage Publications.

Reiser, R., & Dempsey, J. (2011). *Trends and issues in instructional design and technology* (3rd ed.). Boston, MA: Pearson.

Richardson, J., Ashby, I., Alshammari, A., Cheng, Z., Johnson, B., Krausse, T., Lee, D., … Wang, H. (2019). Faculty and instructional designers on building successful collaborative relationships. *Educational Technology Research and Development, 67,* 855–880.

Ritzhaupt, A. D., & Kumar, S. (2015). Knowledge and skills needed by instructional designers in higher education. *Performance Improvement Quarterly, 28*(3), 51–69. doi:10.1002/piq.21196

Ritzhaupt, A. D., & Martin, F. (2014). Development and validation of the educational technologist multimedia competencies survey. *Educational Technology Research and Development, 62*(1), 13–33.

Smith, J., Flowers, P., & Larkin, M. (2009). *Interpretative phenomenological analysis: Theory, method and research*. Thousand Oaks, CA: Sage.

Vaill, A. L., & Testori, P. A. (2012). Orientation, mentoring and ongoing support: A three-tiered approach to online faculty development. *Journal of Asynchronous Learning Networks, 16*(2), 111–119.

Appendix A

Interview

Study Protocol

Sessions conducted individually with participants

Introduction
Thank you for coming today to assist us with this research project on mentorship. This study investigates your experience in the planning, producing, and teaching of an online course mentored by an instructional designer. Also, you will be questioned about whether the mentorship prepared you to independently produce another online course. The study will be examining your perceptions about the effectiveness of working cooperatively with instructional designers. In addition, this study will be exploring the factors impacting the design and development of high-quality online courses. You will be asked several questions about the benefits and challenges you encountered and why it may have been beneficial to work cooperatively with an instructional designer. Your answers will be recorded. Please be assured that no one except for the researchers will have access to these recordings. Also, understand that this interview is voluntary and there is no penalty for withdrawing at any time. We appreciate your time and effort in participating in the interview today. We expect the interview to take one to one-and-a-half hours.

Direction for dialogue
You are included in this study because you successfully completed the planning, producing, and teaching of an online course *mentored* by an instructional designer as part of a grant from the Office of Distance Education at Mason. At the beginning of the grant period, you were informed about which milestones would be completed and what would be expected by the end of the grant period. Then, you experienced working cooperatively with your assigned instructional designer to plan, produce, and teach. I will be asking you a set of 10 questions. Please be aware that there is no right or wrong answer. Please feel free to discuss your thoughts and perspectives.

Researcher, please record the Day, Time and ID of the participant before beginning the interview.

1. What were your expectations for the process of planning (an instructional designer introduces you to the instructional design process), producing (you design and develop your course), and teaching an online course before you began to work with your assigned instructional designer?
2. Were the resources available at Mason including GMU Library, Assistive Technology Office, Copyright Office, Multimedia and others helpful? Please explain.
3. How did the flexibility provided by the mentors in terms of meeting times and methods (e.g., virtual, telephone, email) impact on the quality of the course (including planning, producing, teaching, and assessing)?

4. How did the instructional design resources (e.g., articles, instructions, sample rubrics, sample assignments, guidelines) impact the planning, producing, and teaching of your online course?
5. How did developing the course planning materials (e.g., learning outcomes, table aligning learning outcomes and assessments) impact your vision of your future online course?
6. How did the mentorship process help you decide on the design and development approach to use for the activities and assignments included in your online course? Please explain.
7. How did the mentorship process impact the technology skills you used to develop the course content and the selection of tools for your students to use?
8. How many months/semesters did you spend producing (designing and developing) your online course? What is the average amount of time you spent weekly on the production of this course?
9. Tell me about your experience teaching this online course after designing and developing this course with an instructional designer? What do you think worked in your course? What would you like to improve in your course?
    a. Follow-on question: Have you taught this course before face-to-face? If so, how was this experience different from teaching this course online?
10. Overall, now that you have planned, produced, taught, and received your portfolio results, how confident are you in terms of independently developing another online course? What are your future plans in this regard?

Appendix B

Data analysis guide based on the domains and factors affecting reciprocity by Glazer and Hannafin (2006, p. 187)

Domain	Factors	Sources
Affect	Caring	Chene and Sigouin (1997), Silva and Tom (2001)
	Anxiety level	Hawkey (1997), Manouchehri (2001)
	Patience and sensitivity	Waugh et al. (1994)
	Enjoyment	Kohler et al. (1997)
	Connection to a group	Grams et al. (1997)
	Friendly climate	Chene and Sigouin (1997)
	Connection to an individual	Hall and Davis (1995), Manouchehri (2001)
	Respect	Dillon and Stines (1996), Terehoff (2002)
Beliefs	Teaching	Arnn and Manigeri (1984), McCotter (2001)
	Learning	Manouchehri (2001)
	Instructional design	Carr (2002), Rogers (1999)
	Social obligation	Silva and Tom (2001)
	Self-efficacy	Bandura (1986), Hall and Davis (1995)
Environment	Proximity	Brown and Duguid (1991), Rossman (1984)
	Shared time	Clement and Vandenberghe (2000), Zahorik (1987)
	Individual time	Hunter (2001), Lohman (2000)
	Human resources	Sandholtz et al. (1994)
	Physical resources	Lohman (2000)
	Accessibility	Nisan-Nelson (2001)
Culture	Leadership	Carr (1997), Keedy (1999), Palmer (1993)
	Professionalism	Davies et al. (1999)
	Curriculum	Garet et al. (2001)
	Mutual responsibility	Showers (1985)
	Peer feedback	Kohler et al. (1999)
	Shared tasks	Jarveka et al. (1999)
Cognition	Common understanding	Hausman and Goldring (2001)
	Priority	Zahorik (1987)
	Awareness of learning behaviors	Arnn and Manigeri (1984)
	Lower order thinking	Hertzog (2002), Manouchehri (2001)
	Higher order thinking	Little (1982), Clement and Vandenberghe (2000)
	Reflection	McCotter (2001)

Personality	Assertiveness	Lohman (2000), Zahorik (1987)
	Motivation	Franke et al. (2001)
	Responsibility	Hunter (2001)
	Autonomy	Grossman et al. (2001)
	Availability	Sandholtz and Wasserman (2001)
	Open-mindedness	Chene and Sigouin (1997)
	Organization	Knapp (1997)

Student Perceptions of the Impact of Quality Matters–Certified Online Courses on Their Learning and Engagement

Ayesha Sadaf, Florence Martin, and Lynn Ahlgrim-Delzell
University of North Carolina Charlotte

Abstract
Quality Matters (QM) is one of the most widely adopted sets of standards for best practices in online courses to promote student learning. In this study, we examined student perceptions of the impact of QM-certified courses on students' learning and engagement. Fifty graduate students enrolled in online courses completed a survey developed based on the QM rubric items. The QM framework includes 43 individual standards clustered into eight general categories. Among the eight categories, students rated Course Activities and Learner Interaction to have the highest impact on both student learning and engagement. The exploratory factor analysis revealed that 12 factors explained 88.89% of the variance of the impact on learning, and eight factors explained 85.72% of the variance of the impact on engagement. Clear expectations loaded as the highest factor for both learning (eigenvalue = 12.85) and engagement (eigenvalue = 21.58). These results will help instructional designers and online instructors understand the impact of individual QM design standards from students' point of view to design online courses that effectively contribute to their learning and engagement.

Keywords: Quality Matters, online learning, student engagement, student learning

Sadaf, A., Martin, F., & Ahlgrim-Delzell, L. (2019). Student perceptions of the impact of quality matters-certified online courses on their learning and engagement. *Online Learning, 23*(4), 214-233. doi:10.24059/olj.v23i4.2009

Student Perceptions of the Impact of Quality Matters–Certified Online Courses on Their Learning and Engagement

Given the recent rapid growth of online education, ensuring the quality of online course design has gained considerable concern. Recently, many institutions are using the Quality Matters (QM) program to implement methods of quality control. QM is well-known worldwide as a reliable method for ensuring quality in online learning (Loafman & Altman, 2014; Ralston-Berg & Nath, 2008). The QM program has established a structured peer-review process for online faculty to receive feedback on the design of their courses and for the courses to be QM certified (Crews & Wilkinson, 2015). One of the core principles of QM is consideration of student perspectives and their voices. Collecting and analyzing learner perceptions is of key importance to the continuous improvement of QM standards and processes (Shattuck, 2015).

Student perceptions of the quality of their online courses and their satisfaction with them are important since these perceptions have a direct impact on their learning and motivation (Davies, Howell, & Petrie, 2010). Student perceptions can provide an understanding of the effectiveness of student success in online courses. Researchers have investigated quality in online learning by studying factors related to student concerns (Aman, 2009; Ralston-Berg & Nath, 2008; Swan, Matthews, Bogle, Boles, & Day, 2012; Young, 2014) and found a positive relationship between learners' perceptions of course quality with the courses designed using QM guidelines. Although student perceptions of quality and satisfaction are associated with QM-certified courses, research related to student perceptions about how QM standards impact their learning and engagement in online QM-certified courses is limited. Therefore, it is important to understand students' perceptions of how specific QM standards impact their learning and engagement. In addition, it would be helpful to see how well the student-impact ratings for the QM items align to the eight QM standards. With the massive growth in the number of university students taking online courses (Allen & Seaman, 2016), online course quality in terms of improving student engagement and learning is an important goal. This research will identify student perceptions of the impact of QM standards on their learning and engagement in the QM-certified courses and recommend best practices in online course design using QM guidelines.

Student Learning in QM-Certified Courses

Ally (2004) defines online learning as "the use of the Internet to access learning materials; to interact with the content, instructor, and other learners; and to obtain support during the learning process, in order to acquire knowledge, to construct personal meaning, and to grow from the learning experience" (p. 7). On the other hand, hybrid/blended learning refers to the blending of face-to-face and online learning "where the mix between classroom and online instruction can vary based on consideration of differences in course content and the level of student comfort with online learning" (Potter, 2015, p. 4). The focus of QM is to promote student learning in online and hybrid/blended courses, and the specific criteria evaluated under the rubric were selected as those characteristics shown to positively influence student learning (Legon & Runyon, 2007). Research suggests that well-designed online courses correlate positively to student attainment of learning outcomes, increased student–content interaction, ease of course navigation, decrease in student questions regarding course expectations, and higher student satisfaction (Alizadeh, Mehran, Koguchi, & Takemura, 2019). Swan et al. (2012) revised a course based on the QM standards and found that students achieved better learning outcomes. Young's (2014) study found that learners in the hybrid/blended courses designed to meet QM standards were more motivated, had more positive attitudes, and reported gaining knowledge to a greater extent. Studies also show that students achieve higher grades and have greater interaction with course materials after redesign of courses using QM standards (Hollowell, Brooks, & Anderson, 2017; Swan et al., 2012; Young, 2014). With the positive impact that QM-designed courses have on student learning, it is important to understand how students perceive the impact of individual QM standards on their learning in QM-certified online courses.

Student Engagement in QM-Certified Courses

Student engagement refers to the "extent to which students actively engage by thinking, talking, and interacting with the content of a course, the other students in the course, and the instructor" (Dixson, 2015, p. 2). Researchers affirm the importance of student engagement in online learning because it provides evidence of the effort required for students' cognitive development and their ability to create knowledge in a way that leads to a high level of student success (Banna, Lin, Stewart, & Fialkowski, 2015; Meyer, 2014). Research shows that student engagement, students' GPA, and course retention are improved when courses apply QM standards (Knapp & Paull, 2013; Runyon, 2006). Runyon (2006) explored the impact on student grades of learning activities that were improved to meet QM standards. Results showed that learners engaged more with the course content, and their grades improved as a result of the more interactive activities designed based on the QM guidelines.

In another study, Hixon, Buckenmeyer, and Barczyk (2015) explored student perceptions of the quality of course design and found that clear instructions on how to get started in a course, where to find various course components, and the design features that required students to interact with others were ranked high. They concluded that instructors should make sure that the course design features that facilitate interaction are relevant, appropriate, and well-structured.

Intentionally designing courses to increase students' interaction can positively impact students' overall learning in online courses (Knapp & Paull, 2013). The QM standards include general and specific standards related to learner engagement, but specifically provide a rubric with eight general standards and 43 specific standards to assess the quality of the course design for online courses. Although research suggests that QM-designed online courses can benefit students in terms of improving their engagement, satisfaction, and learning outcomes, there is still little information about how students perceive the impact of specific QM rubric standards on their engagement.

The QM Rubric Standards

The QM program is one method for assessing quality in online courses employed by many institutions of higher education. The QM program uses a rigorous peer-review process and rubric based on standards of best practice, research, and instructional design principles that are well established in online education (Legon, 2015; Shattuck, Zimmerman, & Adair, 2014). To measure the validity of the QM rubric, Legon (2006) compared it with a set of standards endorsed by the Council for Higher Education Accreditation and the eight regional accrediting agencies. He found the rubric to be consistent with published accreditation standards for online education and concluded that it "can demonstrate an institution's commitment to quality assurance of its online offerings and its success in achieving a well-defined standard for course design" (p. 9). In another study, Ralston-Berg (2014) explored student perceptions of course design features that indicate quality and compared student ranking of quality elements with QM-rubric item numerical ratings and found a correlation between learners' responses and standards of quality identified in the QM rubric. The QM rubric includes 43 specific standards clustered into eight general standards that are used to evaluate the design of online or blended courses (Legon, 2015). Every standard is assigned different point values, ranging from three points for essential, two points for very important, and one point for important elements. The QM rubric provides a quantitative measurement for evaluating the quality of the online course. Following are the eight general standards and their objectives:

1. Course Overview and Introduction: This standard ensures that the overall course design is clear to students and helps them understand how to get started in the course. Researchers have found that students perceive clear instructions on how to get started in a course and where to find various course components as the most important feature of a course design (Hixon et al., 2015).

2. Learning Objectives: This standard ensures that learning objectives are clearly stated from a student perspective, are measurable, are properly aligned, are easy to understand, and help students focus their efforts in the course. Learning objectives define the course outcomes the instructor expects students to achieve. Research shows that the use of learning objectives in courses results in more efficient use of instructional time and, therefore, improves learning outcomes (Swan et al., 2012).
3. Assessment and Measurement: This standard ensures that assessments are aligned with the learning objectives, are consistent with course activities and resources, and clearly explain how the course grades are calculated. Learning objectives provide a method by which to tailor assessments to individual assignments and activities. Conveying clear grading expectations to students helps them focus their efforts, produce higher quality work, better grades, and less anxiety about their course assignments (Reddy & Andrade, 2010). Based on the research findings of Jonsson (2014), student performance greatly improved as a result of clarified expectations through the use of rubrics.
4. Instructional Materials: This standard ensures that instructional materials are comprehensive to achieve course objectives or competencies, and thoughtfully selected to support student learning outcomes. Based on her research, Murphy (2000) noted that instructional materials for online courses are effective when they are written with precise objectives and learning activities that are intertwined within the learning units.
5. Course Activities and Learner Interaction: This standard ensures that forms of interaction incorporated in the course motivate students to attain course objectives and promote learning. Research shows that intentionally designing courses for increasing students' engagement can positively impact students' academic achievement (Knapp & Paull, 2013). Legon and Runyon (2007) found that courses designed with a QM rubric resulted in improving student learning outcomes, increasing student–content interaction, and decreasing student questions regarding course expectations.
6. Course Technology: This standard ensures that the course navigation and technology support student engagement and are used to achieve learning objectives. Any technology tools selected to be used by students should align with learning objectives by effectively supporting instructional materials, learning activities, and assessment instruments.
7. Learner Support: This standard ensures that the course provides links to resources for students to access institutional academic policies, technology support, and student support services essential to their success. This helps direct learners to services that can assist them in meeting course expectations and lead them through the institution. Young and Norgard (2006) suggest that technical support is vital to student satisfaction with online courses.
8. Accessibility and Usability: This standard ensures that the course provides documentation on the accessibility of the course materials, tools, and activities for all students. Meeting this standard helps focus learners' attention on the things that are most relevant and reduce time wasted in trying to decide what needs to be accomplished (Legon, 2015).

The QM rubric is based on the best practices and research on the preferences of online students and adults (Legon, 2015). This study builds on the current QM standards by identifying online students' perceptions of the impact of specific QM standards on their learning and engagement. Since student learning and engagement are the key focuses of QM program, such research is of vital importance to determine the impact of the individual rubric standards more precisely and provide evidence of how students perceive the effectiveness of these standards in improving their learning and engagement in online courses. Figure 1 provides a conceptual framework of how online course design is critical for student learning, engagement, and retention and transfer. In this study, we focus on learning and engagement.

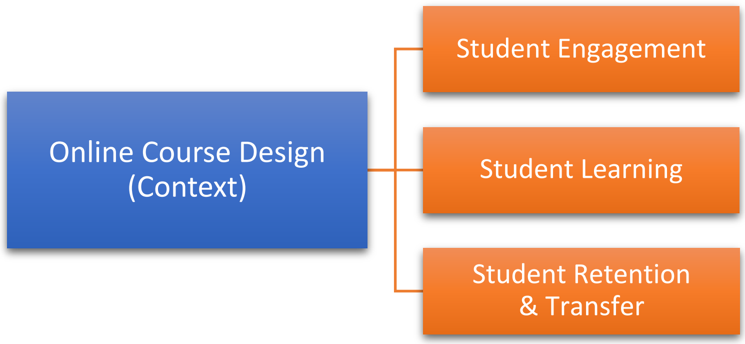

Figure 1. Framework of associations between course design, engagement, and student learning.

Purpose of the Study

Although researchers have been studying student perceptions of the outputs of QM standards, research on student perception of the impact of specific QM standards on their learning and engagement in QM-certified courses is limited. Therefore, the purpose of this study was to examine student perceptions of QM standards on their engagement and learning in QM-certified courses. The following research questions guided our study:

1. What are online student perceptions of the impact of QM standards in QM-certified courses on their learning?
2. What are online student perceptions of the impact of QM standards in QM-certified courses on their engagement?
3. How well do the student-impact ratings for the QM items align to the eight QM standards?

Methods

Participants

A cross-sectional survey was disseminated to 100 students in QM-certified classes offered in an instructional technology program at a university in the southeastern United States. This survey was sent only to one program at a single institution since our intent was to survey students in programs that have received QM certification for program design. This program-design certification ensures that all courses in the program are QM certified, which supports measurement of the impact of QM-certified courses. During the period when this survey was distributed, there were only four programs globally that had received program-level certification or program-design certification. Fifty graduate students who took online courses during spring, summer, and fall 2017 semesters completed the survey. The response rate was 50%. There were 36 (72%) female and 14 (28%) male respondents. The age of the participants ranged from 23 years old to greater than 53 years old. Sixty-six percent of the respondents were students seeking a master’s degree. The remaining respondents were postbaccalaureate or graduate certificate (28%) or postdoctorate students (6%) in Instructional Systems Technology in the College of Education. This sample is representative of the population of students enrolled in the instructional technology program at this institution.

Procedure

This study used a descriptive, survey-based research design in which both closed-ended and open-ended questions were asked. Content validity was established by using the QM rubric to create the survey items. The instrument is described in the Instrument section below with items listed in Table 1. The questionnaire was created by the authors and disseminated through an Internet survey tool called SurveyShare to all of the nonredundant registered students of the eight QM-certified courses in the Instructional Systems Technology program across three semesters so that each student was requested to complete the survey once. Each semester captured only the new students. A personalized email with a link to the survey was sent to each student through the mail merge option in Gmail. Two reminders approximately two weeks apart were sent to students who had not yet completed the questionnaire. No incentive was offered.

Instrument

The 42 QM standards within the eight categories were used to create this survey. Item 7.3 (academic support services and resources) was inadvertently left out of the survey. Each QM standard was rated on a scale from 0 to 3 (*no impact*, *a little impact*, *some impact*, *a lot of impact*) on two the constructs of learning and engagement. Students were given the following prompt: “Please think about each standard and rate how much impact this standard has on your online learning (engagement).” Cronbach’s alpha, an estimate of the internal consistency of student responses across all items of the survey (.98) and separately for each construct (.94 for learning and .97 for engagement), was high. There were also two open-ended questions: (a) “Which strategy(ies) impacted you the most for your learning?” and (b) “Which strategy(ies) impacted you the most for course engagement?”

Data Analysis

Data from each semester were combined into one SPSS 23 database. Descriptive statistics were used to report the participants’ perception of the impact of the QM survey on their engagement and learning in order to answer Research Questions 1 and 2. The percentage of responses for each response option for each QM item is provided as well as a grand percentage for each standard. The mean and standard deviation are provided to support the comparative analysis of individual items. An exploratory factor analysis was conducted to examine Research Question 3 regarding how well student perceptions of the items within the standards aligned to the items of the eight standards as assigned by QM.

Responses to the open-ended survey questions were analyzed using Miles and Huberman’s (1994) constant comparative method. First, the data were coded by segmenting and assigning labels to the text passages. Then, similar responses were categorized into the eight prestructured QM categories to gain further insights into the survey results. The frequencies of the responses were also noted to identify categories that had the greatest explanatory potential. Once all of the responses were coded, each category was then reanalyzed to determine the relationships between the codes to provided further explanations of student perceptions of the standards that impacted their learning and engagement the most.

Results

Research Question 1

The percent of responses for each item and grand percentage for each QM standard for learning is presented in Table 1. A majority of students rated each QM standard item as impacting their learning *A Lot*. For learning, the top two QM standards were Course Activities and Learner Interaction (78.50% *A Lot*) and Learning Objectives (75.20% *A Lot*). Within the Course Activities and Learner Interaction standard, the highest-rated item was 5.1: "The learning activities promote the achievement of the stated learning objectives or competencies" (96% *A Lot* and *Some*, mean 2.78). Within the Learning Objectives standard, the highest-rated item was 2.2: "Module/unit learning objectives or competencies describe outcomes that are measurable and consistent with the course-level objectives or competencies" (82.0% *A Lot*). The lowest rated QM standard to impact learning was Learner Support (42.65% *A Lot*).

Table 1

Percentage, Mean, and Standard Deviation of Response Options for QM Standards Impact on Learning

Items		Percentage				Mean	St Dev
	n	A Lot	Some	A Little	None		
Course Overview & Introduction							
1.1 Clear instructions for getting started	50	78.00	20.00	0	2.00	2.74	.57
1.2 Purpose and structure of the course	49	83.67	14.29	0	2.04	2.80	.54
1.3 Etiquette expectations for communication	50	56.00	22.00	18.00	4.00	2.30	.91
1.4 Course and institutional policies	50	62.00	30.00	6.00	2.00	2.52	.71
1.5 Minimum technology requirements	50	44.00	28.00	20.00	8.00	2.08	.99
1.6 Prerequisite knowledge in the discipline	50	44.00	32.00	18.00	6.00	2.14	.93
1.7 Minimum technical skills	50	38.00	34.00	16.00	12.00	1.98	1.02
1.8 Instructor self-introduction	49	73.47	14.29	8.16	4.08	2.57	.82
1.9 Learner self-introductions	48	66.67	25.00	8.33	0	2.58	.65
Grand Percentage		60.65	24.40	10.50	4.46		
Learning Objectives							
2.1 Measurable course learning objectives	50	74.00	22.00	4.00	0	2.70	.54
2.2 Learning objectives consistent with course-level objectives	50	82.00	14.00	4.00	0	2.78	.51
2.3 Learning objectives stated from learner's perspectives	50	70.00	26.00	4.00	0	2.66	.56
2.4 Clear relationship between learning objectives and course activities	50	72.00	24.00	4.00	0	2.68	.55
2.5 Learning objectives suited to the level of the course	50	78.00	18.00	2.00	2.00	2.72	.61
Grand Percentage		75.20	20.80	3.60	.40		

Items	*n*	A Lot	Some	A Little	None	Mean	St Dev
		Percentage					
Assessment & Measurement							
3.1 Assessments measure the learning objectives	49	77.55	18.37	2.04	2.04	2.71	.61
3.2 Clearly stated course grading policy	49	73.47	18.37	6.12	2.04	2.63	.70
3.3 Provided grading criteria tied to grading policy	49	75.51	20.41	4.08	0	2.71	.54
3.4 Assessment instruments suited to work being assessed	48	75.00	18.75	6.25	0	2.69	.59
3.5 Learners able to track their progress	48	68.75	27.08	4.17	0	2.65	.57
Grand Percentage		74.06	20.60	4.53	.82		
Instructional Materials							
4.1 Instructional materials consistent with learning objectives	49	77.55	20.41	2.04	0	2.76	.48
4.2 Clearly explained use of learning materials	50	74.00	24.00	2.00	0	2.72	.50
4.3 Proper citation of sources	50	58.00	24.00	14.00	4.00	2.36	.88
4.4 Current instructional materials	49	79.59	16.33	4.08	0	2.76	.52
4.5 Varied instructional materials	49	79.59	12.24	10.00	0	2.71	.61
4.6 Distinction between required and optional materials	50	58.00	26.00	10.00	6.00	2.36	.90
Grand Percentage		71.12	20.50	7.02	1.67		
Course Activities & Learner Interaction							
5.1 Learning activities consistent with objectives	50	82.00	14.00	4.00	0	2.78	.51
5.2 Opportunities for learner interaction	50	76.00	20.00	4.00	0	2.72	.54
5.3 Response time and feedback	50	74.00	14.00	12.00	0	2.62	.70
5.4 Requirements for learner interaction	50	82.00	10.00	8.00	0	2.74	.60
Grand Percentage		78.50	14.50	7.0	0		
Course Technology							
6.1 Tools support the learning objectives	49	75.51	20.41	4.08	0	2.71	.54
6.2 Technology tools to promote active learning	49	83.67	14.29	2.04	0	2.82	.44
6.3 Access to technologies tools	49	79.59	16.33	4.08	0	2.76	.52
6.4 Current technology	49	79.59	14.29	6.12	0	2.73	.57
6.5 Links to privacy policies for external tools	49	44.90	28.57	18.37	8.16	2.10	.98
Grand Percentage		72.65	18.78	6.94	1.63		
Learner Support							
7.1 Instructions for technical support	49	40.82	30.61	24.49	4.08	2.08	.91
7.2 Institution’s accessibility policies	49	42.86	26.53	20.41	10.20	2.02	1.03
7.3 Institution’s academic support services	49	44.90	24.49	22.45	8.16	2.06	1.01
7.4 Institution’s student services	50	42.00	26.00	24.00	8.00	2.02	1.00
Grand Percentage		42.65	26.91	22.84	7.61		
Accessibility & Usability							
8.1 Course navigation easy to use	49	81.63	8.16	10.20	0	2.71	.65
8.2 Information about accessible of technologies	50	58.00	14.00	20.00	8.00	2.22	1.04
8.3 Content accessible in different formats	49	61.22	22.45	12.24	4.08	2.41	.86
8.4 Course design is readable	50	78.00	12.00	8.00	2.00	2.66	.72
8.5 Accessible multimedia tools	48	81.25	12.50	4.17	2.08	2.73	.64
Grand Percentage		72.02	13.82	10.92	3.23		

In response to the open-ended question, students recorded the strategies that impacted their learning the most (see Table 2). The strategies were coded using the QM standards. Many students (40%) noted Course Activities and Learner Interaction as the most effective strategies. Students thought that they got the most out of the peer discussions because they helped them understand other students' points of view and reasonings. Students also believed that course activities with hands-on-learning projects impacted their learning by simulating real environments. Some students mentioned that Instructional Materials (22%) were helpful in providing the opportunity to learn content in a variety of formats (i.e., readings, videos, discussions, projects, etc.) to support module learning goals.

Table 2

The Most Effective Online Strategies for Student Learning

Survey categories	Frequency	Percentage
Course Activities and Learner Interaction	20	40
Instructional Materials	11	22
Accessibility and Usability	6	12
Learning Objectives	2	4
Assessment and Measurement	2	4

Note. n = 50. Participants may have mentioned multiple strategies.

Research Question 2

The percent of responses for each item and grand percentage for each QM standard for engagement are presented in Table 3. In general, students rated the QM items as having slightly less impact on engagement than on learning. The top two QM standards for impact on engagement were Course Activities and Learner Interaction (79.08% *A Lot*) and Course Technology (70.61% *A Lot*). Within the Course Activities and Learner Interaction standard, the highest-rated item was 5.2: "Learning activities provide opportunities for interaction that support active learning" (82.98% *A Lot*). Within the Course Technology standard, the highest-rated item was 6.2: "Course tools promote learner engagement and active learning" (83.67% *A Lot*). The lowest rated QM standard to impact engagement was Learner Support (42.71% *A Lot*). Similar to the ratings of impact on learning, the lowest-rated QM standard and item on impact on engagement rating is quite high, falling in the "some impact" range.

Table 3

Percentage, Mean, and Standard Deviation of Response Options for QM Standards' Impact on Engagement

Items		Percentage				Mean	St Dev
	n	A Lot	Some	A Little	None		
Course Overview & Introduction							
1.1 Instructions are clear	49	77.55	18.37	4.08	0	2.73	.53
1.2 Learners introduced to purpose of course	49	73.47	20.41	4.08	2.04	2.65	.66
1.3 Clearly stated etiquette expectations	49	55.10	24.49	16.33	4.08	2.31	.90
1.4 Clearly stated policies	49	63.27	18.37	14.29	4.08	2.41	.89
1.5 Clearly stated minimum technology requirements	47	40.43	29.79	14.89	14.89	1.96	1.08
1.6 Clearly stated prerequisite knowledge	48	45.83	27.08	16.67	10.42	2.08	1.03
1.7 Clearly stated minimum technical skills	49	42.86	28.57	18.37	10.20	2.04	1.02
1.8 Self-introduction by the instructor is available	49	71.43	22.45	6.12	0	2.65	.58
1.9 Learners introduce themselves	48	72.92	22.92	4.17	0	2.69	.55
Grand Percentage		60.32	23.61	11.0	5.08		
Learning Objectives							
2.1 The course learning objectives are measurable	49	59.18	32.65	8.16	0	2.51	.65
2.2 The module learning objectives are consistent with course-level objectives	49	67.35	28.57	4.08	0	2.63	.57
2.3 Clearly stated learning objectives	49	61.22	34.69	4.08	0	2.57	.58
2.4 Clearly stated relationship between learning objectives and course activities	49	71.43	22.45	6.12	0	2.65	.60
2.5 Learning objectives are suited to level of course	49	67.35	28.57	2.04	2.04	2.61	.64
Grand Percentage		65.31	29.39	4.90	.41		
Assessment & Measurement							
3.1 Assessments measure the learning objectives	48	66.67	29.17	4.17	2.04	2.63	.57
3.2 Clearly stated course grading policy	48	62.50	27.08	8.33	2.04	2.50	.74
3.3 Provided grading criteria tied to grading policy	47	76.60	10.64	10.64	0	2.62	.77
3.4 Assessment instruments suited to work being assessed	48	68.75	25.00	6.25	0	2.63	.61
3.5 Learners able to track their progress	47	65.96	25.53	8.51	0	2.57	.65
Grand Percentage		68.10	23.48	7.58	.82		
Instructional Materials							
4.1 Instructional materials contribute to learning objectives	49	75.51	20.41	4.08	0	2.71	.62
4.2 Clearly explained use of instructional materials	49	69.39	22.45	6.12	0	2.59	.71
4.3 Instructional materials are appropriately cited	49	51.02	24.49	14.29	4.00	2.16	1.03

Items		Percentage				Mean	St Dev
	n	A Lot	Some	A Little	None		
Instructional Materials (continued)							
4.5 A variety of instructional materials is used	49	71.43	24.49	4.08	0	2.67	.56
4.6 Clear distinction between required and optional materials	49	63.27	24.49	8.16	6.00	2.47	.82
Grand Percentage		67.95	22.51	6.47	1.67		
Course Activities & Learner Interaction							
5.1 Learning activities promote achievement of learning objectives	48	79.17	18.75	2.08	0	2.77	.47
5.2 Learning activities support active learning	47	82.98	14.89	2.13	0	2.81	.45
5.3 Clearly stated response time and feedback	48	72.92	20.83	6.25	0	2.67	.60
5.4 Clearly stated requirements for learner interaction	48	81.25	16.67	0	0	2.79	.46
Grand Percentage		79.08	17.79	2.62	0		
Course Technology							
6.1 Tools support the learning objectives	49	73.47	20.41	4.08	0	2.65	.66
6.2 Tools promote active learning	49	83.67	14.29	2.04	0	2.82	.44
6.3 Technologies are readily obtainable	49	79.59	12.24	4.08	0	2.67	.75
6.4 Technologies are current	49	67.35	26.53	4.08	0	2.59	.67
6.5 Links to privacy policies for external tools are provided	49	48.98	24.49	18.37	8.16	2.14	1.00
Grand Percentage		70.61	19.59	6.53	1.63		
Learner Support							
7.1 Instructions for technical support are provided	48	43.75	27.08	20.83	8.33	2.06	1.00
7.2 Institution's accessibility policies are provided	48	41.67	25.00	20.83	12.50	1.96	1.07
7.3 Institution's academic support services are provided	48	41.67	27.08	20.83	10.42	2.00	1.03
7.4 Institution's student services are provided	48	43.75	25.0	20.83	10.42	2.00	1.04
Grand Percentage		42.71	26.04	20.83	10.42		
Accessibility & Usability							
8.1 Course navigation easy to use	49	83.67	10.20	6.12	0	2.78	.55
8.2 Information about accessibility of technologies is provided	49	57.14	22.45	14.29	6.12	2.31	.94
8.3 Alternative means of access to course materials is provided	49	59.18	18.37	16.33	6.12	2.31	.96
8.4 Course design is readable	47	70.21	21.28	8.51	0	2.62	.64
8.5 Course multimedia easy to use	48	77.08	16.67	6.25	0	2.71	.58
Grand Percentage		69.46	17.79	10.30	2.45		

In response to the open-ended question, students reported the strategies that impacted their engagement the most (see Table 4). The strategies were coded using the QM standards to further explain the survey results. Several students' responses (30%) were coded under Course Activities and Learner Interaction as the most effective strategies to impact their engagement in the course.

Students explained that interacting with other students and getting feedback from the instructor kept them engaged through the course. In addition, discussion forums and collaborative problem-solving using case studies encouraged engagement in courses. Some students (14%) mentioned that having a variety of instructional materials enhanced their course engagement, such as videos, readings, and PowerPoints. Students also asserted that e-lesson in the course helped them to stay engaged with the course content.

Table 4

The Most Effective Online Strategies for Student Engagement

Survey categories	Frequency	Percentage
Course Activities and Learner Interaction	15	30
Instructional Materials	7	14
Accessibility and Usability	3	6
Learning Objectives	3	6
Assessment and Measurement	2	4

Note. n = 50. *Participants may have mentioned multiple strategies*

Research Question 3

In order to answer the third research question, two exploratory factor analyses (EFA) were conducted using principal components. A preliminary review of the correlation matrix for the factors revealed no correlations reaching the threshold of .35 indicating an orthogonal solution (Tabachnick, Fiddell, & Ullman, 2007). Therefore, a varimax rotation was used. The Guttman-Kaiser rule (Guttman, 195; Kaiser 1960, 1970) of eigenvalues greater than 1 and the scree plot were used to identify the number of factors. Factor loadings of .35 were used to identify the viable items for each factor. The first EFA identified 12 factors that explained 88.89% of the variance of the impact on learning (see Table 5). Some items were complex, loading on more than one factor, and several factors had only one or two items associated with them. The second EFA identified eight factors that explained 85.72% of the variance of the impact on engagement (see Table 7). Again, some items were complex, loading on more than one factor, and several factors had only one or two items associated with them.

We reviewed the factor loadings in an attempt to identify the common element for each of the factors. Tables 6 and 8 list the factor loadings and common theme for each of the factors for learning and engagement, respectively. Items that loaded on more than one factor were assigned to the factor with the highest factor loading. Three factors consisted of only one item (1.2, 1.4, and 6.4) and were eliminated from further consideration, so the number of factors was further reduced from 12 to nine factors for learning. These factors included (a) expectations clearly stated, (b) instructional materials, (c) measurement, (d) how course components fit together, (e) tools and objectives, (f) interaction, (g) assessment, (h) usability, and (i) alignment.

Table 5

Eigenvalues, Variance Explained, and Cumulative Variance for QM Impact on Learning

Factor	Eigenvalue	Variance explained	Cumulative variance
1	12.85	29.89	29.89
2	4.37	10.15	40.04
3	4.07	9.46	49.50
4	2.96	6.88	56.38
5	2.57	5.99	62.37
6	2.47	5.74	68.11
7	2.04	4.74	72.85
8	1.76	4.08	76.93
9	1.53	3.55	80.48
10	1.41	3.28	83.76
11	1.11	2.59	86.35
12	1.09	2.54	88.89

Table 6

Factors and Standardized Loadings for the QM Items Impact on Learning

Factors	Item	Themes and factor loadings	Factors	Item	Themes and factor loadings
Factor 1: Clear	7.4	.90	Factor 5: Tools and	6.1	.75
expectations	7.2	.89	objectives	6.3	.73
	1.7	.89		5.1	.60
	7.1	.85		2.1	.57
	1.5	.78		2.3	.48
	8.2	.68			
	6.5	.65	Factor 6: Interaction	6.2	.74
	4.3	.58		5.2	.71
	8.3	.57		1.3	.61
	1.6	.50		5.4	.42
Factor 2: Instructional	8.1	.88	Factor 7: Assessment	3.5	.76
materials	4.4	.78		3.3	.69
	4.6	.69		3.4	.68
	1.8	.57		3.1	.39
	4.5	.54			
	1.9	.51	Factor 8: Usability	8.5	.88
				8.4	.81
Factor 3: Measurement	3.2	.87			
	5.3	.59	Factor 9: Alignment	2.5	.87
	2.2	.58		2.4	.67
Factor 4: How course	4.2	.80			
components fit together	4.1	.80			
	1.1	.76			

As with the learning EFA analysis, items that loaded on more than one factor for the engagement EFA were assigned to the factor with the highest factor loading. Two factors consisted of only one item (6.3 and 4.5), so they were eliminated from further consideration. The process of assigning the items to the factor with the highest loading and eliminating the two factors with only one item resulted in four identified factors for engagement. They included (a) expectations clearly stated, (b) course objectives, (c) learner centered, and (d) currency.

Table 7

Eigenvalues, Variance Explained, and Cumulative Variance for QM Impact on Engagement

Factor	Eigenvalue	Variance explained	Cumulative variance
1	21.58	50.19	50.19
2	5.16	12.01	62.20
3	2.91	6.76	68.96
4	1.85	4.30	73.26
5	1.60	3.72	76.98
6	1.43	3.31	80.29
7	1.26	2.94	83.23
8	1.07	2.49	85.72

Table 8

Factors and Standardized Loadings for the QM Items' Impact on Engagement

Factors	Item	Themes and factor loadings	Factors	Item	Themes and factor loadings
Factor 1:	7.4	.92	Factor 3:	1.9	.83
Clear expectations	7.2	.91	Learner centered	1.8	.81
	1.5	.89		8.1	.81
	7.1	.88		8.5	.73
	1.7	.86		1.1	.64
	4.3	.84		8.4	.63
	6.5	.74		3.4	.56
	8.2	.74		3.5	.53
	1.6	.64		2.3	.52
	8.3	.61		3.3	.48
	1.3	.59		5.2	.42
	1.4	.57		5.4	.41
	4.6	.56		1.2	.37
	4.2	.56			
	5.3	.47	Factor 4:	4.4	.76
	3.2	.40	Currency	6.4	.70
Factor 2:	2.5	.87			
Course objectives	2.4	.83			
	4.1	.78			
	5.1	.77			
	2.2	.77			
	6.2	.68			
	3.1	.53			
	2.1	.44			
	6.1	.38			
	2.3	.37			

Discussion

Our study found that Course Activities and Learner Interaction was rated the highest among the eight categories when instructional technology students were asked about the impact of QM standards in QM-certified IST courses on their learning and engagement. This supports other research studies that have found that courses designed with the QM rubric resulted in improving student–content interaction (Fedynich, Bradley, & Bradley, 2015; Legon & Runyon, 2007). Students are satisfied with online experiences when they perceive that the instructor provides opportunities to interact in different ways (Fedynich, Bradley, & Bradley, 2015; Walker, 2016). Course Activities and Learner Interaction was also rated the highest based on students' open-ended comments. Students' open-ended comments further revealed that the peer discussions and hands-on projects were very helpful both for engagement and learning in online courses. This is consistent with research studies that conclude that discussions are effective instructional tools to engage learners in online courses (Darabi, Liang, Suryavanshi, & Yurekli, 2013). Similarly, hands-on projects have been found beneficial for engagement and learning in online courses (Chi & Wylie, 2014). Knapp and Paul (2013) concluded that being intentional in designing courses to increase students' engagement can positively impacts students' overall academic achievement.

Learning Objectives was the second highest among the eight categories when students were asked about the impact of QM standards in QM-certified IST courses on their learning. Researchers have stated that informing the learners of the objectives at the beginning of instruction clarifies what is expected of them and assists them in guiding their learning (Reiser & Dick, 1996). Studies on online learning have confirmed the importance of setting clear expectations in online courses (Kearns & Mancilla, 2017; Swan et al., 2012). In addition to establishing expectations in the learner, learning objectives also provide the foundation for designing assessments. Swan and colleagues (2012) found that students' performance in online graduate courses improved because the QM revision led instructors to focus on objectives and the mapping of objectives to learning outcomes. These results suggest that students like having clear and measurable learning objectives that help them be engaged within the course and lead to improved learning. Though Learning Objectives was rated the second highest of the closed-ended survey items, only a few students noted its importance to impact their learning and engagement in the open-ended comments. This may be due to the fact that they already rated the learning objectives in the closed-ended items higher. It is not that they do not value the importance of learning objectives, but they choose to include other items in their open-ended comments. The two themes rated highest based on the open-ended comments were (1) learning activities and interaction and (2) instructional materials.

Course Technology received the second-highest percent of students rating it as impacting their engagement *a lot*. Online course technology provides opportunity for the learners to engage with the instructor, other students, and with the content in online courses. Martin and Bolliger (2018) in their study found that students considered several engagement strategies that used course technologies as important. Some of these included students working collaboratively using online communication tools, instructors' use of the learning management system for activities such as sending announcements or posting online grading rubrics, or using a forum to ask the instructor questions. In addition, students were engaged when content was delivered in different formats, such as text, video, audio, games, and simulations. Instructors are able to create online courses with content in various modalities due to the availability of the technologies. Among the various items on the survey, tools that provide active learning and are readily available were important to the students.

While students had rated Course Activities and Learning Interaction and Learning Objectives as the highest-rated categories in the closed-ended items, Instructional Materials was rated as the second-most-important theme in open-ended items for both learning and engagement (see Tables 2 and 4). Students commented that having a variety of learning tools, such as videos, readings, and PowerPoints, in the QM-certified online course enhanced their engagement with the content. This implies that presenting instructional material in different formats creates a rich learning environment that can sustain engagement and deeper understanding of the course content. Song, Singleton, Hill, and Koh (2004) also found that graduate students benefited from having a variety of activities, including chat rooms, discussion boards, and a few synchronous meetings online, as they helped develop a sense of community in an asynchronous course. QM standards 4.1 and 4.2 emphasize the importance of having both a clear use and purpose for the instructional materials that contribute to the achievement of learning objectives. Instructional materials for online courses are effective when they are written with precise objectives, learning activities, and assessments that are intertwined within the learning units (Kearns & Mancilla, 2017). Alizadeh et al. (2019) suggested that although developing effective online instructional materials and resources is time-consuming, it is a valuable process for student satisfaction in online courses.

An EFA was used to examine the alignment of student perceptions of impact of the QM items to the QM standards to which they had been assigned. Clear expectations loaded as the highest factor for both learning and engagement. The initial factor analysis identified 12 factors that impacted on learning and eight factors that impacted on engagement that were able to be further reduced by combining items that loaded on more than one factor. Although the factors identified through the EFA grouped some of the items in the same standard together, they did not align well to the eight QM standards for impact on engagement or learning. This indicates that students may perceive the QM items differently than the intended standard to which they are assigned. Students may also perceive items differently when thinking about their impact on learning and engagement. Items were grouped into fewer factors for engagement (four factors) than learning (eight factors). Shattuck (2015) suggested that narrowing the search for the impact of a QM review to specific groups of standards, such as course alignment standards or learner engagement standards, can be productive. Although a focus on individual standards in the QM rubric can be a precise way of measuring impact, clustering objectives striving for a common outcome may provide a better account of the cross impacts of multiple standards (Legon, 2015).

Conclusion

This study has implications for instructional designers and online instructors on student perceptions of the QM standards in QM-certified online course design to support learning and engagement. Since Course Activities and Learner Interaction was the most important standard to impact student learning and engagement, instructors using QM guidelines can focus on activities that encourage students to become active learners. For example, instructors can incorporate collaborative learning activities, such as problem-based learning or case-based learning, that can create community of learners through peer-to-peer interactions. Students can interact with the course content as well as each other through discussion boards, group work, peer review, and so on that encourage students to work together and be active participants in the learning process. In addition, students ranked high the necessity of having clearly aligned learning objectives with the course activities. In this regard, instructors can use the syllabus or course introductions to specifically explain how different course activities are aligned with the learning objectives and how the course activities will help students achieve their learning goals. Instructors can also create e-lessons at the beginning of every module to introduce weekly activities and clearly explain the learning objectives that indicate what students will learn and be able to do after successfully completing the assignments every week. Finally, instructors can present instructional materials in a variety of formats using different course technologies to meet the needs of different learning styles. For example, instructors can use digital media (audio or video), such as YouTube, podcasts, TED Talks, screencasts, PowerPoints, Prezi, and so on, to create a rich learning environment that promotes learner engagement and active learning. In addition, they can use diagrams, tables, pictures, games, simulations, and so on to make content visually appealing and sustain motivation and deeper understanding.

Limitations and Future Research

There were some limitations in this study. First, the sample size was small and was drawn from a single program at a single university. The perceptions drawn from this sample may not be representative of the population of online learners. Additional research with different samples of participants is needed to corroborate these findings. Second, all data were self-reported due to the nature of the study. Participants were enrolled in QM-certified courses. It is possible that the student perceptions varied because they were not familiar with the QM standards or because they knew they were enrolled in a QM-certified course. Third, these findings may have response bias. The response rate was 50%. Students who chose to participate in the survey might have answered differently than students who chose not to participate in the survey. Future researchers could replicate the factor analysis of this study in preparation for confirmatory factor analysis. It would be worthwhile to follow up quantitative studies via interviews or focus groups that can add to the existing body of research.

Author Note

This work was supported by the Scholarship of Teaching and Learning Grant at University of North Carolina Charlotte.

References

Allen, I. E., & Seaman, J. (2016). *Online report card: Tracking online education in the United States*. Babson Park, MA: Babson Survey Research Group.

Alizadeh, M., Mehran, P., Koguchi, I., & Takemura, H. (2019). Evaluating a blended course for Japanese learners of English: Why quality matters. *International Journal of Educational Technology in Higher Education*, *16*(1), 6.

Ally, M. (2004). Foundations of educational theory for online learning. *Theory and Practice of Online Learning*, *2*, 15–44.

Aman, P. R. (2009). Improving learner satisfaction and retention with online instruction through systematic faculty peer review of courses (Unpublished doctoral dissertation).

Banna, J., Lin, M. F. G., Stewart, M., & Fialkowski, M. K. (2015). Interaction matters: Strategies to promote engaged learning in an online introductory nutrition course. *Journal of Online Learning and Teaching*, *11*(2), 249.

Chi, M. T. H., & Wylie, R. (2014). The ICAP Framework: Linking cognitive engagement to active learning outcomes. *Educational Psychologist, 49*(4), 219–243.

Crews, T. B., Wilkinson, K., & Neill, J. K. (2015). Principles for good practice in undergraduate education: Effective online course design to assist students' success. *Journal of Online Learning and Teaching*, *11*(1), 87–103.

Darabi, A., Liang, X., Suryavanshi, R., & Yurekli, H. (2013). Effectiveness of online discussion strategies: A meta-analysis. *American Journal of Distance Education*, *27*(4), 228–241.

Davies, R. S., Howell, S. L., & Petrie, J. A. (2010). A review of trends in distance education scholarship at research universities in North America, 1998-2007. *The International Review of Research in Open and Distributed Learning*, *11*(3), 42–56.

Dixson, M. D. (2015). Measuring student engagement in the online course: The online student engagement scale (OSE). *Online Learning, 19*(4).

Fedynich, L., Bradley, K. S., & Bradley, J. (2015). Graduate students' perceptions of online learning. *Research in Higher Education Journal, 27*, 1–13.

Guttman, L. (1954). Some necessary conditions for common factor analysis. *Psychometrika, 19*, 149–161.

Hixon, E., Buckenmeyer, J., & Barczyk, C. (2015). Closing the feedback loop: Hearing the student voice in course quality. *Quality Approaches in Higher Education*, *6*(1), 26–31.

Jonsson, A. (2014). Rubrics as a way of providing transparency in assessment. *Assessment & Evaluation in Higher Education*, *39*(7), 840–852.

Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement, 20*, 141–151.

Kaiser, H. F. (1970). A second generation Little Jiffy. *Psychometrika, 35*, 401–417.

Kearns, L. R., & Mancilla, R. (2017). The impact of Quality Matters professional development on teaching across delivery formats. *American Journal of Distance Education*, *31*(3), 185–197.

Knapp, B., & Paull, J. (2013, September). *Measuring the impact on learner engagement in the redesigned blended course using Quality Matters Standards*. 2013 QM Research Grant presentation at the 4th annual Quality Matters Conference, Nashville, TN. Retrieved from https://www.qualitymatters.org/measuring-impact-student-engagement-redesigned-blended-course-using-standards

Legon, R. (2006, September). *Comparison of the Quality Matters rubric to accreditation standards for distance learning.* Retrieved from https://confluence.delhi.edu/download/attachments/74055682/Comparison+of+the+Quality+Matters+Rubric+-+Summary.pdf

Legon, R. (2015). Measuring the impact of the Quality Matters Rubric™: A discussion of possibilities. *American Journal of Distance Education*, *29*(3), 166–173.

Legon, R., & Runyon, J. (2007, August). *Research on the impact of the Quality Matterscourse review process*. Paper presented at the 23rd Annual Conference on Distance Teaching & Learning. Madison, WI.

Loafman, L., & Altman, B. W. (2014). Going online: Building your business law course using the Quality Matters Rubric. *Journal of Legal Studies Education, 31*(1), 21–54.

Martin, F., & Bolliger, D. U. (2018). Engagement matters: Student perceptions on the importance of engagement strategies in the online learning environment. *Online Learning*, *22*(1), 205–222.

Meyer, K. A. (2014). Student engagement in online learning: What works and why. *ASHE Higher Education Report, 40*(6), 1–114.

Miles, M. B., & Huberman, A. (1994). *Qualitative data analysis: An expanded sourcebook*. Sage.

Murphy, W. (2000). "I hope this goes somewhere": Evaluation of an online discussion group. *Australasian Journal of Educational Technology*, *16*(3), 239–257.

Potter, J. (2015). Applying a hybrid model: Can it enhance student learning outcomes? *Journal of Instructional Pedagogies,* 17, 1–11.

Ralston-Berg, P. (2014). Surveying learner perspectives of quality: Value of QM Rubric items. *Internet Learning, 3*(1), 116–126.

Ralston-Berg, P., & Nath, L. (2008, August). What makes a quality online course? The student perspective. In *Proceedings of the 24th annual conference on distance teaching and learning*.

Reddy, Y. M., & Andrade, H. (2010). A review of rubric use in higher education. *Assessment & Evaluation in Higher Education*, *35*(4), 435–448.

Reiser, R. A., & Dick, W. (1996). *Instructional planning: A guide for teachers*. Allyn and Bacon.

Runyon, J. M. (2006). *Quality in design: Impact on learner achievement*. [2005 QM Research Grant]. Unpublished final report. College of Southern Maryland, LaPlata, MD: Author.

Shattuck, K. (2015). Research inputs and outputs of Quality Matters: Update to 2012 and 2014 versions of *What we're learning from QM-focused research*. Annapolis, MD: Quality Matters.

Shattuck, K., Zimmerman, W. A., & Adair, D. (2014). Continuous improvement of the QM rubric and review processes: Scholarship of integration and application. *Internet Learning*, *3*(1), 5.

Song, L., Singleton, E. S., Hill, J. R., & Koh, M. H. (2004). Improving online learning: Student perceptions of useful and challenging characteristics. *The Internet and Higher Education*, *7*(1), 59–70.

Swan, K., Matthews, D., Bogle, L., Boles, E., & Day, S. (2012). Linking online course design and implementation to learning outcomes: A design experiment. *The Internet and Higher Education*, *15*(2), 81–88.

Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (2007). *Using multivariate statistics* (Vol. 5). Boston, MA: Pearson.

Walker, C. H. (2016). *The correlation between types of instructor-student communication in online graduate courses and student satisfaction levels in the private university setting* (Unpublished doctoral dissertation). Carson-Newman University, Tennessee.

Young, A., & Norgard, C. (2006). Assessing the quality of online courses from the students' perspective. *The Internet and Higher Education*, *9*(2), 107–115.

Young, M. R. (2014). Integrating Quality Matters into hybrid course design: A principles of marketing case study. *Journal of Marketing Education, 36*(3), 233–243.

Introduction to Section II of *Online Learning* Volume 23, Issue 4

Peter Shea
Editor of *Online Learning*
University at Albany, SUNY

Section II of this final issue of 2019 contains seven articles that were received through our regular submission process. These papers reflect a wide range of themes, research questions, and methods. This collection of studies advances our understanding of instructional quality, K-12 online learning, degree completion, doctoral education, and professional development in online educational settings.

The first paper is “An Examination of Instructional Approaches in Online Technical Education in Community Colleges” by Brian Horvitz, Lisa R. Garcia, and Regina Garza Mitchell of Western Michigan University and Cheryl Calhoun, of Santa Fe College. Technical education plays an important role for preparing students to enter a changing workforce, and online learning provides flexible access in the furtherance of that mission. In recent years community colleges that provide technical education have had to go beyond the technical to also prepare students with soft skills, such as socialization, teamwork, organization, and time management. However, we have little systematic knowledge about how this is being accomplished with the help of online instruction. This National Science Foundation–funded study asks how online learning components have been integrated into technical education in 15 NSF Advanced Technological Education (ATE) funded projects. Based on semistructured interviews with key personnel from each project, the authors uncover patterns of instructional delivery methods and support for “hands-on” learning that provides a new benchmark for understanding the organization of online technical education.

The next paper in this section is “K-12 Student Perceptions of Online Teacher and On-Site Facilitator Support in Supplemental Online Courses” by Jered Borup and Chawanna Chambers of George Mason University and Rebecca Stimson of Michigan Virtual. This study focuses on online learning as organized in precollege settings and provides much needed insight with regard to the necessarily different support structures that address the needs of online K-12 learners. The students in this study were generally high school students who were working in an online system that mandates both an instructor and a facilitator. Though guidelines exist, little is known about how roles are divided between online instructors and facilitators in actual practice. This study provides details, based on student reports that provide this information. The results indicate that students received a high level of support from both online teachers and on-site facilitators, with most of the support coming from the facilitators. This was in part due to the fact that students were able to develop caring relationships with facilitators through consistent communication that often included social and personal topics. This paper will be helpful to administrators and teachers contemplating initiating new online programs or revising existing ones.

The third paper in this issue is “Investigating the Impact of Online Classes on Undergraduate Degree Completion” by Sharon Wavle and Gamze Ozogul of Indiana University. This paper builds on previous research to advance our knowledge of the effects of online course enrollment on degree completion, much of which has been conducted with community college populations. In contrast, the purpose of this study was to examine the impact of taking online classes on rates of degree-completion among first-time, full-time undergraduate students enrolled in 4-year bachelor's degrees. The authors ask two questions. First, controlling for other predictors of degree completion, does taking one or more online classes increase the likelihood that a first-time, full-time undergraduate student will complete their degree on time? Second, is there a difference in student performance, as measured by course grades, between online and on-campus classes? The authors tracked more than 12,000 students for a 6-year period to determine the contribution of online course taking in the variance of degree completion and course grades. Students were tracked at three different campuses. Results indicate that students who took at least one online class were between 2.7 and 8.1 times more likely to complete their degree within 6 years. Interestingly, and in contrast to other research in this area, some of the students had higher course grades in their online courses than their classroom courses. This paper is a valuable contribution to the emerging research systematically investigating the impact of online learning on metrics of student success, such as time to degree.

The next two papers look at online doctoral education. The first of these is "Educational Leadership Doctoral Students' Perceptions of the Effectiveness of Instructional Strategies and Course Design in a Fully Online Graduate Statistics Course" by Mei Jiang, Julia Ballenger, and William Holt of Texas A&M University. Teaching certain content online presents unique challenges, and implementing effective online statistics instruction can be especially difficult. The authors of this paper use a qualitative approach to surface issues among nine recent doctoral students in an online statistics course. The paper explores students' perceptions about this graduate level introductory statistics course, asking whether the instructional strategies and course design helped students learn statistics. This was done in the service of developing a more effective statistics course design. Results indicate that students identified PowerPoint presentations with recorded lectures and live question and answer sessions to be the most useful instructional approaches, but the paper also contains much nuance helpful in considering the design of graduate statistics courses for online delivery.

The fifth paper is "Identifying Significant Personal and Program Factors that Predict Online EdD Students' Program Integration" by Amanda Rockinson-Szapkiw of the University of Memphis, Joe Holmes, and Jacqueline Stephens of Mercer University. This study addresses the issue of high attrition in doctoral-level education and proposes a model for online doctoral student program integration that may help us explain and predict retention. Using a 32-item self-report instrument that measures faculty integration, student integration, and curriculum integration, the authors found that the model significantly predicted online EdD students' program integration. Men had higher program integration, as did students who participated in a cohort within their online doctoral program. An increase in synchronous communication also predicted program integration.

The next paper in Section II is "A Professional Learning Program for Novice Online Teachers: Application of Professional Development Guidelines Using Threshold Concepts and Online Learning Perceptions" by Maria Northcote, Peter Kilgour, Daniel Reynaud, and Catherine McLoughlin of Avondale College of Higher Education in Australia and Kevin Gosselin of HonorHealth Research Institute. Author of this study gathered evidence about the experiences and views of students and staff to inform pedagogical guidelines to be used as the foundation of professional learning programs for novice online teachers. Central to this work is the notion of threshold concepts, the most difficult or challenging ideas encountered during the learning process.

The authors identify a number of these threshold concepts and strategies for overcoming them among novice online instructors.

The final paper in this issue is “A Cross-Institutional Study of Instructional Characteristics and Student Outcomes: Are Quality Indicators of Online Courses Able to Predict Student Success?” by Tanya Joosten of the University of Wisconsin–Milwaukee. This study examined online course instructional characteristics and their relationship to student outcomes in 2- and 4-year colleges. Instructional characteristics included learner support, course design and organization, content design and delivery, interaction, assessment, and evaluation. A student survey instrument was used to capture perceptions of the instructional characteristics of their courses, learning, and satisfaction with the courses. Data collected from the student survey was merged with student information system data (e.g., demographics). This article examines the relationship between these instructional characteristics, sometimes referred to as *indicators of online course quality*, and their relationship to student outcomes for all students and for underrepresented students. While none of the items were significantly correlated with grades, interaction with faculty and quality of course design were significantly and positively correlated with perceived learning. Interestingly, interaction with peers was negatively correlated with perceived learning.

We invite you to read and share this issue with colleagues and to consider submitting your original work to *Online Learning*.

An Examination of Instructional Approaches in Online Technical Education in Community Colleges

Brian S. Horvitz, Ph.D., Lisa R. Garcia, and Regina Garza Mitchell, Ed.D.
Western Michigan University

Cheryl D. Calhoun, Ph.D.
Santa Fe College

Abstract
Technical education programs in community colleges prepare students for many science and engineering-based jobs in the United States. An increasing number of technical education programs in community colleges are using online learning tools to teach courses. However, little is currently known about the ways these programs are integrating online learning in their coursework. This study examined fifteen National Science Foundation funded technical education programs that use online learning to partially or entirely deliver their courses. We conducted semi-structured interviews with key personnel from each project. Through analysis of this data, we found that these technical education programs used a variety of instructional delivery approaches that can be categorized as follows: (a) a hybrid or blended course with asynchronous online lectures; (b) a hybrid or blended course with synchronous lectures; (c) a hybrid or blended course with a combination of asynchronous and synchronous lectures and discussions; or (d) a course that is fully online. We also found that these online or hybrid technical education programs used a variety of different methods to give students experience in their field of study that can be categorized as follows: (a) pre-recorded video; (b) live video; (c) simulations; (d) equipment at home; (e) equipment in lab; and (f) professional site experience. We recommend that future research examine how well these approaches are working, incorporate student perceptions, and incorporate the views of employers of these programs' graduates.

Keywords: technical; higher education; STEM; two-year college; hybrid

Horvitz, B.S., Garcia, L.R., Garza Mitchell, R., & Calhoun C.D. (2019). An examination of instructional approaches in online technical education in community colleges. *Online Learning, 23*(4), 237-252. doi:10.24059/olj.v23i4.1613

An Examination of Instructional Approaches in Online Technical Education in Community

Community colleges have been instrumental in helping students develop the knowledge and technical skills they need to be successful in today's labor market (Carnevale, Smith, & Strohl, 2013). Technical education, also called vocational education, prepares students for jobs as technicians in largely science and engineering-based fields such as manufacturing technology, agricultural and bio-technologies, energy and environmental technologies, information technologies, and security technologies. The United States Department of Education (2012) noted that modernizing technical education is essential in bolstering our educational system and increasing economic outcomes in the country. The same report described how online learning can help to increase technical education opportunities for students in rural and remote communities. Community colleges were early adopters of online education, and they continue to experience the greatest amount of growth in that area (Allen & Seaman, 2016; Lokken, 2018).

Despite the continued growth of online education at community colleges, the bulk of the literature focuses on online education in entry-level general education or liberal arts courses. Few studies have examined how online education is incorporated into technical education. The majority of empirical work in this area was produced before 2010, and we draw on it because it provides the small baseline about what is known. This study adds to the literature base by sharing the findings of an exploratory study of online integration into technical education at community colleges.

Review of Literature

Technical Education

Technical education has played a prominent role in community colleges and is taking on even more importance. Technical education is increasingly seen as a profitable resource for community colleges, states, and the private sector, as well as a solution for boosting degree completion (e.g., D'Amico, 2016; Harrison, et al., 2006; Robinson & Christophersen, 2008) and a stimulus for the economy (D'Amico, Morgan, Katsinas, & Friedel, 2015; U.S. Department of Education, 2012). Jobs requiring technical degrees are one of the largest growing markets (Jepsen, Troske, & Coomes, 2014; U.S. Department of Labor, 2014) and this trend continues. Jobs requiring technical education and training are viewed as a gateway to the middle class and require education at the associate degree or certificate level (Carnevale, Jayasundera, & Hanson, 2012). The importance of technical education was reinforced by U.S. federal efforts such as the White House's (2009) call for an additional 5 million graduates from community colleges by the year 2020. To help achieve this goal, over $2 billion was allocated to fund community college and industry partnerships through the Trade Adjustment Assistance Community College and Career Training (TAACCCT) program (Plotkin, 2011; The White House, 2014).

Over the past ten years, technical education has had to transform itself in order to meet the increase in skills and knowledge that employers demand as well as the complexities of today's economy (Kreamer & Zimmerman, 2016). In addition, industries require robust skill sets that surpass vocational instruction to include soft skills such as socialization, teamwork, organization, and time management (Benson, et al., 2005; Carnevale et al., 2013; Hora, Benbow, & Oleson, 2016 Lynch, 2000). This transformation resulted in a shift from mere job preparation to a model that combines technical skills for career preparation with domain-specific concept and knowledge learning (Kreamer & Zimmerman, 2016).

Much of this technical education grew within community colleges as part of the "new vocationalism" movement in the early to mid-1990s (Mars, 2013). In response to increasing demands for high-skilled workers, community colleges moved toward offering programs that prepared students for mid-level technical and managerial skills sets that are valued in an increasingly knowledge-based economy.

Although little research has been conducted on the instructional practices of technical education, one study found that technical faculty members “most frequently use the instructional strategies of interactive lecture, questioning, whole-group discussion, and guided practice in their courses” (Fletcher, Djajalaksana, & Eison, 2012, p. 80). These practices align with a conventional one-to-many approach used in traditional face-to-face classes in which instructors transmit information to students (Hanna, 2003). Methods of instruction are an important consideration when planning and investigating online education, which favors more constructivist approaches that involve instructors connecting asynchronously with students who then interact with both instructors and other students in collaborative ways (Garrison, Anderson, & Archer, 2010; Hanna, 2003; Major, 2015).

Online Learning in Community Colleges

Online education in community colleges, the setting for much technical education, is not a new phenomenon. Allen and Seaman (2016) report that 45% of all online enrollments at public institutions are in community colleges. For the purposes of this project, we define online, hybrid, and web-enhanced courses using definitions provided by the Instructional Technology Council: online courses are those in which 80% or more of a course is delivered online; hybrid courses are those in which 30-79% of content is delivered online; web-enhanced courses are those which incorporates online elements to facilitate no more than 29% of the class (Lokken & Mullins, 2014). The National eLearning Survey of Community Colleges by the Instructional Technology Council (ITC) (Lokken, 2018), an affiliate council of the American Association of Community Colleges, found that online enrollment in community colleges increased 8% from the Fall of 2015 to the Fall of 2016. In its review of 2014-2016 enrollment, this report found that “community college students (30.9%) were more likely than undergraduates at four-year public institutions (29%) or four-year private colleges (25.6%) to be enrolled in at least one online class” (Lokken, 2018, p. 7). Growth in enrollment and offerings indicates that online education, in various formats, will continue to play an important role for community colleges.

Traditionally, an instructor was solely responsible for his or her course and course material, but online education changed the faculty role. In some cases, courses became productions that were the result of specialists in the form of instructional designers and multimedia professionals working with faculty, whose role became that of “content expert” (Hanna, 2003; Smith, 2010). In others, faculty performed dual roles as both faculty and instructional designers and struggled with adapting and conceptualizing their courses for the online environment (Buckenmeyer, Hixon, Barczyk, & Feldman, 2011). Hence, colleges are forced to examine and, perhaps, alter their views of teaching, learning, and the faculty role.

The shift toward online education, and in particular online technical education, provides challenges for administrators and faculty. Such programs have historically used “hands-on” apprenticeship-style teaching (Pratt, 1998). The very nature of this hands-on tradition makes technical education the most challenging to deliver in an online format due to lab-based components and apprenticeship models that are time-consuming, challenging to replicate, and require coordination and buy-in from multiple constituents (Author, 2011). Unfortunately, there is a dearth of published research on the ways technical education programs are using online learning tools and environments. There are few case examples and little guidance in the literature that can help technical education leaders and educators make informed decisions as they work to create or improve online learning options for their programs.

To begin to fill this gap in the literature, we conducted a research study, funded by the National Science Foundation's (NSF) Advanced Technological Education (ATE) program (award #1501794), that examined other NSF-funded technical education projects in community colleges that incorporate online learning as a key instructional component. We investigated how online learning is being implemented and integrated into community college technical education programs that have traditionally been classroom-based. The research reported here is subset of this larger study that examined online learning components, impacts on students, and impacts on faculty.

Our guiding research questions for the portion of our study described here were the following:

How have online learning components been integrated into technical education in funded ATE projects?

a. What is the nature of the courses being developed? (e.g., fully online, hybrid, web enhanced)?

b. How do students gain "hands on" experience in partially or fully online technical education programs?

To answer these questions, we designed a study intended to examine a set of community college technical education programs that use what we determined to be a significant amount of online learning (we describe below how we determined what programs to include). To accommodate the needs and interests of our study's funding source, the NSF, we focused the pool of potential programs to current or recent recipients of NSF-ATE funding. The NSF could then learn about how their funding is contributing to innovations in online technical education.

Method

Data Collection

A review of five years of funded projects from 2010-2014 identified 38 possible sites for inclusion in the study. We asked the primary investigator (PI) from each of the 38 NSF project sites to participate in our study. We ultimately got participation from 17 projects, and 15 of those cases are examined here. Two cases were eliminated because we learned they did not focus on community college technical education programs. For the remaining 15 projects, we interviewed one or two key personnel: the PI from each project and in some cases, a second person from the project, either a co-PI or an instructor that worked on the project.

For our research project, we developed a semi-structured interview protocol. We opted to use semi-structured interviews to allow for questions that may help elicit further meaning from participants (Merriam & Tisdell, 2016). The interview protocol was tested and refined prior to being implemented. Each researcher conducted a sample interview with a community college faculty member who has implemented online education, but who was not a part of the study sample. The interview protocol was revised based on feedback from the sample interviewees to ensure questions were appropriate and relevant, as well as designed to obtain the kinds of information we sought.

Items were included in the interview protocol that were written to address the research questions listed above. To learn about the "nature of the courses being developed," we asked these questions:

> What elements of your course (e.g. lecture, assignment, discussion, etc.) are being taught online? What tools are being used for online courses and course elements (e.g., LMS, simulations, programs, assignments)? What elements are conducted in a face-to-face setting? What approaches are being used to teach content (e.g., active learning, collaborative learning, synchronous, asynchronous, etc.)?

To learn about how "students gain 'hands on' experience in an online environment," we included these questions in our protocol:

> How do students gain "hands on" experience in your online environment? How do students learn the soft skills necessary for employment in your online setting?

Interviews were conducted by our project's co-PIs. We used an online audio-conferencing system called Zoom to conduct the interviews. This enabled us to use Zoom's recording functionality to create an audio file of each interview. Audio files were sent to a professional transcriptions service, providing us with an electronic text file of each interview.

Data Analysis

For this study, interview transcripts were coded by all of our research team members. One of the foci for our coding was what we termed "instructional delivery approach". This included discussion of what modes of instruction programs used such as fully online instruction, hybrid, or face-to-face. We also looked for discussion of the specific instructional tools and strategies programs used such as video, types of lab work, and simulations. We termed these "types of educational experience". Each transcript was analyzed by a minimum of two researchers, and the research group had regular discussions to ensure codes and themes accurately described the findings.

As a group, we identified multiple themes relevant to the use of online learning technologies in technical education including those related to the research questions listed above. In the Results section below, we explain what themes we identified as a group under both of the foci listed above: instructional delivery approach and types of educational experience. We describe the ways each of these themes was found to be present in the technical education programs we investigated.

Results

Instructional Delivery Approach

Online learning in CTE can be delivered in different ways. Often, courses are offered in a hybrid or blended mode, which combines traditional face-to-face learning in a classroom, along with live e-learning and self-paced online learning (Hoic-Bozic, Mornar, & Boticki, 2009). Students can also learn either synchronously, where materials for the course are presented live and in real time (Phelan, 2015) or asynchronously, where "material is archived and then available anytime, anywhere" (Phelan, 2015, p. 257). The type of instructional delivery and online course content for the programs examined in this study fell under four categories: (a) a hybrid or blended course with asynchronous online lectures; (b) a hybrid or blended course with synchronous lectures; (c) a hybrid or blended course with a combination of asynchronous and synchronous lectures and discussions; or (d) a course that is fully online.

Nine of the 15 projects in this study used a hybrid mode for instructional delivery with asynchronous online lectures, such as online lectures and modules. For example, one renewable energy project enabled instructors to record “whiteboard” lectures (where the instructor walks through steps drawn out on a whiteboard) and post the videos on YouTube, where students could view at a time that best fit their schedules. This asynchronous learning was accompanied by a synchronous face-to-face lab. In an advanced manufacturing program, all of the coursework was located online and included video demonstrations embedded in PowerPoint presentations. The students were able to go through the online components of the class and once they felt they were ready, came to campus and connected with faculty in the laboratory and showed instructors their finished projects. Lectures and modules were also placed online for a biomanufacturing project. Students completed online modules on their own time, and then went through the modules together with their instructor in class. Another example included a sustainable energy project which used online lectures and after viewing, students would then come in for in-person labs.

Although not as common as the courses with asynchronous lectures, four of the 15 projects used a hybrid mode with synchronous lectures, which either occurred face-to-face or through the use of video conferencing software, such as GoToMeeting. A cybersecurity project used video conferencing as well as in-person labs to connect with students, and the class offered virtual internships as well. Another project dealing with robotics and advanced manufacturing used synchronous in-class discussions, lectures, and labs while also providing videos and PowerPoint presentations for students online asynchronously. A vacuum technology project offered lectures via telepresence interspersed with demonstration and lab activities, while at the same time offering readings, study guides, and quizzes online.

There was one project that offered a combination of both asynchronous and synchronous lectures and discussion. This winemaking project utilized video conferencing for students and instructors so that they could have synchronous discussions and presentations. However, the program also made use of prerecorded lectures for students to view on their own time asynchronously. The program also required students to perform field hours at either a vineyard or a winery. This unique blend of asynchronous and synchronous lectures allowed students to benefit from both types of learning. Whether the courses used asynchronous or synchronous lectures, though, almost all of the projects studied used a hybrid or blended learning approach. This supports the notion of blended learning as an “increasingly popular form of e-learning” (Hoic-Bozic, Mornar, & Boticki, 2009, p. 19).

Finally, one project we examined was offered entirely online. This cybersecurity learning project was offered in a mostly asynchronous online environment and made use of virtual machines for both online hands-on assignments as well as online labs. Students participated in online discussions and were also required to record their progress and document their completion in a virtual notebook. Students could also choose, however, to meet synchronously with their peers for online collaboration and activities. This course may have been easier to implement fully online due to the nature of the subject matter since cybersecurity work is primarily done in a networked computer environment, so students only need a networked computer to have access to something approaching a professional environment.

Types of Educational Experience

Many of the skills taught in technical education programs are hands-on in nature. Students frequently learn skills that require the manual use of tools and machinery. This creates a challenge for programs that are developing online or hybrid courses. How do these programs ensure that their students get the practice they need to develop and hone these hands-on skills? To learn about this, we asked our interviewees about the modes of instruction they used in their online or hybrid courses and programs. In particular, we examined the strategies and tools used to give their students direct or vicarious experience performing technical skills and procedures. We identified six different strategies technical education programs used to give students such experience: pre-recorded videos, telepresence (real-time, live video), computer-based simulation, use of equipment in students' home, use of equipment in a lab, and real experience at a professional site. Each of these strategies falls along a continuum of concrete to abstract experience, as described by Edgar Dale (1969) in his seminal writing on the Cone of Experience. The Cone of Experience is a visual representation of the progression of potential learning experiences ranging from direct, purposeful experience, or learning by doing (hands-on or simulated experience) to more iconic experiences, or learning through observation (live or video demonstrations), and finally to more symbolic experiences, or learning through abstractions (reading). Pre-recorded videos and telepresence are both examples of learning through observation. Computer-based simulation, use of equipment in students' home, use of equipment in a lab, and real experience at a professional site are examples of learning by doing. Examples of each of these strategies are listed in Figure 1.

Eight of the projects in this study used pre-recorded videos as a learning-through-observation tool. In an advanced manufacturing program, all skill demonstrations were video recorded and shared with students online. These students then came to campus and applied what they have learned from the videos through practice on actual equipment. Another program that focused on building the math skills of students in rural communities used videos to flip the classroom, a strategy in which teachers move more traditional direct instruction outside of the classroom. Students watched instructional videos on their own time, allowing them to use in-person classroom time to ask questions and work through problems with the instructor. In both of these examples, because the videos were pre-recorded, students could watch them, pause them, and rewind them as many times as necessary to meet their learning goal.

Pre-recorded Video

- Online videos used to supplement course material
- Use of streaming videos to supplement course content
- Whiteboard lectures posted on YouTube
- Didactic portion of courses moved online and used videos to appeal to working students
- Students used screen-casting tools to record and share their projects; instructors used screen-casting to share lessons
- Instructors used video-lectures and screen-casting videos for students to watch online
- All instructor demonstrations were videotaped and posted online with PowerPoint presentations
- YouTube videos were used to share some content with students

Equipment at Home

- Cybersecurity labs done on networked home computers
- Winemaking and tasting kits in a box
- Work at home on sustainable technology lab kit in preparation for two week lab training on campus or at mobile training lab

Simulation

- Developed own simulations to give students feel of industrial or workplace settings
- Students used NETLAB, a virtual sandbox system for practice
- Students used online simulation games to help them learn and understand complex building projects

Equipment in Lab

- Didactic portions of the courses were online while the labs were in person on campus
- Moving lectures online allowed much more time for hands-on labs on campus demonstration and lab activities
- Most students did physical lab on campus with help from lab techs
- Trainer equipment which replicates most functionality of professional equipment was made available for students to practice on and learn
- Students could access the servers they needed to complete their labs on campus
- After their home kit labs, students participated in a two week intensive lab session on campus or at the program's mobile solar training lab
- Students viewed lectures online and came on campus one day per week for lab work

Telepresence/Live Video

- Video conferencing for discussions and presentations
- High definition telepresence used to demonstrate expert use of professional equipment

Professional Site

- Provided students with virtual internships in which students worked with industry mentors remotely, using weekly video conference calls
- Set up student internships at area employers to help them get professional experience
- Students did a field practicum at a local vineyard or winery to receive professional experience

Figure 1. Examples of Strategies Used to Give Students Experience

Live video, or telepresence, was used as a learning-through-observation tool by one program and as a real-time remote discussion tool by one other program. A vacuum technology program used high-definition telepresence technology that allowed students in a select set of remote locations around the country to watch expert instructors demonstrate how to use expensive professional equipment. Since these were live demonstrations, students were afforded the opportunity to have the instructor show or operate some aspect of the equipment they might not have otherwise. Students were also able to ask questions or request clarification from the instructors in this interactive telepresence environment. The winemaking and viticulture program use real-time online video for group discussions to supplement the online asynchronous discussions in some courses.

Computer-based simulations provided a learning-by-doing tool in five projects. One of the cybersecurity programs we examined used simulations to give students practice, in addition to the practice they received during the in-person components of their hybrid courses. Cyber security is a computer-based field, so the simulations in this program were not intended to give students access to equipment they could not otherwise access. Rather, these simulations gave students repeated practice that helped in skill-building. In contrast, a bio-manufacturing program used a program to simulate use of technical equipment they would not otherwise have access to at home. Both of these examples demonstrate how simulation can be used to provide students with repeated practice performing a skill, though not on actual professional equipment.

In order to enable learning-by-doing, students in five programs used technical equipment at home. In a sustainable energy technology program, students conducted a series of labs at home with equipment they purchased on their own, such as temperature sensors and solar energy kits. These labs helped students prepare for a two-week intensive practicum at the school's campus. In another cybersecurity program, students were able to use a home computer connected to the Internet to access a remote server, which was identical to the type of server they would use professionally. This afforded students the opportunity to do assignments and practice skills on actual equipment from home.

We found seven projects that enabled learning-by-doing by allowing students to work on technical equipment at a laboratory. In a hybrid photonics program, students worked on modularized courses online and then completed the lab portions of their courses on campus, where they received support from expert instructors. This allowed them to learn and practice on expensive professional equipment that would have been hard to access otherwise outside of an industrial setting. The vacuum technology program gave students opportunities to practice on trainer equipment, which was essentially a replica of the equipment they will eventually use professionally. These trainings? are expensive to produce, so only a few of them were produced for the handful of national sites where students enrolled in their program at a distance.

Finally, three of these programs permitted students to work in actual professional settings as a way to enable learning-by-doing. One of the cybersecurity programs had its students participate in what they call "virtual internship" or an "intern/extern" model. Students worked for technology companies but were able to do so from their homes. They received supervision and support from supervisors via videoconferencing and by loading their issues onto a shared wiki. In contrast, a winemaking and viticulture program required students, who were scattered across the country, to conduct field hours at actual professional settings near them, such as wineries or vineyards. Some students in this program already worked in such a setting, while others worked with the program to identify a setting where they could perform these field hours.

Discussion

Instructional Delivery Approach

In examining the ways that online learning has been integrated into technical education we found that most of the fifteen programs we examined were online/face-to-face hybrids and utilized asynchronous interactions in their courses. This finding is in-line with Watts' (2016) assertion that, "Although asynchronous has been the primary method for interacting in the online setting, technological advancements have made it possible for students and instructors to interact in a more face-to-face like setting" (p. 30). One likely reason asynchronous learning is more prevalent in online learning is that it provides students with a more flexible and self-paced learning environment (Skylar, 2009). Many of the program directors we interviewed discussed self-pacing and flexibility as a rationale for using asynchronous instruction. One program director mentioned that many of the students were working professionals—commonplace in technical education programs - and were not able to attend an in-class lecture, so the asynchronous lectures worked better for them. Another interviewee talked about the benefit of students being able to go back, pause, and review lectures as a way of self-learning.

There are benefits to asynchronous learning for the instructors as well. According to one director, asynchronous learning allows instructors to give more content exposure to students that need additional extra time without slowing down the class for people that are able to grasp the material immediately or more quickly. Asynchronous learning, according to another interviewee, also frees up the instructor to have higher-level conversations with students because they were able to learn the material on their own time. Due to its potential benefits for both the student and instructor, it is not surprising that asynchronous learning is found in many technical education programs.

We also found programs that used synchronous lectures for students. One of the program directors in this study stated that for certain subjects, such as mathematics, students tend to grasp the material better if they have more face-to-face interaction with their instructors, so it made sense to have synchronous instruction in the course. Synchronous learning can also be helpful to instructors, as synchronous delivery allows instructors to assess student learning in real-time and help them to tailor the material accordingly (Schullo, Hilbelink, Venable, & Barron, 2007). One director stated that instructors need to be able to read the body language of the students and determine if they are confused and need additional help. Another director who used asynchronous learning in her program spoke about how she felt that synchronous learning better enabled instructors to help a student immediately and was pushing to have more synchronous instruction in her program. An interviewee who used synchronous telepresence in his program talked in depth about the sophisticated technology used, from multiple cameras to a 75-inch monitor that allowed the cameras to zoom in so the students could view highly technical demonstrations. While this program had the funds to purchase advanced technological equipment, more programs may not use synchronous learning due to expense as well as investment in technical infrastructure, faculty development, and technical competencies of students (Olson & McCracken, 2015).

Types of Educational Experience

The findings from this study of fifteen technical education programs show that such programs are offered, at least in part, at a distance, and use a variety of different instructional strategies to help students develop professional skills. As discussed in the Results section, some of these strategies reflected a learning-through-observation approach while others reflected a learning-by-doing approach, with some variety within each general category. As researchers, we are interested in understanding what factors may drive the decisions to use these various instructional strategies. One factor we looked at was accessibility or scarcity of the equipment students are learning to master. Four of the projects examined here help illustrate this dynamic.

The vacuum technology program trains its students to use equipment that will only be found in high-tech industry settings, making it relatively scarce. Their solution was two-pronged: 1) investing heavily in a state-of-the-art telepresence system so students can watch an expert instructor operate live equipment, and 2) investing heavily in the creation of a few equipment "trainers," high fidelity replicas of the actual equipment on which students can practice, which were shipped to select remote sites around the country.

Second, there was the winemaking and viticulture program. The equipment they train their students to use can be found at wineries and vineyards all over the country, making it accessible to someone who can work or intern at one of these businesses in their geographical area. The equipment is large and expensive. Given such accessibility at local businesses, the program required its students to perform field hours at local wineries or grape farms.

Third, there was the renewable energy program. The program used online videos to move the didactic portion of instruction out of the classroom. This allowed students to spend face-to-face time in the school lab where they could get hands-on experience using professional equipment like amp, volt, and ohm meters. The equipment was not hard to obtain and did not require a large investment, so it was easy to purchase equipment specifically for the program and make it available for students to become familiar with and practice on at the lab.

Fourth, there were the cybersecurity programs. In the field, the primary equipment students are trained to use is computers. Since most, if not all, students in these programs have personal computers, students were able to get hands-on professional training from home or anywhere with an Internet connection.

These four programs reflect a range of accessibility to professional equipment on which students can learn and practice. This accessibility may impact where these programs fall on a continuum of fully online to hybrid to face-to-face learning. The only program that chose to go completely online was one of the cybersecurity programs. This was possible because, as stated above, the only professional equipment they need to learn to use is computer-based and students have access to their own computers. All the other programs chose to design some type of a hybrid program. The renewable energy program was able to create a mostly online program in which face-to-face time was used for students to get hands-on practice on equipment that is easy for anyone to obtain. Because the winemaking and viticulture program trained students on equipment that is widely accessible in many geographically dispersed businesses, the majority of their program was online with only required field hours and some wine tasting happening face-to-face. The vacuum technology program, however, required significantly more face-to-face time for students in the form of practice on trainer equipment and the need to go to a classroom for telepresence sessions because of the limited accessibility, or scarcity of the equipment in their field.

As stated above, one program examined here made coursework entirely online. It was one of the cybersecurity programs in which students were learning to use equipment that is entirely software-based. All the other programs incorporated some actual hands-on instruction or lab work during which students could use professional equipment or a close facsimile of it. It seems the leaders of the programs examined do not believe that traditional hands-on learning and experience can be completely replicated online. Related to this, they may be concerned about their students being prepared to go into professional settings and be ready to work on actual professional equipment. These seem like logical concerns that might prevent a complete transition to entirely online instruction in most technical fields.

Conclusion

For this study, we reviewed 15 NSF ATE projects in order to understand how online learning was being integrated into those technical education programs. We found there were projects that used a hybrid mode of instructional delivery and complemented the courses with either asynchronous or synchronous lectures and discussion. There were also a variety of instructional strategies adopted by the programs, which ranged from learning-through-observation to learning-by-doing, depending on the type of program.

There are important implications for practice gleaned from this study. The first deals with terminology. While we identified these technical education programs because of their significant use of online learning tools and environments, almost all of these programs are hybrid in nature. After more than 20 years of offering online education, terminology used to describe online versus hybrid versus web-enhanced courses remains an issue. It is important that programs clearly articulate the instructional delivery approaches they use so students can determine how well a program will meet their needs in terms of flexibility and preferred learning style.

A second implication is for the people responsible for implementing these programs. As described here, programs are getting creative in the ways they are using a variety of online tools and blending them with face-to-face experiences to meet students' needs and the programs' goals. These hybrid environments are likely different than those most instructors have previously taught in or that their students have learned in. Programs moving in this direction will benefit from investing resources in training related to teaching in online and hybrid environments as well as supporting students as they learn how to succeed in such environments. It was clear from the participants in this study that instructional design assistance is also a key support mechanism for faculty. Faculty struggle with technical and design aspects of courses and having supported instructional design also provides continuity in regard to what students can expect when they take these courses.

A third implication deals with the design of such innovative technical education programs. It is critical that programs consider the nature of the content they teach and the kinds of equipment and machinery they are training students to master as they make educational design decisions (Horvitz, 2018). While programs focused on fields like cybersecurity which are largely computer-based may transition smoothly to an online environment without need for extensive capital investment, programs focused on fields that are more heavy machinery-focused like vacuum technology or robotics may need to invest heavily in the development training tools such as simulators or high definition telepresence equipment.

One solution is unlikely to fit all technical education programs, and programs must consider budget, ongoing costs, and the needs of their students when making these decisions. State funding for colleges continues to decline and has not risen to pre-recession levels (Katsinas, D'Amico, Friedel, Adair, Warner, & Malley, 2016) and the cost of maintaining technical program equipment (physical or virtual) continues to rise. Hence, the fourth recommendation for practice is that programs and institutions should consider partnerships in order to grow programmatic offerings and share costs. Each of the programs we studied was involved in a partnership because it was part of their grant requirement. However, each also demonstrated an ability to produce more or better content and to reduce costs at individual colleges. Partnering with high schools created a much-needed pipeline of students who would potentially enter and complete their degree at the college and partnering with universities opened a pipeline for students to continue on to earn bachelor's and even master's degrees. Some colleges partnered with industry to either provide equipment (physical or simulations) and/or to further workers' education. Other partnerships involved multiple community colleges sharing didactic content portions online to allow students to complete a degree that might not otherwise be available at their institution. Considering partnerships from multiple partners and directions opens doors for colleges and, more importantly, for students.

Our review of the NSF ATE projects underscores the need for further research in a few areas. The grant funding received from the NSF could have played a factor in the decision-making of each program's instructional design, so we recommend future research focus on how programs not funded by the NSF are integrating online components into technical education programs. We also recommend that future studies examine how well these types of programs are performing. Researchers could begin to collect student performance data in order to help other technical education programs make better informed decisions. Also, student perceptions of these programs would be an important area to explore in the future because it would add an important dimension that can shed light on how these innovative online learning strategies are being experienced and if they meet students' needs. Future research should focus on how and what students are experiencing and learning which can inform decisions about the best ways to design these technical education programs. Finally, future research that incorporates interviews with employers to examine their perceptions of student learning would also benefit the field. Insight from these key stakeholders would be valuable as they are the ones who will eventually hire these students upon graduation. It is our hope that future research could lead to major improvements as well as shed much needed insight on the best ways to incorporate online learning in technical education.

About the Authors

Brian S. Horvitz, Ph.D. is an associate professor of Educational & Instructional Technology at Western Michigan University in Kalamazoo, Michigan. Lisa R. Garcia is a doctoral student in Higher Education Leadership at Western Michigan University in Kalamazoo, Michigan. Regina Garza Mitchell, Ed.D. is an associate professor of Higher Education Leadership in Higher Education at Western Michigan University in Kalamazoo, Michigan. Cheryl D. Calhoun, Ph.D. is Dean of Access & Inclusion for Santa Fe College in Gainesville, Florida.

References

Allen, I. E. & Seaman, J. (2016). *Online report card: Tracking online education in the United States*. Retrieved from http://onlinelearningsurvey.com/reports/onlinereportcard.pdf

Benson, A. D., Johnson, S. D., Taylor, G. D., Treat, T., Shinkareva, O. N., & Duncan, J. (2005). Achievement in online and campus-based career and technical education (CTE) courses. *Community College Journal of Research and Practice, 29*(5), 369-394. doi:10.1080/10668920590921589

Buckenmeyer, J., Hixon, E., Barczyk, C. C., & Feldman, L. (2011). Invest in the success of online programs at the university? Mentor professors. *Contemporary Issues in Education Research, 4*(6), 1-6.

Carnevale, A. P., Smith, N., & Strohl, J. (2013). *Recovery: Job growth and education requirements through 2020*. Washington, DC: Georgetown Public Policy Institute, Georgetown University. Retrieved from: https://cew.georgetown.edu/wp-content/uploads/2014/11/Recovery2020.FR_.Web_.pdf

Carnevale, A. P., Jayasundera, T., & Hanson, A. R. (2012). *Career and technical education: Five ways that pay along the way to a B.A.* Washington, DC: Georgetown Public Policy Institute, Georgetown University. Retrieved from: https://1gyhoq479ufd3yna29x7ubjn-wpengine.netdna-ssl.com/wp-content/uploads/2014/11/CTE.FiveWays.FullReport.pdf

Dale, E. (1969). *Audiovisual methods in teaching* (3rd ed.). New York, NY: Holt, Reinhart & Winston.

D'Amico, M. M. (2016). Community college workforce development in the student success era. In M. B. Paulsen (Ed.), *Higher Education: Handbook of Theory and Research, 31* (pp. 217-264.

Fletcher, E. C., Djajalaksana, Y., & Eison, J. (2012). Instructional strategy use of faculty in career and technical education. *Journal of Career and Technical Education, 27*(2), 69-83.

Garrison, D. R., Anderson, T., & Archer, W. (2010). The first decade of the community of inquiry: A retrospective. *Internet and Higher Education, 13*, 5-9. doi:10.1016/j.iheduc.2009.10.003

Hanna, D. E. (2003). Organizational models in higher education, past and future. In M. G. Moore & W. G. Anderson (Eds.), *Handbook of Distance Education* (pp. 67-78). Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

Harrison, H.D., Earnest, D., Grehan, L., Wallace, J. (2006). *Executive summary: secondary and post-secondary career and technical education in Tennessee*. The University of Memphis, TN: Sparks Bureau of Business and Economic Research.

Hoic-Bozic, N., Mornar, V., & Boticki, I. (2009). A blended learning approach to course design and implementation. *IEEE Transactions on Education, 52*(1), 19-30.

Hora, M. T., Benbow, R. J. , & Oleson, A. K. (2016). *Beyond the skills gap: Preparing college students for life and work.* Cambridge, MA: Harvard University Press.

Horvitz, B.S. & Zinser, R. (2011). Identifying the state of online instruction in National Science Foundation funded technical education programs at community colleges. *International Journal of Instructional Technology and Distance Learning, 8*(12), 33-44.

Horvitz, B.S. (2018). Extending the reach of technical education with distance learning. *Community College Journal of Research and Practice*, DOI:10.1080/10668926.2018.1507849

Jepsen, C., Troske, K., & Coomes, P. (2014). The labor-market returns to community college degrees, diplomas, and certificates. *Journal of Labor Economics, 32*(1), 95-121.

Katsinas, S. G., D'Amico, M. M., Friedel, J. N., Adair, J. L., Warner, J. L., & Malley, M. S. (2016). *Education's new normal: An analysis of national surveys of access and finance issues, 2011 to 2015.* Tuscaloosa, AL: The University of Alabama Education Policy Center. Retrieved from http://edpolicy.ua.edu/research/

Kreamer, K.B. & Zimmermann, A. (2016). Setting a new standard in the 21st century: Career technical education and programs of study. In S. Andreason (Ed.) Developing Career-Based Training (pp. 5-11). Atlanta, GA: Federal Reserve Bank of Atlanta, Publisher.

Lokken, F. & Mullins, C. (2014). *Trends in elearning: Tracking the impact of elearning at community colleges*. Washington, DC: Instructional Technology Council.

Lokken, F. (2018). *Trends in eLearning: Tracking the impact of eLearning at community colleges.* Columbus, OH: Instructional Technology Council.

Lynch, R. L. (2000). *New Directions for High School Career and Technical Education in the 21st* Century (Information Series No. 384). Washington, DC: Office of Educational Research and Improvement. Retrieved from: https://files.eric.ed.gov/fulltext/ED444037.pdf

Major, C. H. (2015). *Teaching online: A guide to theory, research, and practice*. Baltimore, MD: Johns Hopkins University Press.

Mars, M.M. (2013). Community college economic and workforce development education in the neoliberal and academic capitalist contexts. In J.S. Levin and S.T. Kater (Eds.) Understanding Community Colleges (pp. 217-230). New York, NY: Routledge.

Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to design and implementation* (4th ed.). San Francisco, CA: Jossey-Bass.

Olson, J. S., & McCracken, F. E. (2015). Is it worth the effort? The impact of incorporating synchronous lectures into an online course. *Journal of Asynchronous Learning Network*, *19*(2), 1–12.

Phelan, J. (2015). The use of e-learning in social work education. *Social Work, 60*(3), 257-264**.**

Plotkin, H. (2011, January 20). New job training and education grants program launched [Blog Post]. Retrieved from http://www.whitehouse.gov/blog/2011/01/20/new-job-training-and-education-grants-program-launched

Pratt, D.D. & Associates. (1998). *Five perspectives on teaching in adult and higher education*. Malabar, FL: Krieger Publishing.

Robison, M.H. & Christophersen, K.A. (2008). *The economic contribution of Capital Community College: State of Connecticut*. Moscow, ID: Economic Modeling Specialists Inc. Retrieved from https://www.capitalcc.edu/wp-content/uploads/2016/05/Institutional-Research-The-Economic-Contribution-Of-CCC-2016-1.pdf

Schullo, S., Hilbelink, A., Venable, M., & Barron, A. E. (2007). Selecting a virtual classroom system: Elluminate Live vs. Macromedia Breeze (Adobe Acrobat Connect Professional). *MERLOT Journal of Online Learning and Teaching*, *3*(4), 331–345. Retrieved from http://jolt.merlot.org/vol3no4/hilbelink.htm

Skylar, A. A. (2009). A comparison of asynchronous online text-based lectures and synchronous interactive web conferencing lectures. *Issues in Teacher Education*, *18*(2), 69–84.

Smith, V. C. (2010). Essential tasks and skills for online community college faculty. In R. L. Garza Mitchell (Ed.), *New Directions for Community Colleges 150, Online Education* (pp. 43-56). San Francisco, CA: Jossey-Bass.

The White House. (2009). *Education: Knowledge and skills for the future*. Retrieved from: https://obamawhitehouse.archives.gov/issues/education/higher-education/building-american-skills-through-community-colleges

The White House. (2014). *Higher education*. Retrieved from The White House website: http://www.whitehouse.gov/issues/education/higher-education

U.S. Department of Education (2012*). Investing in America's future: A blueprint for transforming career and technical education*. Washington, DC: Author.

U. S. Department of Labor. (2014). *Trade Adjustment Assistance Community College and Career Grant Training Program***.** Retrieved from https://doleta.gov/taaccct/

Watts, L. (2016). Synchronous and asynchronous communication in distance learning: A review of the literature. *The Quarterly Review of Distance Education, 17*(1), 23-32.

K-12 Student Perceptions of Online Teacher and On-site Facilitator Support in Supplemental Online Courses

Jered Borup and Chawanna B. Chambers
George Mason University

Rebecca Stimson
Michigan Virtual

Abstract

In an attempt to better support their students and reduce online course attrition rates, some brick-and-mortar K-12 schools provide their online students with an on-site facilitator who supports students face-to-face. However, little is known about how students perceive the support provided by their on-site facilitator and online teacher. For this report, 70 students completed a survey and 51 students participated in one of eight focus groups to share their perceptions and experiences regarding online teacher and on-site facilitator support. Findings focused on the following support indicators: (1) advising students regarding course enrollments, (2) orienting students to online learning procedures and expectations, (3) facilitating interactions, (4) developing caring relationships, (5) motivating students to more fully engage in learning activities, (6) organizing and managing student learning, and (7) instructing students regarding the course content. The majority of support appeared to come from students' on-site facilitators. An important exception was that the large majority of the content-related support came from the online teacher. While students were largely positive when describing the support from their on-site facilitators, students were split and more critical of the support (or the lack of support) from their online teacher.

Keywords: parental engagement, online learning, student engagement, virtual schooling, online teachers, on-site facilitators

Borup, J., Chambers, C.B., & Stimson, R. (2019). K-12 student perceptions of online teacher and on-site facilitator support in supplemental online courses. *Online Learning, 23*(4), 253-280. doi:10.24059/olj.v23i4.1565

K-12 Student Perceptions of Online Teacher and On-site Facilitator Support in Supplemental Online Courses

The growth in K-12 online course enrollments has increased the need for highly skilled online teachers (Evergreen Education Group, 2017). Teacher preparation programs have largely failed to address the skills that are unique to K-12 online teaching and those teachers who begin teaching online commonly lack the ability to fully support and engage with students (Archambault, Kennedy, Shelton, Dalal, McAllister, & Huyett, 2016). The skills that teachers require can also vary based on their model of online learning. While exact numbers are difficult to ascertain, it is clear that the majority of students who enroll in online courses do so to supplement face-to-face courses (Evergreen Education Group, 2017). Some of the largest supplemental online course providers are state-run virtual schools. Evergreen Education Group (2017) estimated that in 2016 over 523,000 students (84.39% in high school) in 24 states enrolled in about 935,000 courses offered by state-run virtual programs.

Online courses have experienced significantly higher student attrition rates compared to their face-to-face counterparts. For instance, Freidhoff (2018) compared K-12 students' supplemental online course pass rates to those same students' pass rates in face-to-face courses in the state of Michigan. On average, Michigan students only passed 55% of the over 500,000 online enrollments compared to a pass rate of 78% in their face-to-face courses. While students' failure to pass online courses is a complex issue with many possible causes, students often lack the necessary self-regulation ability and understanding of how to successfully learn online (Cavanaugh, 2007; Moore, 1993, 2007; Rice, 2006; Weil et al., 2013). Lowes and Lin (2015) summarized that online courses are especially challenging for adolescents because "students not only need to learn a subject online but need to learn how to learn online" (p. 18). While some have argued that unprepared students should be excluded from online learning, Rose, Smith, Johnson, and Glick (2015) stressed that online programs should take a more equitable approach to online learning: "Rather than 'Is online learning right for me?' students should be asked, 'What support systems do you need to be successful in online learning?'" (p. 75).

Research has found K-12 online teachers can provide a high degree of support that builds close, caring relationships with some students (Velasquez, Graham, & Osguthorpe, 2013). However, supplemental courses rely heavily (if not exclusively) on asynchronous communication, making it difficult for online teachers to provide all of their students with the timely support they require (Rice & Carter, 2016). As a result, online students are increasingly being provided with an on-site facilitator who works with them in their local brick-and-mortar schools. Similar to online teachers, on-site facilitators often lack professional development opportunities. One obstacle to providing professional development is the lack of research examining successful on-site facilitator and online teacher support. As the primary stakeholders, student perceptions can prove especially helpful to those wishing to better understand the types of support that are especially helpful to online students. While some researchers have examined K-12 online students' perceptions (see Roblyer, Freeman, Stabler, & Schneidmiler, 2007), most research has ignored students' perceptions when examining student support in programs that offer students an online teacher and an on-site facilitator (Borup, 2018).

In this research, online high school students completed a survey and participated in focus groups to share how they perceived and valued the support they received from their online teachers and on-site facilitators. More specifically, this research addressed the following questions:

1. What types of support indicators do online students perceive while enrolled in a supplemental online course?
2. How do students value the support they receive from online teachers and on-site facilitators?

Review of Literature

This section first reviews frameworks focused on online learning interactions and support in both higher education and K-12 settings. Following, research will be reviewed that has helped to identify the specific responsibilities of K-12 on-site facilitators.

Online Learning Interaction and Support Frameworks

Two frameworks that were developed in higher education are particularly relevant to K-12 online learning support because they focus on student interactions. In his Theory of Transactional Distance, Moore (1980) defined *dialogue* as two-way, mediated communication between the learner and instructor in a distance education setting. He also defined *structure* as the extent that learning objectives, procedures, and assessments are planned and cannot be easily adapted to students' needs. He then explained that courses with less structure can allow or require more dialogue. Inversely, courses with high structure are unable to respond to individual student's needs and require less dialogue. Moore also argued that the levels of dialogue and structure determine what he termed learner's *transactional distance*. Moore hypothesized that transactional distance is lowest in courses with high levels of dialogue and low structure and is the highest in courses with low levels of dialogue and high structure. Moore (2007) also explained that instructors need to carefully examine learner *autonomy,* or the ability to decide "what to learn, how to learn, and how much to learn" (p. 90). Moore (1980) warned that "a learner cannot learn effectively if the educational transaction demands more autonomy than he is able to exercise" (p. 29). Moore (2007) later explained "the greater the transactional distance the more the learners have to exercise autonomy" (p. 95). Moore (1993) also highlighted the subjective nature of transactional distance when he stated that it was a "psychological and communications space" (p. 22) that can even be present in face-to-face education. Garrison (2009) made the distinction between distance education that focuses on principles of independence, autonomy, and self-pacing, and online learning that focuses on principles of collaborative constructivist approaches. Using social constructivist principles, Garrison and his colleagues (Garrison, Anderson, & Archer, 2000) established the widely-accepted Community of Inquiry (CoI) framework. The CoI framework adopted the existing concept of *social presence* and defined it as "the ability of participants…to project their personal characteristics into the community, thereby presenting themselves to the other participants as 'real people'" (Garrison et al., 2000, p. 89). This definition emphasized the actual communication behaviors over the quantity of interactions. While Garrison and his colleagues would show that social presence could be established using only asynchronous text (Rourke, Anderson, Garrison, & Archer, 2001), researchers have more recently found that social presence can be established more efficiently when students and instructors communicate using asynchronous audio and video (Borup, West, Thomas, & Graham, 2014; Thomas, West, & Borup, 2017). Garrison et al. (2000) also explained that social presence impacts students' *cognitive presence* because it allows for the meaningful and sustained communication that is required to co-construct knowledge of the course material. However, Garrison et al. (2000) stated that neither social nor cognitive presence was likely to reach adequate levels without *teaching presence,* which they viewed as the "binding element" of the framework (p. 96). More specifically, Anderson, Rourke, Garrison, and Archer (2001) stated that teaching presence is established through instructional design and organization (e.g., setting curriculum, designing methods, establishing time parameters, selecting technology, and establishing netiquette), facilitating online discussions (e.g., identifying areas of agreement, seeking consensus, reinforcing student contributions, setting the climate for learning, prompting participation, and assessing the efficacy of the process), and direct instruction (e.g., presenting content, summarizing discussions, diagnosing misconceptions, providing feedback, and responding to technical concerns).

While the above frameworks can help to guide K-12 online learning research, their applicability to the K-12 setting is limited due to the unique characteristic of K-12 online learners and environments. As compared to adult learners, K-12 students require higher levels of support (Roblyer et al., 2007). While this additional support can come from the online teacher, it also frequently comes from parents, on-site facilitators, and other adults. As a result, Borup, West, Graham, and Davies (2014) developed the Adolescent Community of Engagement (ACE) framework to better describe the support most likely to increase adolescent online students' affective, behavioral, and cognitive engagement. The primary hypothesis of the ACE framework was that student engagement is positively correlated with teacher, parent, and peer engagements. Because parent and peer engagements are beyond the scope of this research, this section will focus on the concept of teacher engagement, which includes the following:

- **Instructing:** Using content and pedagogical expertise to support students in their efforts to learn and apply course content. Instructing activities include asking and answering questions, drawing students' attention to course concepts, providing students with resources, summarizing student discussions, tutoring, and providing feedback.
- **Organizing and designing:** Providing students with an organized online learning environment and helping them to organize their learning schedules.
- **Facilitating interaction**: Supporting and engaging students in their interactions with the course content and other involved people by
    - *nurturing* caring relationships with students;
    - *monitoring and motivating* students' engagement, progress, and learning; and
    - *encouraging communication* with and between students, parents, and other stakeholders.

The authors of the ACE framework (Borup et al., 2014) encouraged researchers to use a variety of methods such as surveys, interviews, participant reflections, and observations to describe teaching engagement in K-12 online learning environments, claiming that "such research could refine and/or expand the ACE framework and, more importantly, identify the critical components to student success" (p. 23). The ACE framework was first applied to case study research conducted at a successful cyber high school where students took all or most of their courses online and learned primarily at home. Analysis of surveys and interviews with teachers, students, and parents provided a rich description of teacher engagement that largely confirmed the constructs of teacher engagement (Borup, Graham, & Drysdale, 2014; Borup & Stevens, 2016b, 2017). However, the ACE framework authors (Borup et al., 2014) also warned that research examining one model of learning should not be generalized to others because "in the several types of existing learning models, each requires different levels of teacher, parent, and peer engagement" (p. 23). For instance, research conducted at a large independent study program found that while online teachers were available to help their students, students most frequently turned to local teachers not affiliated with the online high school for support (Oviatt, Graham, Davies, & Borup, 2018).

Research has found that while K-12 online teachers can develop strong caring relationships with students, those relationships can take longer to develop and requires active student participation (Velasquez, Graham, & West, 2013a; Velasquez, Graham, & Osguthorpe, 2013b). Large enrollment courses can also be an obstacle to providing adequate student support (Hawkins, Barbour, & Graham, 2011; Hawkins, Graham, & Barbour, 2012). Furthermore, the types of support that online teachers provide are somewhat limited due to their physical distance from their students (Borup, Graham, & Drysdale, 2014). Online programs are also increasingly requiring local schools to provide their online students with facilitators who can support students in person, at times in a lab setting. Because students receive some face-to-face and online support, this model of learning can be seen as a type of blended learning. Staker (2011) used the term *online-lab model* to describe environments where online students regularly worked with an on-site facilitator in a lab environment. Specifically, Staker (2011) defined the online-lab model as "programs that rely on an online platform to deliver the entire course but in a brick-and-mortar lab environment. Usually these programs provide online teachers. Paraprofessionals supervise but offer little content expertise" (p. 8). Only recently has the ACE framework been applied to the online-lab model (Borup & Stimson, 2019). Following their research, Borup and Stimson (2019) recommended that the ACE framework be expanded to include two additional constructs—(1) *advising* students regarding online course enrollments and (2) *orienting* students to the online course environment and expectations. In the following section we more fully describe the roles of on-site facilitators.

On-site Facilitators

On-site facilitators (also commonly called mentors, coaches, or guides) are not content experts but are knowledgeable about how to successfully learn online. On-site facilitators' responsibilities can be summarized as ensuring that "everything is working smoothly and order is maintained" (Hannum, Irvin, Lei, & Farmer, 2008, p. 213). While on-site facilitators are commonly certified teachers, on-site facilitators' responsibilities do not require content expertise and can be addressed by other school employees such as administrators, office assistants, librarians, and coaches (de la Varre et al., 2011; Hannum et al., 2008; Harms et al., 2006). Following interviews with 58 on-site facilitators in rural K-12 schools, de la Varre et al. (2011) found that the on-site facilitators were commonly certified teachers who had pre-existing relationships with students. Barbour and Mulcahy (2009) also noted that those who are tasked with serving as on-site facilitators are commonly not provided with time or incentives to fulfill their responsibilities. Instead, programs rely on "volunteerism and the good will of overworked teachers" (p. 782).

Harms et al. (2006) were some of the first researchers to list on-site facilitator responsibilities, which included:

- advising students on course enrollments,
- getting to know students on a personal level,
- helping students develop online learning skills,
- fostering communication with and between students, parents, and online teachers, and
- monitoring students' progress and grades.

In one of the largest and earliest studies on the topic, Roblyer et al. (2007) evaluated an online program that used online teachers and on-site facilitators to support students at over 100 K-12 schools. What made this research especially helpful is the scope of their data collection which included student achievement data, teacher and student surveys, and interviews with facilitators, teachers, and students. Their research found that the facilitators played a critical role in student success. However, teachers also found that facilitators needed better training—especially with troubleshooting skills—and that students required more "daily facilitator support and monitoring" (p. 40).

On-site facilitator responsibilities can also vary depending on the time of semester. Borup and Stimson (2017) interviewed successful on-site facilitators and online teachers and found that at the start of a semester facilitators spent the majority of their time (1) orienting students to the online learning course and accompanying expectations, (2) supplying and troubleshooting technology, and (3) building relationships with students. Later, facilitators spent increased time (1) monitoring and motivating student engagement and (2) facilitating instructional support from the online teacher and local content experts. At the end of the semester, facilitators primarily focused on (1) proctoring exams, (2) using a variety of rewards and punishments to encourage students to finish the course, and (3) recording grades. While teachers attempted to motivate and develop relationships with students, they found their attempts to be limited and were especially dependent on on-site facilitators to develop student relationships and to motivate students to fully engage in the course. In qualitative research that included 40 rural high schools, Kean, de la Varre, Irvin, and Hannum (2008) found that facilitators were especially important "when online instructors were unavailable to students, or in some cases insensitive to their needs" (p. 43). They also found that students' abilities to have a positive online learning experience was dependent on the on-site facilitators' ability to develop relationships with students and their families. Inversely, de la Varre, Irvin, Jordan, Hannum, and Farmer (2014) asked unsuccessful online students and their on-site facilitators why they failed their courses and found that while challenges in understanding the content was in part to blame, more frequently issues surrounding learning online and the lack of motivation was to blame. The researchers concluded that the students would have been more successful if on-site facilitators were more readily available and able to assist and motivate them.

The quality, quantity, and types of facilitation can vary greatly across schools. For instance, some on-site facilitators work with students daily in labs, while others only meet with students on an as-needed basis (Freidhoff, Borup, Stimson, & DeBruler, 2015). Online students who study daily in a structured lab environment with an on-site facilitator are significantly more likely to pass their courses than are students who have more flexibility in when and where they work (Roblyer et al., 2008). Hannum et al. (2008) conducted a cluster-randomized control trial that also found on-site facilitators were most effective if they received professional development. Specifically, using several discussion board activities, on-site facilitators at rural high schools received extended professional development that encouraged them to share anecdotes from their work and discuss authentic scenarios that were presented using text, images, and audio (Irvin, Hannum, Farmer, de la Varre, & Keane, 2009; Kean et al., 2008).

While on-site facilitators are not charged with teaching the content, research has repeatedly found that facilitators provide students with some direct instruction. For instance, de la Varre et al. (2011) found that certified teachers who served as on-site facilitators were more likely to engage in content support and instruction than were those facilitators who were not certified teachers. Barbour and Mulcahy (2004) qualitatively examined an online program where on-site facilitators were explicitly told that their responsibilities did not include providing direct instruction or tutoring. However, in practice it was found that on-site facilitators regularly provided students with instructional support, especially when the facilitator had some content expertise. Similarly, O'Dwyer et al. (2007) surveyed 231 online students enrolled in online algebra courses and found that over two-thirds asked their on-site facilitators for math assistance even through their facilitators were not certified to teach math. However, this instructional support was not always welcomed by online teachers who believed that on-site facilitators who also taught content to students could undermine core teachers' ability to fulfill their responsibilities (de la Varre et al., 2011). While some have argued that facilitators should not engage in instructional content support, Hendrix and Degner (2016) believed it was unlikely that on-site facilitators would stop instructing their students, especially in rural settings where facilitators have developed close relationships with students.

While previous research has provided important insights, it has relied largely on online teacher and on-site facilitator perceptions. As a result, the focus of this research is to hear and understand students' perspectives and experiences regarding ways their online teachers and on-site facilitators supported them throughout their online course. By understanding students' perceptions and experiences, we hope to provide important insights to online teachers and on-site facilitators regarding how their support efforts are being received by students and how they might work to improve their practice. Furthermore, previous research has tended to examine online teachers' efforts and on-site facilitators' efforts separately. While the ACE framework acknowledged that roles outlined in the concept of teacher engagement could be filled by multiple individuals, including an online teacher and on-site facilitator, it did not describe how online teachers and on-site facilitators might specifically share those responsibilities. Harms et al. (2006) explained that, in practice, there is "considerable overlap" between online teachers' and on-site facilitators' responsibilities, and on-site facilitators can at times act as teachers, and online teachers can act as facilitators. By examining students' perspectives of both sources of support simultaneously, we hope to add some clarity to how teacher engagement responsibilities can be shared by online teachers and on-site facilitators.

Methods

Context

Research was conducted in three Michigan brick-and-mortar K-12 schools that had 82, 197, and 407 online student enrollments from students who were supplementing their face-to-face course work with online courses offered by Michigan Virtual (MV), a state-run virtual school that enrolled 10,426 students during the 2016-17 academic year. Michigan provided an especially interesting context for this research because Section 21f of Michigan Public Act No. 60 (2013) required local schools to provide on-site facilitators to their students who are enrolled in online courses. However, Section 21f only stipulated that the on-site facilitator "monitor the pupil's progress in the course" and be "available for assistance to the pupil." Teachers were charged with "determining appropriate instructional methods for each pupil, diagnosing learning needs, assessing pupil learning, prescribing intervention strategies, reporting outcomes, and evaluating the effects of instruction and support strategies" (Michigan Department of Education, 2014, 5-O-D-2). Following these directives, on-site facilitators and online teachers have great leeway in how they actually fulfill their responsibilities. MV also provided onsite facilitators and online teachers with guides that offered more information on their responsibilities.

Data Collection

In a different study conducted during the 2015-16 academic year, 12 schools were identified that had student pass rates of 85% or higher. Researchers then interviewed the on-site facilitators at those schools to better understand how they perceived their roles and then actually worked to fulfill these responsibilities (see Borup & Stimson, 2019). Following that research, we sampled three of the 12 schools that had particularly engaged and supported on-site facilitators.

The three school student bodies ranged between 650-820 students. Each high school was the only one in its city. Cities ranged in population from 4,500-8,000.

With facilitators' cooperation at the three schools, all parents of enrolled MV students were invited to provide consent for us to survey and conduct focus groups with their students. The survey used in this research was created by adapting a survey created by Oviatt, Graham, Borup, and Davies (2018). The original survey listed types of support identified in the ACE framework. Once students indicated they received a specific type of support, they were asked who had provided them with that support. Oviatt et al. (2018) developed the survey by first identifying each support type outlined in the ACE framework. They then created a statement to represent each of those support types. To ensure that the items accurately represented the framework, the lead author of the ACE framework served as an expert reviewer and suggested changes for clarity. Lastly, an online high school student participated in a think- aloud interview where the student shared his perceptions of what each item meant. However, the instrument was created specifically for an online independent study context and did not address some of the support types that were previously identified following an analysis of teacher and on-site facilitators at MV, especially advising students on course enrollments and orienting them to the online learning environment and expectations. As a result, some items were added to the survey to address those gaps. An MV representative then reviewed the instrument and expressed concerns regarding its length. To address this concern, some items were collapsed into more general items. The length of individual items was also reduced when possible and items were changed to past tense. For instance, the original item "Review the policies of the online school and course with you at the beginning of the course" was changed to "Reviewed the policies and expectations for learning online."

All 70 MV students who completed the survey were also invited to participate in focus groups. The focus group questions were similar to the survey questions. However, the focus group questions encouraged students to share experiences and elaborate on the types of support that they reported receiving on the survey. In addition, the focus groups focused on the value that students placed on the support they received. As a result, both the survey and the focus groups helped to address the first research question and only the focus group allowed us to address the second research question.

Each focus group contained 4 to 9 students and lasted 45 to 60 minutes. Two focus groups were conducted at two of the schools, and four focus groups were conducted at the third, for a total of eight focus groups with 51 student participants: one freshman, seven sophomores, 11 juniors, and 32 seniors. Of the 32 seniors, 18 had taken online courses during previous semesters. For privacy purposes, we have renamed the schools and student participants. All data collection and analysis procedures were approved by the lead author's university institutional review board.

Data Analysis

The first research question was addressed by identifying the types of support indicators that students reported receiving in their survey and focus group responses. Student survey responses were analyzed using descriptive statistics. The value that they placed on the support that they received—the focus of the second research question—was determined in students' focus group responses. Student focus group recordings were transcribed and sent to student participants to check for accuracy. Following what Glaser (1965) called the "basic, defining rule for the constant comparative method" (p. 439), one of the researchers coded focus group comments into as many different categories as possible while comparing them to all previously coded comments.

Similar categories were then grouped together. The groupings were guided by, but not limited to, the elements identified in the ACE framework. Groupings were also reviewed by the entire research team three times during the analysis—once for each school's focus groups. In the meetings, the group commonly highlighted specific statements that they believed were different from the other statements similarly coded. The group also highlighted subcategories to discuss if they would fit better under another coding category or become its own category. All disagreements were discussed until resolved.

Results

For the survey, 70 students reported the support indicators they had received and then indicated whether the source of that support was their online teacher and/or on-site facilitator (see Table 1). The two most commonly reported support indicators focused on monitoring students' progress and checking in with students to ensure they were working hard to progress through the course. On-site facilitators appeared to be the primary source for both activities. In fact, overall, on-site facilitators were reported as the support source over 30% more times than were online teachers and more frequently than online teachers on 10 of the 16 indicators. While online teachers were reported most frequently as the support source on six support indicators, the differences were most prominent on three: providing feedback on assignments, helping students communicate with peers online, and helping students create learning schedules. Overall, relatively few students reported receiving help on deciding which online course(s) to take. Similarly, two of the four least reported support indicators focused on helping students to communicate and collaborate with their peers.

Table 1.

Number of Survey Participants Perceiving Support Indicators and Source of Support

Support Indicators		Source	
	# of Participants	# of Facilitators	# of Teachers
Checked in with you to make sure you were working hard to complete assignments.	61	51	22
Checked your grades/progress regularly.	59	49	27
Gave you course materials.	56	49	19
Explained things to you when you had questions.	55	37	41
Showed you how to use Blackboard.	52	39	28
Reviewed the policies and expectations for learning online.	45	31	35
Helped you if you were having computer or internet problems.	45	36	12
Motivated you to complete assignments.	44	36	22

Support Indicators		Source	
	# of Participants	# of Facilitators	# of Teachers
Provided you with feedback on your assignments (before or after they were submitted).	44	11	40
Made sure you had a place to study.	43	37	9
Helped you gain the skills you needed to successfully learn online.	41	32	29
Helped you set goals for completing assignments.	40	25	29
Helped you learn how to communicate with others online.	32	10	30
Helped you decide which online course(s) to enroll in.	31	30	7
Helped you create a study schedule.	24	10	18
Helped you work with other students on assignments.	23	15	13
	Total	**498**	**381**

Analysis of focus group transcripts identified the following support categories: (1) advising students regarding course enrollments, (2) orienting students to the online course platform and expectations, (3) facilitating communication, (4) nurturing caring relationships, (5) monitoring student progress and learning, (6) motivating students to more fully engage in learning activities, and (6) teaching the course material (see Table 2). Students' comments regarding the support they received from their on-site facilitators was almost entirely positive. This is likely the result of our purposeful sampling of facilitators who were particularly engaged in students' learning. In contrast, student comments regarding the support they received from their online teachers were more divided and tended to be more negative in some categories.

Table 2.

Number of Focus Groups Containing Positive and Negative Comments on Support Categories

Support Category	On-site Facilitator		Online Teacher	
	Positive (n = Groups)	Negative (n = Groups)	Positive (n = Groups)	Negative (n = Groups)
Advising	4	1	0	0
Orienting	8	2	7	7
Facilitating Com.	8	1	8	8
Nurturing	8	1	8	8
Monitoring	8	4	7	8
Motivating	8	3	4	4
Instructing	2	0	8	8

Advising

Even before courses began, those who were new to online learning tended to seek guidance from a knowledgeable adult regarding whether enrolling in an online course was in their best interest. However, some students did not perceive a need to be advised, and students in only four focus groups stated that they turned to their on-site facilitator for advising support. Sharron summarized her thought process as, "There's an online class. Let's do it." Courtney added that she "decided all by [her]self" and was "jumping at the opportunity."

Students in two of the schools commented that their on-site facilitators provided them with high levels of advising support. In fact, one student, Wyatt, commented that his on-site facilitator was "almost...one of the [school] counselors sometimes, which is really nice." These on-site facilitators seemed to be particularly helpful because they were familiar with students' goals and interests. Jason summarized, "He did help me figure it out because he kind of knew what I was already interested in and then just recommended different things that I could try." Sophia added that it was especially helpful when the on-site facilitator "would have another student who took the class already to come and have a conversation with [her] about what to expect." Another student was left to "sort of just guess on what...to take" and would have preferred more support.

Orienting

Students required access to the required learning materials and needed to become oriented to the online learning environment and course expectations. During the semester prior to conducting this research, MVU had placed a "Unit 0" in each of the students' online courses that helped students become familiar with course expectations and the learning management system (LMS). Sara described the unit as "a slideshow of exactly what to do, how to message [the online teacher], how to access lessons—everything." Sage added that Unit 0 also had to pass an assessment before they could "actually move on to [their] class content." The unit also contained course expectations regarding student behavior, effort, and workload. Bob added, "As far as expectations and requirements go, like plagiarism, cheating, they make sure they hammer that point home, that's not allowed." While Unit 0 appeared to be helpful, Sage found it to be a "little tedious once you've taken multiple classes and you have to do it over and over again."

Students found that Unit 0 reduced their dependency on their online teacher and on-site facilitator. Kacee stated that before Unit 0, "you kind of had to learn it yourself, or [the on-site facilitator] would explain it." While Unit 0 was helpful, students still needed orienting support from their online teacher and on-site facilitator. For instance, Stephanie's on-site facilitator actually "went through some of Unit 0" with her. Online teachers also created course announcements with more course-specific information and video tutorials. While some students found the announcements and video tutorials to be "kind of cool," Cole admitted that he "never read" them.

Students explained that they could email their teacher for orienting support, but the online teacher "wasn't by our side telling us." For that reason, students tended to turn to their on-site facilitator to get help "right away." On-site facilitators also provided students with whole-group direct instruction that showed them "step-by-step how to get online and how to sign in." Brooke shared, "The first classes, he always explains how [the LMS] works. He goes through everything and shows you the steps to use it." Students also explained that their on-site facilitator would set expectations: "being on time, and coming to class, and…maybe doing [work] at home." On-site facilitators also stressed the need to follow the course-provided pacing guide “because otherwise you’re going to regret it later in the semester.”

On-site facilitators proved to be less effective at troubleshooting technological issues that commonly occurred at the start of the semester. For instance, Sage explained that it “took about a week probably to figure out…[how] to get the cameras to hook up to our computers.” However, students tended to turn to their facilitator regardless because it was better “than trying to message my instructor and having to wait a whole day to get a response back.” As a result, students found that “a tech issue can shut you down for the entire day.” Adam advocated for more “on-the-spot tech help.”

Facilitating Communication

Students expressed a wide range of emotions and experiences regarding their interactions with the online teacher. Some students were comfortable contacting their online teachers because “they’re not physically there so it can’t be socially awkward.” Some students, such as Kami, also found that teachers adequately responded to their needs because “you can always message the instructor and get what you need.” Online teachers typically “got back with you within 24 hours.” Sophia did not seem to mind having to wait: “The great thing about online is if you’re having problems with an assignment, you can email your teacher and actually go on to the next assignment depending on what course you take.”

While some students were highly positive when describing their communication with the online teacher, over two-thirds of students’ comments regarding their communication with their online teachers were negative. This was partly because some students struggled communicating via email. Holly explained, “I don't really like communicating email-wise, and that's pretty much all you do. It's something to get used to.” David added that “trying to ask a certain question can get a little tedious.” However, most of students’ frustration and dissatisfaction stemmed from having to wait too long for a response. Jessica explained, “It's kind of frustrating because I also can't skip ahead because it might be something essential that I need to know.” Furthermore, four students shared experiences where their online teacher did not adhere to the 24-hour response time guideline and experienced “three to four days where they didn't respond.” Madalyn added that online teachers’ slow response time made her feel like she was “just bugging them,” so she did not “ask a lot of questions like [she] should.” Overall, students had to learn to “be patient and wait” when communicating with the online teacher.

While students had mixed perceptions and experiences communicating with their online teachers, students were almost entirely positive regarding communication with their on-site facilitators. Unlike emailing the online teacher, which could be time-consuming and “tedious,” students found interactions with the on-site facilitator to be immediate, comfortable, and natural. Landon shared, “You could just walk in their class, ask them a question, and they'll have an answer for you.” Furthermore, students believed their on-site facilitators enjoyed communicating with them. Angela explained, “He is so happy to help all the time… He loves helping in any way he can… I will gladly go to him for help.” The only critique was when students were not learning in a lab setting, making it difficult to communicate with the on-site facilitator because they would “have to go and look around the school for him.” Stella had a unique perspective because she was enrolled in two courses—one required her to work in a lab, and the other allowed her to work in the library when she was “ahead of pace.” She shared, “I go into the library but then it's hard to find [the on-site facilitator] whenever I need to; whereas in the lab, he sits right in front of me and I can ask him anything."

Not only did on-site facilitators effectively communicate with students, they also helped facilitate student-teacher communications. In describing his on-site facilitator, Wyatt shared, "He's very willing to talk with your teacher on your behalf...and so a lot of times he's communicating with our teacher just as much as we are."

Nurturing Caring Relationships

Despite the obstacles to communicating with their online teacher, some students in all eight focus groups indicated they were able to form close, positive relationships with their online teacher. Of the focus group participants, perhaps Beth was able to form the closest relationship with an online teacher:

> I ask my teacher a lot of questions. I email my teacher all the time, trying to schedule stuff and then when I have problems with an assignment, or when I submit an assignment she'll comment on it and be like, "You did really good at this." She asks a lot of questions too, so she'll be like, "Oh, how did you do that?" So we'll email back and forth just about personal stuff, just getting to know each other, just talking about the assignments. That's nice. It's really good to communicate.

Online teachers' self-disclosure seemed to help students see their teacher as "a real person." For example, Stephanie's Spanish teacher would say things such as, "Hey, I can't be teaching today because my daughter's sick," which made Stephanie think, "Oh, he is a real person. He has kids." Kacee added, "My teachers use bitmojis in their announcement boards, so I'm like, 'Oh, they're friendly.'" She also enjoyed it when her teacher facilitated social communication by asking students to participate in "a little discussion board where we told each other what we dressed up as for Halloween and what we're doing for Thanksgiving and Christmas to keep it more social." Kacee believed that the social interactions actually had academic implications "because it makes it a lot easier if you need help, you can just message one of the other students in the course even if they don't go to your school."

However, nearly two thirds of students' comments indicated that their teacher interactions lacked meaningful social interaction. Stella believed that his online teachers "don't interact with you unless they need to." Gina added, "My online teacher doesn't really communicate with me unless I get something wrong." The lack of social interaction made it difficult for students to fully trust their online teacher. Rick summarized, "So you can trust them to be fair with grading the work, but not really in relation to other things." Sandy added that she was less likely to follow the direction of the online teacher because "it's just a stranger telling me that." Some students went as far as saying, "It feels like you're talking to a robot."

While students generally did not feel like they were able to develop positive relationships with online teachers, it is also important to note that some students did not feel a need to. Harper stated that "there isn't much of a need [to build a relationship] beyond grading what you submit." In fact, some students believed that it "might be weird." Sandy shared that she had a teacher who "kept asking us questions about our lives" and would share family photos and give "updates about her life and in the discussion boards sometimes use real life examples." Sandy found attempts at these types of social communication "kind of weird because you've never met them."

Students in one focus group argued that it was more important to form close relationships with their on-site facilitator than with the online teacher because they "see [their facilitator] at least four out of five days a week" whereas they could "go the entire year without having to email or talk to [their online teacher]." Furthermore, they acknowledged that their relationships with on-site facilitators were more important because they saw them throughout their high school years, "whereas every online class has a different teacher." In reference to her relationship with the online teacher, Sandy asked, "What's the point of building the relationship? They're not really going to get to know you that well and you're not going to have them possibly ever again."

Students found they were able to form "way better" relationships with their on-site facilitator because they regularly communicated face-to-face. Roger shared, "[My on-site facilitator] walks around all day talking to all different kids about how we're doing even outside of our class, so he tries to get to know everyone to build trust with them." Similarly, Sage stated that her communication with her facilitator was not "superficial...he'll actually ask, 'How is your day going?' and he'll actually mean it." Furthermore, Levi found that, "Everyone likes [the facilitator] because he just connects to you on a personal level and he doesn't care who you are, how popular you are, whatever." Cynthia added that on-site facilitators could recognize non-verbal cues and know when she was "having an off day at school and they'll come talk to me but with online [teachers] they can't see and so they don't know that." Over time students explained that they formed close, caring relationships due to facilitators' friendly and positive demeanor. For instance, students at one school stated that their on-site facilitator was "very, very personal," "super friendly," and "one of the nicest faces here." Another student went as far to say, "I definitely feel like he's my friend but also my [facilitator]."

Monitoring and Motivating

Some students believed that teachers regularly monitored their progress in the course. John explained, "I feel like they monitor your grades as much as a normal teacher would--they have to. A major part of their job is just grading the work." Madalyn recalled that her online teacher would send her "progress reports every couple of weeks" and would email her when her "grades are getting low or anything." In contrast to Madalyn's experience, some students did not believe that their online teacher monitored their progress because teachers did not contact or try to motivate them when they had fallen behind. For instance, Raymond was "getting a fairly good grade" and did not receive personalized emails about his progress. Similarly, Rick admitted that "he just kind of forgot that [he] had the class" and did not hear from his teacher until the middle of the semester. The experience made him ask, "Does [my online teacher] even know that I'm not doing it at that moment?" Similarly, Sharron recalled turning in work after being four weeks behind: "The instructor didn't care [that I had fallen behind], they just graded everything and were like, 'good work' but nothing was mentioned of it, that I even fell that far behind."

When one student stated that online teachers monitored students' progress more than face-to-face teachers, Sara countered, "I feel like they monitor our grades maybe more, but I feel like they care less about what the grade is." Similarly, Sandy stated, "I don't really get a lot of motivation from my actual teacher." Even when online teachers recognized students' progress and sent students motivational messages, their efforts appeared to have little impact on students. Rick found that encouraging statements such as "You're doing good," felt "more like a set response than a motivator." Madalyn added that teachers could be more motivational if they "have better communication skills."

In contrast, students believed their on-site facilitator closely monitored their progress and effectively motivated them to more fully engage in learning activities. Students shared that their on-site facilitator also met with them regularly to discuss their progress. Beth stated, "Every Friday, [my facilitator]… comes by you and says, "Hey, you're here. You have this percent so you have this and this and this due to get [caught] up." Cole elaborated that these meetings did not need to be long, "He'll just call you up for a minute, 'So how's it going? You're working on your course.' He always checks in." Kacee added, "Even though you think it's irritating, [my facilitator] will pull you out of other classes to see how you're doing." Adam, who admitted that he was "not responsible enough to check [his progress] for [him]self," appreciated the "helpful checkups" with his on-site facilitator because they helped to "make sure that [he was] up to date."

Students also found that facilitators effectively motivated them to more fully engage in learning activities. In part, this motivation was a result of their relationship with the on-site facilitator. Bob shared, "Since he is so invested in our lives...you respect him in that way. You also want to do your work, just naturally want to do it." Facilitators also used a combination of rewards and punishments to engage students. Students explained that their facilitator would "get on your case" when they were behind, but also "gives you incentives." For instance, Angela shared that if you are caught up in the course "you can leave, you have freedom...but if you're behind you have to stay back and catch up." At times facilitators also contacted parents to motivate students because "parents don't really check on there to see [their students' grades]." Kacee said that she was unaware that her facilitator had contacted her parent until she went home and her mom said, "Go do your online [course.]... I know you're behind…. Do it at the kitchen table." While a few "really self-motivated" students claimed that their facilitator's efforts were unnecessary, most students valued their motivational efforts.

On-site facilitators seemed to be especially effective at monitoring and motivating students because the majority of students were required to attend a daily lab time. Several focus group participants reported that they believed lab time was important and often integral to student success. Cynthia explained:

> I think it's important for you to have a set amount of time to work on your class. If you're not a self-motivated person, then [lab time] is set right there for you. Maybe it's not perfect for everybody. For me it's really good. I might not have time at home to do it, so then I have time at school.

Stephanie believed

> The lab is good because you're under the eyes of the facilitator and your fellow classmates. You just kind of feel the drive to be like, "Oh, I need to be working on it." It helps you stay focused on what you need to be getting done.

Raymond reiterated that "sociologically speaking, seeing other people doing their work makes you want to. It's just that peer to peer thing...you naturally follow along."

Attending a lab with other students could also prove distracting, and on on-site facilitators were required to manage students' behavior to ensure they remained on-task. Katie explained, "If you're sitting in there playing on your phone, then he'll come up and approach you." According to Sage, "Having a facilitator or a teacher around, ...it's quieter [and] eliminates a lot of distractions." Charles said, "We usually keep quiet and have everybody learn their own stuff," but when there were distractions, the "facilitator [would] tell them to be quiet and focus."

Instructing

While working on assignments, students commonly required content support. Bob explained, "[Online teachers] definitely offer their help. It's definitely there if you need it." Cynthia was enrolled in a sign language course and found that the teacher did "a good job of explaining things" and "would change her directions to make them more clear for [her students]." However, few students actually shared times when they received content-related support prior to submitting an assignment. Raymond, who was enrolled in a pre-calculus course, found it difficult to ask the online teacher via email specific questions about "how to solve x equation," so his "first course of action would either be to look up a YouTube video on how to solve the equation, maybe ask a peer,...or go ask one of the math teachers down the hallway." Lisa also recalled that a friend enrolled in a language course had "to look up different apps to learn the language," because "the guide that [the online teacher] gave them does not really help." At the time Lisa remembered thinking to herself, "Um, I'm pretty sure the instructor is supposed to do that [for you]."

The majority of teachers' instructional support appeared to have come in the form of feedback. Nolan explained that the feedback he received was especially helpful because it helped him "know what to work on for [his] next assignment." Similarly, Alexis found that when she submitted papers, the online teacher gave her "really specific instructions on how to do better and how to include information in a different way." Rick added that the critical feedback he received was delivered in a "really positive" manner, "It's not, 'You did this wrong, fix it immediately.' It's more of, 'Here's how you did it wrong. I can see what you were going for and how that works, but it works better this way.'" Some teachers went as far as providing students with feedback via audio or video recordings. Brooke shared, "For my sign language course she leaves video comments and tells me what to fix, and that's really helpful so I know how to do it better."

While most of the students' comments were positive, they also found that teachers could vary greatly in the quality and quantity of their feedback. Angela stated,

> I feel like each class is different because with one of my classes my teacher gives me like, "You did good on this, but you can work on this for your next assignment," but then my other class they don't give you anything, so you don't know what to improve upon.

Brooke also expressed frustration because she "didn't get anything back [on her] writing assignments so [she] didn't know if they were good or bad." Other students found that they received high or perfect scores and generic "Good job!" comments even when they put very little effort into the assignment, making them question how closely teachers actually read their work. For instance, Alexis' teacher told her "Great job!" and gave her "100%" on papers she believed she "did terrible on." Holly summarized, "There's definitely big extremes between the feedback."

While they were not content experts, students in two focus groups stated that their on-site facilitators occasionally assisted students on projects. For instance, Madalyn's on-site facilitator would review her work in a finance course to "make sure [she would] have the answers right" before she turned them in. Beth described witnessing her peer who "struggles with math all the time" receive regular support from the on-site facilitator, which resulted in her "getting [a] 100%." Angela said, "I will email my instructor...it just takes days," so she seeks help from her on-site facilitator as well because "he usually helps me until we figure out a solution."

Discussion

Graham, Henrie, and Gibbons (2014) stated, "Well-established scholarly domains have common terminology and widely accepted models and theories that guide inquiry and practice, while researchers in less mature domains struggle to define terms and establish relevant models" (p. 13). Widely accepted frameworks have been established in higher education and initial work has begun to establish frameworks in K-12 online learning. However, limited efforts have been made to develop frameworks and theory for blended learning environments in either higher education or K-12 environments (Graham et al., 2014). Specifically, in K-12, researchers have tended to focus mostly on ways that blended learning is structured and less on the types of learning and teaching strategies that occur in those structures (see Staker, 2011). While the online-lab model is similar to fully-online courses, the addition of face-to-face support results in important differences that limit the utility of online learning frameworks. For instance, the Theory of Transactional Distance's concepts of structure and autonomy tends to focus on students' ability to make decisions regarding "what to learn, how to learn, and how much to learn" (Moore, 2007, p. 90)—what is commonly referred to as the learning path in blended learning literature (Staker, 2011). Blended learning also takes a broader view of autonomy that includes students' learning time, place, and pace (Staker, 2011).

There was little evidence that students in our research had autonomy in their learning path and the learning activities and sequence appeared to be fairly set. In fact, our previous research at MV found that online teachers were not allowed to modify the courses even if they recognized that they did not meet individual students' needs (Borup & Stimson, 2019). The local schools included in this research also somewhat restricted students' ability to exercise autonomy over their learning time and place by requiring them to attend a daily lab. Furthermore, facilitators attempted to exert some control over students' learning pace by closely monitoring their progress and intervening when students lagged behind the pacing guide. Moore (1980) stated that "a learner cannot learn effectively if the educational transaction demands more autonomy than he is able to exercise" (p. 29). While Moore was largely speaking of autonomy over their learning path, the same could be applied to students' ability to exercise autonomy over their learning place, time, and pace. Moore also hypothesized an inverse relationship between structure and dialogue. This holds true when focusing on students' learning path. However, we found that student-facilitator dialogue likely increased as a result of adding structure to students' learning time, place, and pace. As a result, those who apply the Theory of Transactional Distance to blended learning environments should take a broader, more nuanced view of structure, dialogue, and autonomy than what was originally outlined in the framework.

For the first research question, the ACE framework proved helpful in identifying the types of support indicators that students perceived receiving. This research supports the addition of the constructs advising and orienting to the ACE framework. Merriam (1998) explained that the primary purpose of qualitative research is not to "test concepts, hypotheses, and theories" (p. 45). Rather, as Stake (2010) stated, qualitative research is best at understanding "how things work" (p. 16). However, just because a type of support is occurring does not mean that it should be included in a framework. Whetten (1989) explained that researchers may feel a tension between developing a comprehensive framework and one that is more parsimonious. Ferdig, Cavanaugh, DiPetro, Black, and Dawson (2009) also stressed that K-12 online learning researchers should attempt to highlight best practices—not all practices—and that a complete list would actually prove too distracting. In fact, Mishra and Koehler (2006) wrote that one of the primary purposes of a framework is to help researchers focus on what is most important and to ignore others. To this point, Whetten (1989) explained that a framework is complete not when it includes *all* factors but when it contains the *right* factors. While adding the constructs of advising and orienting increases the complexity of the ACE framework, they appear important enough to warrant their addition.

Orienting students to the online environment could be viewed as a type of instructing, however, it is distinct enough to warrant being its own construct for two reasons. First, the construct of instructing focuses largely on learning the course content and the construct of orienting focuses largely on learning the course platforms, procedures, and expectations. In other words, orienting is focused on helping students "learning how to learn online" whereas instructing focuses on helping students "to learn a subject online" (Lowes & Lin, 2015, p. 18). Second, by its nature, orienting occurs at the start of the course while instructing occurs once students have begun the course assignments. While it was not originally included in the ACE framework, orienting should not be overlooked by researchers because students' inability to effectively use the platform used to deliver the online course can prove to be a major obstacle to effectively interacting with the course materials, peers, and instructor (Hillman et al., 1994).

Although advising students regarding online enrollments occurs before the start of the course, quality advising can help students to avoid or prepare for challenges they will face in online courses. While advising can include encouraging or discouraging students to enroll in online courses based on their ability, Rose et al. (2015) warned that this type of advising could result in unintentional biases. Instead, Rose et al. recommended that advising should focus more on identifying the types of support that students require. For instance, one type of support that can be offered to students is the opportunity to learn in a lab setting in the presence of an on-site facilitator. In this research, being physically present with students on a regular basis seemed to help on-site facilitators to fulfil their other responsibilities. This may help to explain why research has found that students are more likely to be successful when they learn in a lab setting (Roblyer et al., 2008). The schools included in this research required the large majority of their students to attend a daily lab. Other schools may take a more personalized approach and only require lab attendance when students lack the skills to successfully exercise autonomy over their learning time and place. Schools may choose to require students to attend a lab environment when they are new to online learning but then provide them with more flexibility once they have demonstrated their ability to successfully learn online. Inversely students could be required to begin attending a lab when their performance is inadequate. This more personalized approach could have two benefits. First, it may be a better use of the available resources by focusing on those students who need it most. Second, it may allow students to develop the self-regulation skills they would need when exercising control over their learning place and time.

Not all of the support responsibilities were equally shared across on-site facilitators and teachers. In part, teachers assumed certain responsibilities due to their content and pedagogical expertise whereas on-site facilitators assumed certain responsibilities due to their physical proximity to students. This type of support model works best when online teachers and on-site facilitators coordinate their efforts and clearly understand the scope of their responsibilities (de la Varre et al., 2011). Specifically, de la Varre et al. (2011) recommended that there be an "in-depth instructor-facilitator conversation at the outset of the course" (para. 26). However, in practice it is likely impractical for online teachers to have in-depth conversations with all of their students' facilitators or for an on-site facilitator who works with a large number of students to have in-depth conversations with all of their students' instructors. A more pragmatic and scalable approach would be for the course provider to provide online teachers and on-site facilitators with clear expectations for what they should and should not do. For instance, MV provides online teachers and on-site facilitators with detailed guides pertaining to their responsibilities. However, guides are unlikely to provide online teachers or on-site facilitators with the support required to develop the skills needed to effectively fulfill their responsibilities. Practitioners and researchers should collaborate to identify effective approaches to professional development (Dawson & Dana, 2018). Researchers have already found that students who work with facilitators who have completed extended, scenario-based professional development tended to be more successful than students who worked with facilitators who received no professional development (Hannum et al., 2008). Considering their shared responsibilities, we also recommend that programs explore strategies that allow online teachers and on-site facilitators to participate in professional development jointly so that they have opportunities to communicate one with another and better understand each other's challenges, concerns, and needs.

When addressing the second research question, we found that students did not value their online teachers' and on-site facilitators' support efforts equally across all support indicators. For instance, students valued building relationships with their on-site facilitator more than with their online teacher. Research findings examining student-teacher relationships have been mixed. Similar to this research, Hawkins, Barbour, and Graham (2011) examined student-teacher relationships at a state-run virtual school where teachers reported little social interaction with students. Hawkins et al. (2011) found that teachers believed social interactions would be a "waste of students' time" (para. 42) especially in light of their high student loads. Larkin, Brantley-Dias, and Lokey-Vega (2015) conducted a survey to measure 108 online teachers' satisfaction on five aspects of their job. Teachers ranked their interactions with students the lowest while also having the highest standard deviation, indicating that teachers are more divided on their satisfaction with their student communication than they are with other aspects of their job. In a previous study, online teachers at MV shared several strategies they regularly employed to develop relationships with students. Ultimately, they found that their ability to generally develop relationships with students to be limited, and several found teaching online to be a "solitary business" (Borup & Stimson, 2019, p. 37). Similarly, Hawkins, Graham, and Barbour (2012) found that a lack of meaningful student-teacher relationships left teachers feeling isolated and disconnected. Inversely, research has found that developing student-teacher relationships improved teachers' job satisfaction at a full-time online high school (Borup & Stevens, 2016a; Drysdale, Graham, & Borup, 2016). Furthermore, Lin, Zhang, and Zheng's (2017) analysis of 466 online students' survey responses at a virtual high school found that learner-instructor interactions had a positive relationship with student satisfaction. While not generally the case with the students who participated in our research, previous research at full-time online high schools has found that online teachers were successful in forming close relationships with students through regular, sustained online communication. In fact, teachers and students have reported that these relationships can actually feel closer than the relationships formed in face-to-face learning environments (Velasquez et al., 2013a; Velasquez et al., 2013b).

While some students found their online teachers to be impersonal, they still valued the support they were able to provide. One student explained, "[Online teachers] are robots that help me." The teacher support that was the most valued was feedback on assignments. However, not all feedback was helpful. At times students viewed simple, generic feedback comments on larger projects as an indicator that the teacher had not actually reviewed their project. This was especially true when they put little effort on a project and still received "100%" and a "Great job!" In contrast, some students reported receiving detailed, helpful feedback via audio or video recordings, a practice that has been researched in higher education (Borup, West, & Thomas, 2015; West, Jay, Armstrong, & Borup, 2017) but has yet to be examined in K-12 online learning environments. Feedback has been shown to be a critical component in students' learning (Hattie, 2009). However, as supported in this research, Hattie found that "some types of feedback are more powerful than others" (p. 174). Murphy and Rodriguez-Manzanares (2009) highlighted a connection between feedback and motivation for K-12 online students, "Detailed, quality, frequent and prompt feedback are the number one motivator" (p. 9). The opposite also appeared true in our research, where students interpreted poor feedback as a sign that the teacher did not care about them or their learning. Despite its importance, little is actually known regarding teacher feedback practices. Eraut (2006) summarized that "we need more feedback on feedback" (p. 118). This is especially true in K-12 online settings and researchers should use a variety of methods to address this gap. For instance, researchers can conduct interviews with students and teachers as well as analyze actual feedback comments to determine their utility and timeliness. Programs should also provide professional development focused on providing effective feedback.

Students also found that they were unable to receive tutoring or technological support from their online teacher in the moment they needed it. Furthermore, they found it difficult to ask some types of questions via email. As a result, students commonly turned to their on-site facilitator, peers, teachers in their building, or online videos for assistance. However, students still wished they had more "on-the-spot" support from teachers. For subjects such as math, where students must master specific skills before progressing to more advanced skills, online programs may improve students' learning experience by providing them with content experts who could give just-in-time instruction. The need for more immediate instruction helps explain why on-site facilitators in previous research frequently provided students with content support (Barbour & Hill, 2011; de la Varre et al., 2011; Taylor et al., 2016). However, some online teachers can become frustrated when on-site facilitators provide content support, especially when they are not knowledgeable enough to provide accurate information (de la Varre et al., 2011). It is unrealistic to expect online teachers to always be available to students, especially in online programs that rely heavily on part-time teachers who teach face-to-face full-time during the day. As a result, supplemental online programs and researchers may explore practical strategies for providing students with more immediate content-related support. One potential solution in subjects such as math is to have on-call tutors for students to contact when questions arise similar to tech support call centers.

Students also found that on-site facilitators were especially helpful when they closely monitored students' progress and motivated them to more fully engage in learning activities. Facilitators were especially proactive at personally meeting with students to discuss their progress and at times even pulling them out of another class to do so. In contrast, students believed their online teachers regularly checked their progress but tended not to reach out to them or show any concern when they became inactive in the course. This left some students feeling like their online teacher was not invested in their learning and did not care if they were successful or not. One student shared, "I feel like they monitor our grades maybe more, but I feel like they care less about what the grade is." Student emotions and motivation are strong predictors of K-12 online student success (Kim, Park, & Cozart, 2013). In fact, Roblyer et al. (2007) argued that student success in online courses has more to do with motivation than with their actual ability to understand the content. As a result, "facilitators that are directly working with students day by day are key to the success of the program" (Roblyer et al., 2007, p. 11). More research is needed that examines students' affective engagement and the types of interactions that best form caring relationships with students.

Conclusion

Online courses tend to have higher attrition rates than face-to-face counterparts, causing some to call for more expensive student support systems (de la Varre et al., 2014; Freidhoff, 2018; Taylor et al. 2016). While learning the actual course content can prove challenging, more frequently it appears that the flexible nature of online learning is most daunting for adolescents who tend to lack self-regulation abilities (Cavanaugh, 2007; Moore, 1993, 2007; Rice, 2006; Weil et al., 2013). Moore (1980) warned that "a learner cannot learn effectively if the educational transaction demands more autonomy than he is able to exercise" (p. 29). Roblyer et al. (2007) explained, "Students' ability to handle distance education courses appears to depend more on motivation, self-direction, or the ability to take responsibility for individual learning" (p. 11). As a result, many students are failing online courses, not because they cannot learn the course content but because they cannot efficiently "learn now to learn online" (Lowes & Lin, 2015, p. 18). Many programs now require that students' local brick-and-mortar schools provide them with on-site facilitators. Little is known about how students perceive the support they receive from their online teachers and on-site facilitators. In this research we found that students received a high level of support from both online teachers and on-site facilitators, with most of the support coming from the latter. This is in part because students felt somewhat uncomfortable communicating with teachers via email and became frustrated when having to wait a day—and at times much longer—for a response. Students also appeared to be more comfortable communicating with their on-site facilitators face-to-face and found them to be more accessible. One student explained that it was "easier to ask someone in person." Students explained that they were comfortable communicating with their on-site facilitators because they were able to develop caring relationships with them through regular, sustained communication that often included social and personal topics. In contrast, students' communication with their online teacher tended to focus mostly on course content. In fact, when teachers did share personal information or tried to get to know students on a personal level, their efforts were appreciated by some while others thought that it was "kind of weird because you've never met them." Students also tended to see less value in forming relationships with their online teacher because those relationships ended with the course, whereas their relationships with the facilitator would extend further—possibly through all of their high school years. However, students still lamented that their online instructors felt more like "robots" than humans. Murphy and Rodriguez-Manzanares (2009) also recognized this issue and explained that teachers should work to establish a "personal connection, so students understand that there is a person behind the computer and not a robot" (p. 8).

It is important to note that the three local brick-and-mortar schools sampled in this research were purposefully selected based on their high student pass rates and their impressive levels of on-site facilitator engagement. Research has found that on-site facilitator engagement can vary greatly across schools; thus, the findings from this research cannot be generalized to other settings. On-site facilitators in this research were highly engaged and successful at developing close, caring relationships with students, which likely reduced students' perceived need to also develop similar relationships with their teachers. In cases when students have not developed close relationship with on-site facilitators, they may feel more of a desire to develop a relationships with the online teacher. As a result, additional research is needed that examines student-teacher relationships—

especially from the student perspective—in various settings including supplemental online programs where students are not provided an on-site facilitator or where students' facilitators are not as highly engaged in their learning. It is also possible that online teachers prioritized their efforts to develop relationships with students in schools with less engaged facilitators. More research examining teachers' perceptions and strategies would provide additional insights. Future research should also use different methods such as direct observations and one-on-one interviews. While difficult, these type of research efforts could provide important insights into how students receive and perceive the support that is—or is not—offered to them and provide a better understanding of the strategies and skills that online teachers and on-site facilitators need to understand and develop in order to lower online course attrition rates.

References

Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, *5*(2), 1–17.

Archambault, L., Kennedy, K., Shelton, C., Dalal, M., McAllister, L., & Huyett, S. (2016). Incremental progress: Re-examining field experiences in K-12 online learning contexts in the United States. *Journal of Online Learning Research*, *2*(3), 303-326.

Barbour, M. K., & Hill, J. (2011). What are they doing and how are they doing it? Rural student experiences in virtual schooling. *Journal of Distance Education*, *25*(1). Retrieved from http://www.jofde.ca/index.php/jde/article/view/725/1248

Barbour, M. K., & Mulcahy, D. (2004). The role of mediating teachers in Newfoundland's new model of distance education. *The Morning Watch*, *32*(1). Retrieved from http://www.mun.ca/educ/faculty/mwatch/fall4/barbourmulcahy.htm

Barbour, M. K., & Mulcahy, D. (2009). Beyond volunteerism and good will: Examining the commitment of school-based teachers to distance education. In Annual Conference of the Society for Information Technology and Teacher Education.

Borup, J. (2018). On-site and online facilitators: Current and future direction for research. In K. Kennedy and R. Ferdig (Eds.), *Handbook of research on K-12 online and blended learning (2nd ed.).* (pp. 423-442). ETC Press. Retrieved from: http://repository.cmu.edu/etcpress/82/

Borup, J., Graham, C. R., & Drysdale, J. (2014). The nature of online teacher engagement at an online high school. *British Journal of Educational Technology, 45,* 793-806. doi: 10.1111/bjet.12089

Borup, J. & Stevens, M. (2016a). Factors influencing teacher satisfaction at an online charter school. *Journal of Online Learning Research*, *2*, 3-22.

Borup, J. & Stevens, M. (2016b). Parents' perceptions of teacher support at a cyber charter high school. *Journal of Online Learning Research. 2*, 227-246. Retrieved from: http://www.learntechlib.org/p/173212

Borup, J. & Stevens, M. (2017). Using student voice to examine teacher practices at a cyber charter high school. *British Journal of Educational Technology, 48*, 1119-1130.

Borup, J. & Stimson, R. (2017). Helping online students be successful: Mentor responsibilities. Lansing, MI: Michigan Virtual Learning Research Institute. Retrieved from: http://media.mivu.org/institute/PDF/helping-students-mentors-responsibilities.pdf

Borup, J. & Stimson, R. (2019). Responsibilities of online teachers and on-site facilitators in online high school courses. *American Journal of Distance Education*. *33*(1), 29-45. https://doi.org/10.1080/08923647.2019.1554984

Borup, J., West, R. E., Graham, C. R., & Davies, R. S. (2014). The Adolescent Community of Engagement: A framework for research on adolescent online learning. *Journal of Technology and Teacher Education*, *22*(1), 107–129.

Borup, J., West, R. E., & Thomas, R. A. (2015). The impact of text versus video communication on instructor feedback in blended courses. *Educational Technology Research and Development, 63*, 161-184. doi :10.1007/s11423-015-9367-8

Borup, J., West, R. E., Thomas, R. A., Graham, C. R. (2014). Examining the impact of video feedback on instructor social presence in blended courses. *The International Review of Research in Open and Distance Learning*, *15*, 232-256.

Cavanaugh, C. (2007). Student achievement in elementary and high school. In M. G. Moore (Ed.), *Handbook of distance education* (2nd ed., pp. 157–168). Mahwah, NJ: Lawrence Erlbaum Associates.

Dawson, K. & Dana, N. F. (2018). Professional development for K-12 online teachers. In K. Kennedy and R. Ferdig (Eds.), *Handbook of research on K-12 online and blended learning (2nd ed.)*. (pp. 247-260). ETC Press. Retrieved from: http://repository.cmu.edu/etcpress/82/

de la Varre, C., Irvin, M. J., Jordan, A. W., Hannum, W. H., & Farmer, T. W. (2014). Reasons for student dropout in an online course in a rural K–12 setting. *Distance Education*, *35*(3), 324–344. https://doi.org/10.1080/01587919.2015.955259

de la Varre, C., Keane, J., & Irvin, M. J. (2011). Dual perspectives on the contribution of on-site facilitators to teaching presence in a blended learning environment. *Journal of Distance Education*, *25*(3). Retrieved from http://www.jofde.ca/index.php/jde/article/viewArticle/751/1285

Drysdale, J. S., Graham, C. R., & Borup, J. (2016). Teacher and student perspectives on facilitating a sense of community through an online high school's "shepherding" program. *International Journal of E-Learning*, *15*(2), 149–178.

Eraut, M. (2006). Feedback. Learning in Health and Social Care, *5*, 111–118. https://doi.org/doi:10.1111/j.1473-6861.2006.00129.x

Evergreen Educational Group. (2017). Keeping pace with K-12 online learning 2016. Evergreen Education Group. Retrieved from http://www.kpk12.com/wp-content/uploads/EEG_KP2016-web.pdf

Freidhoff, J. R. (2018). Michigan's k-12 virtual learning effectiveness report: 2016-17. Lansing, MI: Michigan Virtual University. Available from: https://mvlri.org/research/effectiveness-report/

Freidhoff, J. R., Borup, J., Stimson, R. J., & DeBruler, K. (2015). Documenting and sharing the work of successful on-site mentors. *Journal of Online Learning Research*, *1*(1), 107–128.

Ferdig, R. E., Cavanaugh, C., DiPietro, M., Black, E., & Dawson, K. (2009). Virtual schooling standards and best practices for teacher education. *Journal of Technology and Teacher Education*, *17*(4), 479–503.

Garrison, R. (2009). Implications of online learning for the conceptual development and practice of distance education. *Journal of Distance Education*, *23*(2), 93–104.

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2*(2–3), 87–105. https://doi.org/10.1016/S1096-7516(00)00016-6

Glaser, B. G. (1965). The constant comparative method of qualitative analysis. *Social Problems*, *12*(4), 436–445. Retrieved from http://www.jstor.org/stable/798843

Graham, C. R., Henrie, C. R., & Gibbons, A. S. (2014). Developing models and theory for blended learning research. In A. G. Picciano, C. D. Dziuban, & C. R. Graham (Eds.), *Blended learning: Research perspectives, volume 2* (pp. 13–33). New York, NY: Taylor & Francis.

Hannum, W. H., Irvin, M. J., Lei, P., & Farmer, T. W. (2008). Effectiveness of using learner-centered principles on student retention in distance education courses in rural schools. *Distance Education*, *29*(3), 211–229. https://doi.org/10.1080/01587910802395763

Harms, C. M., Niederhauser, D. S., Davis, N. E., Roblyer, M. D., & Gilbert, S. B. (2006). Educating educators for virtual schooling: Communicating roles and responsibilities. *The Electronic Journal of Communication, 16*(1 & 2).

Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Routledge, New York.

Hawkins, A., Barbour, M. K., & Graham, C. R. (2011). Strictly business: Teacher perceptions of interaction in virtual schooling. *The Journal of Distance Education, 25*(2).

Hawkins, A., Barbour, M. K., & Graham, C. R. (2012). "Everybody is their own island": Teacher disconnection in a virtual school. *The International Review of Research in Open and Distance Learning, 13*(2), 124–144.

Hendrix, N., & Degner, K. (2016). Supporting online AP students: The rural facilitator and considerations for training. *American Journal of Distance Education*, *30*(3), 133–144. https://doi.org/10.1080/08923647.2016.1198194

Hillman, D. C., Willis, D. J., & Gunawardena, C. (1994). Learner-interface interaction in distance education: An extension of contemporary models and strategies for practitioners. *American Journal of Distance Education, 8*(2), 30–42.

Irvin, M. J., Hannum, W. H., Farmer, T. W., de la Varre, C., & Keane, J. (2009). Supporting online learning for advanced placement students in small rural schools: Conceptual foundations and intervention components of the facilitator preparation program. *The Rural Educator*, *31*(1), 29–37.

Keane, J., de la Varre, C., Irvin, M. J., & Hannum, W. (2008). Learner-centered social support: enhancing online distance education for underserved rural high school students in the United States. In N. Whitton & M. McPherson (Eds.), *Rethinking the Digital Divide: Research Proceedings of the 15th Association for Learning Technology Conference* (ALT-C 2008) (pp. 39–48). Retrieved from http://repository.alt.ac.uk/435/1/ALT_C_2008_rp_keanej_delavarrec_irvinm_hannumw.pdf

Kim, C., Park, S. W., & Cozart, J. (2013). Affective and motivational factors of learning in online mathematics courses. *British Journal of Educational Technology*, n/a-n/a. https://doi.org/10.1111/j.1467-8535.2012.01382.x

Larkin, I. M., Brantley-Dias, L., & Lokey-Vega, A. (2015). Job satisfaction, organizational commitment, and turnover intention of online teachers in the K-12 setting. *Online Learning*, *20*(3), 26–52.

Lin, C., Zheng, B., & Zhang, Y. (2017). Interactions and learning outcomes in online language courses. *British Journal of Educational Technology*, *48*(3), 730–748. https://doi.org/10.1111/bjet.12457

Lowes, S., & Lin, P. (2015). Learning to learn online: Using locus of control to help students become successful online learners. *Journal of Online Learning Research*, *1*(1), 17–48.

Merriam, S. B. (1998). *Qualitative research and case study applications in education: Revised and expanded from case study research in education*. San Francisco, CA: Jossey-Bass.

Michigan Department of Education. (2014). 5-O-A: Virtual learning, distance learning, & independent study. In *Pupil accounting manual* (pp. 5-O-A-1 – 5-O-A-5). Lansing, MI. Retrieved from http://mi.gov/documents/5O-VirtualHS-DistLearn- ing_41466_7.pdf

Michigan Public Act § No. 60. (2013). Retrieved from http://www.legislature.mi.gov/documents/2013-2014/publicact/htm/2013-PA-0060.htm

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, *108*(6), 1017–1054.

Moore, M. G. (1980). Independent study. In R. D. Boyd & J. Apps (Eds.), *Redefining the discipline of adult education* (pp. 16–31). San Francisco, CA: Jossey Bass.

Moore, M. G. (2007). The theory of transactional distance. In M. G. Moore (Ed.), *Handbook of distance education* (2nd ed., pp. 89–105). Mahwah, NJ: Lawrence Earlbaum Associates.

Moore, M. G. (1993). Theory of transactional distance. In D. Keegan (Ed.), *Theoretical principles of distance education* (pp. 22–28). New York, NY: Routledge.

Murphy, E., & Rodríguez-Manzanares, M. A. (2009). Teachers' perspectives on motivation in high school distance education. *Journal of Distance Education, 23*(3), 1–24.

O'Dwyer, L. M., Carey, R., & Kleiman, G. (2007). A study of the effectiveness of the Louisiana algebra I online course. *Journal of Research on Technology in Education, 39*(3), 289–306.

Oviatt, D. R., Graham, C. R., Borup, J., & Davies, R. S. (2018). Online student use of a proximate community of engagement in an independent study program. *Online Learning, 22*(1), 223–251. https://doi.org/10.24059/olj.v22i1.1153

Rice, K. L. (2006). A comprehensive look at distance education in the K-12 context. *Journal of Research on Technology in Education, 38*(4), 425–449.

Rice, M. F., & Carter, R. A. (2016). Online teacher work to support self-regulation of learning in students with disabilities at a fully online state virtual school. *Online Learning, 20*(4), 118–135.

Roblyer, M. D., Davis, L., Mills, S. C., Marshall, J., & Pape, L. (2008). Toward practical procedures for predicting and promoting success in virtual school students. *American Journal of Distance Education,* 22(2), 90–109.

Roblyer, M. D., Davis, L., Mills, S. C., Marshall, J., & Pape, L. (2008). Toward practical procedures for predicting and promoting success in virtual school students. *American Journal of Distance Education, 22*(2), 90–109.

Roblyer, M. D., Freeman, J., Stabler, M., & Schneidmiler, J. (2007). External evaluation of the Alabama ACCESS initiative phase 3 report. Eugene, OR: International Society for Technology in Education. Retrieved from http://accessdl.state.al.us/2006Evaluation.pdf

Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (2001). Assessing social presence in asynchronous text-based computer conferencing. *Journal of Distance Education, 14*(2), 51–70. Retrieved from http://www.jofde.ca/index.php/jde/article/view/153/341

Rose, R. M., Smith, A., Johnson, K., & Glick, D. (2015). Ensuring equitable access in online and blended learning. In T. Clark & M. K. Barbour (Eds.), *Online, blended, and distance education in schools: Building successful programs* (pp. 71–83). Sterling, VA: Stylus Publishing.

Stake, R. E. (2010). *Qualitative research: Studying how things work*. New York, NY: Guilford Press.

Staker, H. (2011). The rise of K-12 blended learning: Profiles of emerging models. Innosight Institute. Retrieved from http://www.christenseninstitute.org/wp-content/uploads/2013/04/The-rise-of-K-12-blended-learning.emerging-models.pdf

Taylor, S., Clements, P., Heppen, J., Rickles, J., Sorensen, N., Walters, K., … Micheiman, V. (2016). Getting back on track the role of in-person instructional support for students taking online credit recovery: Research brief 2. Washington, D.C.: American Institutes for Research. Retrieved from http://www.air.org/system/files/downloads/report/Role-of-In-Person-Instructional-Support-Online-Credit-Recovery-Algebra-April-2016.pdf

Thomas, R. A., West, R. E., & Borup, J. (2017). An analysis of instructor social presence in online text and asynchronous video feedback comments. *Internet and Higher Education*, *33*, 61-73.

Velasquez, A., Graham, C. R., & West, R. E. (2013). An investigation of practices and tools that enabled technology-mediated caring in an online high school. *The International Review of Research in Open and Distance Learning*, *14*(5), 277–299. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/1465/2758

Velasquez, A., Graham, C. R., & Osguthorpe, R. D. (2013). Caring in a technology-mediated online high school context. *Distance Education, 34*(1), 97–118. https://doi.org/10.1080/01587919.2013.770435

Weil, L. G., Fleming, S. M., Dumontheil, I., Kilford, E. J., Weil, R. S., Rees, G., … Blakemore, S. (2013). The development of metacognitive ability in adolescence. *Consciousness and Cognition*, *22*(1), 264–271. https://doi.org/10.1016/j.concog.2013.01.004

West, R., Jay, J., Armstrong, M., & Borup, J. (2017). "Picturing them right in front of me": Guidelines for implementing video communication in online and blended learning. *TechTrends, 61,* 461-469. Accessible at http://rdcu.be/tRrA

Whetten, D. A. (1989). What constitutes a theoretical contribution? *The Academy of Management Review, 14*(4), 490–495. https://doi.org/10.2307/258554

Investigating the Impact of Online Classes on Undergraduate Degree Completion

Sharon Wavle and Gamze Ozogul
Indiana University

Abstract
This study expands on current research that examines the impact of online courses on retention, degree completion, and student success. The researchers investigated the impact of online courses on degree completion by using existing graduation rate data, course enrollment data, and student grades for undergraduate students at a multicampus 4-year institution. The researchers aimed to provide advisors, faculty, and administrators with a better understanding of how online classes fit into an undergraduate student's program of study while completing their degrees within the desired time frame. The researchers additionally sought to understand the impact of taking online classes on degree completion while controlling for student demographic and academic factors (e.g., age, first-generation student status, socioeconomic status, SAT/ACT scores, and first semester GPA) and campus type (traditional flagship, urban research, and regional). Results indicated that, regardless of campus type, taking one or more online classes during their program of study increased undergraduate students' likelihood of successful degree completion. Lastly, to provide further insight, this study compared student performance in online and on-campus classes. Results for this comparison were mixed; slightly higher or slightly lower online course grades were obtained by students compared to face-to-face course grades, depending on type of campus.

Keywords: online classes, online learning, graduation rates, degree completion, course completion, retention, student success

Wavle, S., & Ozogul, G. (2019). Investigating the impact of online classes on undergraduate degree completion. *Online Learning, 23*(4), 281-295. doi:10.24059/olj.v23i4.1558

Investigating the Impact of Online Classes on Undergraduate Degree Completion

Increasing demand for online learning is reflected in online enrollment growth rates that are over 10 times higher than the growth in overall higher education enrollments (Allen & Seaman, 2010, 2013). Allen and Seaman (2015) documented that in every year since 2003 the number of students taking one or more online classes has grown at a rate greater than the growth rate for all students in higher education overall, with the number of online students often growing at rates of 20–28% per year. In fall 2015, more than six million students, or 29.7% of all students involved in higher education, took one or more distance education courses, with the vast majority (83%) of these students at the undergraduate level. The proportion of students taking one or more online class has risen steadily from under 10% in 2002, to 25.9% in 2012, and 28.3% in 2014. This growth in demand for online classes is happening even though the number of total students in higher education has declined slightly each year since 2012 (Allen & Seaman, 2017).

Despite this increasing student demand for online classes, Allen and Seaman (2015) report that only 28% of academic leaders feel that their faculty “fully accept the value and legitimacy of online education” (p. 12). Gutman (2012) describes concerns over online class quality as a barrier to faculty acceptance of online classes, stating that faculty are “skeptical about the effectiveness of courses delivered from a distance” and that many faculty still feel that online classes “are poor attempts to replace the teacher with technology” (p. 55). Taking this further, Grossman and Johnson (2015) found that business faculty were significantly less likely to accept transfer credit for classes taken in hybrid and online formats, despite equivalent grades and/or institution. Much of the faculty distrust of online education comes from the fact that online classes often have lower completion rates (Carr, 2000; Jaggars & Xu, 2010; Xu & Jaggars, 2011; Johnson et al., 2015; Shea & Bidjerano, 2017; Hart et al., 2018), even though a recent study conducted by Wisneski, Ozogul, and Bichelmeyer (2017) reported no significant differences in student performance when undergraduate students were allowed to take prerequisite and postrequisite courses in a variety of online and on-campus combinations in their required course sequences.

Review of Related Literature

Since 2010 several studies have compared online and on-campus course completion rates and/or examined the impact of online classes on retention and degree completion rates. These studies were primarily conducted at the community college level, but a few studies have incorporated 4-year institutions as well. Table 1 below provides a brief summary of large-scale studies conducted from 2010 to 2018, providing the institution level at which they were conducted and the primary findings related to course completion and retention/degree completion as appropriate.

Table 1

Summary of Current Research: Online Courses, Course Completion, and Degree Completion

Study	Institution	Course completion	Degree completion
Jaggars & Xu (2010)	Community college	Students more likely to fail or withdraw from online course	Taking online in early semesters lowers retention and degree attainment
Xu & Jaggars (2011)	Community college	Students more likely to fail or withdraw from online course	Taking online in early semesters decreases retention, and a high % of online slightly decreases completion
Pontes & Pontes (2012)	Undergrad		First-gen low-income students taking online show increased progress toward degree
Xu & Jaggars (2014)	Community college	All students performed lower in online courses than face-to-face, particularly males, younger students, and Black students.	
Shea & Bidjerano (2014)	Community college		Early participation in online predicts higher rates of degree attainment, even for those at risk

Study	Institution	Course completion	Degree completion
Johnson, Cuellar Mejia, & Cook (2015)	Community college	Pass rates in online courses lower than traditional on campus	
Shea & Bidjerano (2016)	Community college		Significantly more students engaged in online attained a degree than those who did not; women students graduate more quickly when taking online
James, Swan, & Daston (2016)	2- and 4-year on-ground and online	Online courses do not impact course completion rates	Online courses did not lower retention rates
Shea & Bidjerano (2017)	Community college	Online course GPAs lower relative to on campus course GPAs	Students taking online and on campus classes 1.5 times more likely to complete degree; female, White, full-time, older students more likely to take online and on campus
Shea & Bidjerano (2018)	Community college		Higher proportions of online classes decreases degree completion (tipping point = 40%)
Hart, Friedmann, & Hill (2018)	Community college	Outcomes in online courses poorer than on campus	
Ortagus (2018)	2- and 4-year institutions		Positive relationship between taking some online classes and long-term outcomes, including earning a degree or successful transfer

Course Completion

Seven of the 12 studies presented in Table 1 examined course grades and/or course completion in online classes compared to traditional on-campus classes. All but one of these studies found that student performance in online classes was lower than in on-campus courses. Jaggars and Xu (2010) studied 24,000 Virginia community college students and found that students were more likely to fail or withdraw from online courses. In a similar study of 51,000 students in the Washington State Community College System, Xu and Jaggars (2011) reached the same conclusion that students were more likely to withdraw from or fail their online classes. Xu and Jaggars (2014) extended their analysis of course completion to look at student subgroups, and found that in particular male students, younger students, and Black students suffered from the biggest performance gaps between online and on-campus courses. Johnson, Cuellar Mejia, and Cook (2015) studied online and traditional courses in the California Community College system and found higher rates of failing and incomplete grades in online courses, after adjusting for student type, college, subject, and term. Similarly, Shea and Bidjerano (2017) determined that in the community colleges of the State University of New York, the online GPAs of students were lower relative to the grades they earned in their on-campus classes. Hart, Friedmann, and Hill (2018) also studied the California Community College system and found that on average, student outcomes in online courses were poorer than those in on-campus courses, even when accounting for instructor differences.

Of the studies presented in Table 1, only James, Swan, and Daston (2016) found that taking a course online did not impact course completion rates. Their study used student-level data available through the Predictive Analytics Reporting (PAR) Framework that included 2- and 4-year colleges with a mix of institutions delivering instruction primarily online and primarily on campus.

Degree Completion

Nine of the 12 studies presented in Table 1 examined the impact of online classes on retention and/or degree completion and also showed mixed results. Both the Virginia Community College system study by Jaggars and Xu (2010) and the Washington State Community College system study by Xu and Jaggars (2011) reported that students who took online courses early in their academic career were slightly less likely to be retained than those who did not, and that those students with a high proportion of online course credits were less likely to complete their associate's degree. In contrast, Shea and Bidjerano (2014) found that early participation in online classes predicted higher rates of degree completion in community college students within the SUNY system, even though those students who were less likely to receive a degree were overrepresented in the national population of online students studied. They concluded that "even potentially less prepared students who participated in distance education early in their college careers were more likely to attain a degree than students who had not done so" (p. 110). Shea and Bidjerano (2014) also noted that students who were female, older, from larger families, and those who received higher amounts of financial assistance were more likely to take online courses.

Pontes and Pontes (2012) similarly studied a specific at-risk population and found that first-generation, low-income (FGLI) students who took online classes demonstrated better progress toward degree completion that those who did not take online classes. The authors noted that "FGLI students may be more likely to value the convenience of distance education classes, which allows them to stay enrolled in their program of study for the entire academic year" (Pontes & Pontes, 2012, p. 6). Picciano, Seaman, and Allen (2010) supported this observation, suggesting that many students chose to enroll in online classes because the format affords a more flexible learning environment, allowing them to combine work and family obligations into their higher education plans.

Shea and Bidjerano (2016) examined national community college data from the National Center for Education Statistics, focusing on time-to-degree, dropout, and transfer rates for students taking at least one online course, compared to classroom-only students. Their results differed from prior studies at the state level (Xu & Jaggars, 2011, and Jaggars & Xu, 2010), finding that students who took online classes had higher rates of degree completion and earned their degree faster than those who took only campus classes, and that there were no significant differences in dropout or transfer rates among these students. Further, Shea and Bidjerano (2016) noted that the national data indicate that women take more online courses than men do and that "women graduate most quickly when they took at least some online classes" (Shea & Bidjerano, 2016, p. 23).

James et al. (2016) also reported findings consistent with Shea and Bidjerano (2014, 2016) and contrary to the state-level community college studies by Xu and Jaggars (2011) and Jaggars and Xu (2010). They found that taking "some" online courses did not have a negative impact on student retention. An important distinction in James et al. (2016), however, was that the researchers grouped students into three categories: students with no online classes, students with all online classes, and students who took combinations of online and on-campus courses. After separating students into these groups, they found that students who took all of their courses online had lower retention rates, but students who took combinations of online and on-campus courses were retained at higher rates than students who took all of their courses on campus. No differences were observed in relation to gender or Pell Grant status.

Shea and Bidjerano (2017) continued to study community college students taking online classes, finding that students who took online classes had lower GPAs but were more likely to complete their degree than students who did not take online classes. They have described this as an "online paradox" in which students underperform at the course level yet overperform at the degree-completion level. Consistent with James et al. (2016), Shea and Bidjerano (2017) also found that students taking combinations of online and on-campus classes were more likely to complete their degree than students who took on-campus courses only. Students who took all of their classes online, however, were less likely to complete their degree than students who had combination online and on-campus schedules. In their most current study, Shea and Bidjerano (2018) examined the question further by exploring whether there is a "tipping point" at which students lose the benefits of taking online classes to enhance their chances of degree completion. The authors found that students who took 40% or more of their classes online start to see negative impacts on degree completion compared to their peers who took on-campus courses only.

Ortagus (2018) conducted a national study of both 2-year and 4-year students, examining the impact of taking either some or all online classes during a student's first year on long-term academic outcomes, including the likelihood of dropping out, likelihood of receiving a degree, and the likelihood of successful transfer. This study found that students from both the 2-year and 4-year samples who enrolled in "some online courses" were less likely to drop out of college. Students in the 2-year sample who enrolled in some online courses were more likely to complete an associate's degree and were also more likely to successfully transfer to another 4-year institution than students who took only face-to-face courses.

Additional Online Success Factors

The above-described research studies focused on the impact of online class-taking behaviors on course and degree completion. There are other factors that can impact student success in online courses and programs, including student GPA, gender, age, ethnicity, first-generation status, and income status. For example, a few studies have found GPA to be a significant predictor of online success (Aragon & Johnson, 2008; Harrell & Bower, 2011; Xu & Jaggars, 2013), finding that students with higher GPAs have higher rates of success in online courses. With respect to gender, Aragon and Johnson (2008) found a significant association between gender and course completion, finding that women had higher online course-completion rates than male students. Looking at ethnicity, Kaupp (2012) has noted that online instruction increases the achievement gap that already exists between Latino and White students. And, while Engle and Tinto (2008) have noted that FGLI students are four times more likely to leave college without a degree, Pontes and Pontes (2012) found that taking online classes decreased the likelihood that FGLI students would have an enrollment gap, increasing their progress toward their degree. In terms of age, Xu and Jaggars (2010) and Jaggars and Xu (2011) found that students aged 25 or higher were more likely to take online classes. Although these studies did not determine if age impacted performance in online classes specifically, McNeil, Long, and Ohland (2014) found that older students achieved both higher grades and higher graduation rates than their younger classmates in STEM coursework.

In summary, much of the existing research on the differences between online and on-campus courses and their impact on degree completion has focused on state- and national-level community college data, with some newer studies beginning to look at transfer students and students working toward 4-year degrees. While early studies found negative impacts of taking online courses on retention, degree completion, and course completion, later studies have shown some positive results for taking some online courses. Thus, the purpose of this study is to examine the impact of taking online classes on degree-completion rates of first-time, full-time undergraduate students enrolled in 4-year bachelor's degrees at a multicampus university. This study will also investigate the additional factors identified above that have been shown to impact student retention in online classes and degree completion in both positive and negative ways.

Research Questions

To investigate the impact of taking online courses during undergraduate 4-year bachelor's degree programs at a multicampus university, the following two research questions were posed:

1. Does taking one or more online classes during a student's program of study increase the likelihood that a first-time, full-time undergraduate student will complete their degree on time?
2. Is there a difference in student performance, as measured by course grades, between online and on-campus classes?

Answers to these questions will help advisors, faculty, and administrators better understand how online classes fit into a student's program of study for the purpose of helping students complete their degrees within the desired time frame. The results of this study may be of benefit to administrators and faculty looking to improve degree-completion rates to help meet federal and state performance metrics and goals. This study may also inform decisions about departmental course offerings as well as the distribution of online versus on-campus courses offered each semester. Understanding the overarching role of online classes may also help to improve faculty perceptions of online courses and their willingness to design and teach online classes, as well as recommend them to their students as an option when needed.

Method

Participants

Existing student graduation-rate data from 12,840 students who entered in the fall 2010 first-time, full-time cohort at a large multicampus public university in the Midwest served as the data set for the study. At the time this study was undertaken, using the data from the fall 2010 cohort provided the necessary 6-year window that allowed for determination of whether the student completed the bachelor's degree within 6 years, or 150% of program length (the standard metric used for graduation-rate analysis at the university). Inclusion of student demographic and academic performance data allowed for analysis of the results while controlling for specific factors identified in the literature as having possible impacts on degree completion, including age, gender, ethnicity, income status, first-generation student status, first semester GPA, composite SAT/ACT scores, and number of credit hours taken online.

Data for this study were obtained from official university graduation-rate study census files for all students enrolled in the fall 2010 full-time, first-time undergraduate cohort. All students in the selected cohort were included in the data set for the data analysis. The graduation-rate study census files contained the following attributes for each student:

- Campus type: Classifies students into three primary campus types based on campus size, student demographics, and student academic attributes: traditional flagship campus, urban research campus, and regional campus.
- Residency: Identifies the student as an in-state resident or nonresident student.
- Pell/Stafford: Indicates whether the student was a recipient of Pell Grant or Stafford Loan benefits as a proxy for low-income indication.
- Gender: The self-identified gender of the student at the time of program enrollment.
- Underrepresented minority: Based on university definitions, a dichotomous variable created to indicate whether the student identified as Hispanic, Black/African American, Pacific Islander, or Two or More Races on the student application for admission.
- First-generation status: Indicates whether the student is a first-generation college student.
- Age: The age of the student at the time of program enrollment.
- SAT/ACT composite score: Student composite score as calculated from submitted SAT and ACT scores from the student application for admission.
- First semester GPA: Student GPA in their first academic term of their program of study.
- Degree completion flag: Indicates whether the student completed their degree within 150% of the expected program length.

Official university census enrollment and grade data were also used to create a flag indicating whether a student had taken one or more online classes during their program of study. This data was also used to calculate each students' online and on-campus GPA as described in the data analysis section below.

Data Analysis

The fall 2010 graduation-rate study cohort files were retrieved from the University Institutional Research and Reporting website and filtered to include only first-time, full-time undergraduate students. All students that were marked as deceased or withdrawn for military duty were excluded from the data set. Each first-time, full-time undergraduate student included in the study population was queried in the university enrollment and course grade snapshot files to determine the number of online and on-campus credit hours each student took during their undergraduate career. For each course taken, grades in the form of quality points (e.g., A = 4.0, B = 3.0, etc.) were also accumulated to calculate student GPA values (total credit hours ÷ total quality points) for online and on-campus courses. Consistent with the Integrated Postsecondary Education Data System (IPEDS) definitions, courses categorized as "online" included those that use asynchronous and/or synchronous technologies to bridge the distance between the student and instructor when they are separated by a physical distance 76% or more of the class time (NCES, 2016). Classes not meeting these criteria were categorized as "on campus" for comparison. Online and on-campus credit hours and quality points for each student were mapped back to the graduation-rate cohort files using Excel VLOOKUP functions.

The fall 2010 data were summarized by comparing graduation rates for students who took one or more online classes during their undergraduate career to those who did not take any online classes. Descriptive analyses were conducted for each of the three campus types— traditional flagship campus, urban research campus, and regional campus—consistent with traditional demographic groups at the university. Later, ANOVA tests were performed to determine the differences between students at each campus type in terms of the number of online class credit hours taken online, age, SAT score, first semester GPA, online course GPA, and on-campus course GPA.

In order to answer Research Question 1, investigating the impact of online classes on student degree-completion rates, variables typically associated with completion as mentioned in prior research findings were identified and controlled for in a logistic regression model. The variables considered as potential factors that could impact degree completion included residency status, Pell/Stafford status (as an indicator of socioeconomic status), gender, underrepresented minority status, first-generation student status, age at time of enrollment, SAT/ACT composite score, first semester GPA, and earning at least one credit in an online class.

In order to answer Research Question 2, whether online courses had an impact on student performance as measured by course grades, paired samples *t*-tests were conducted. These *t*-tests were conducted for each campus type to account for differences in student demographics and preparation.

Results

Overall Demographic Analysis

Table 2 shows the results of the overall descriptive analysis for the fall 2010 cohort data used for this study. The demographic characteristics in Table 2 were presented for all students and were also broken out by campus type: traditional flagship campus, urban research campus, and regional campus.

Table 2

Fall 2010 First-Time, Full-Time Cohort Demographics by Campus Type

	All campuses	Flagship	Urban	Regional
All students	12,840	6,935	2,647	3,258
Resident students	10,087 (79%)	4,377 (63%)	2,509 (95%)	3,201 (98%)
Pell/Stafford recipient	6,554 (51%)	2,654 (38%)	1,727 (65%)	2,173 (67%)
Female	7,196 (56%)	3,636 (52%)	1,587 (60%)	1,973 (60%)
Underrepresented minority	1,942 (15%)	870 (13%)	467 (18%)	605 (19%)
First generation	3,915 (31%)	1,317 (19%)	1,103 (42%)	1,495 (46%)
Average age	18.9	18.6	18.9	19.6
Average SAT/ACT composite score	1100	1199	1013	944
Average first semester GPA	2.84	3.06	2.78	2.44
Students taking one or more online class	5,174 (40%)	2,009 (29%)	1,683 (64%)	1,482 (46%)
Students completing in 6 years	7,557 (59%)	5,328 (77%)	1,240 (47%)	989 (30%)
Completion: students taking one or more online	69%	85%	65%	52%
Completion: students with no online	52%	74%	16%	12%

One-way analysis of variance (ANOVA) tests were conducted on all variables displayed in Table 2 to determine whether the percentages on the categorical variables (residency, Pell/Stafford recipient, gender, underrepresented minority, first generation) or averages for the continuous variables (age, SAT/ACT score, first semester GPA) varied significantly between the three campus types. The analysis revealed that all of the variables were significantly different ($p < .01$) at the univariate level between the traditional flagship, urban research, and regional campus types. Follow-up Bonferroni corrections were conducted, and these differences were confirmed, with additional clarifications between campus type for gender, underrepresented minority, and Pell/Stafford recipient. For these three variables, there was a significant difference ($p < .01$) between the flagship campus and the urban and regional campuses, but the urban campus and regional campuses did not vary significantly on these two variables. There were significantly more Pell/Stafford recipients, women students, and underrepresented minority students at the urban and regional campuses compared to the traditional flagship campus. The number of Pell/Stafford recipients, women students, and underrepresented minority students was not significantly different between the urban and regional campuses. The three campus types also varied significantly in the percentages of students taking one or more online class, as well the number of students in the cohort who completed their degree within 150% of the program length.

To summarize the campus-type differences, students at the traditional flagship campus were more likely to be nonresident, younger, higher income students (as indicated by Pell/Stafford recipient status), also with higher SAT scores and higher first semester GPAs than students at the urban research campus or regional campuses. The traditional flagship students were less likely to be first-generation students, were less likely to take one or more online classes during their program of study, and were more likely to complete their degree on time. In contrast, students at the regional campuses were most likely to be resident, older, first-generation students with lower SAT/ACT composite scores and lower first semester GPAs, and were less likely to complete their degree on time.

Table 3 below displays a demographic comparison of the fall 2010 cohort. The table presents the frequencies of students who did not take any online courses during their academic program compared to those who did take one or more online courses. Similar to the campus-type breakdown, one-way ANOVA tests were conducted on all demographic variables to determine whether the percentages on the categorical variables (residency, Pell/Stafford recipient, gender, underrepresented minority, first generation) or averages for the continuous variables (age, SAT/ACT score, first semester GPA) varied significantly between students who took online classes and those who did not. All of the variables presented in Table 3 were significantly different between students taking one or more online classes and those taking no online classes ($p < .01$) except for student age and underrepresented minority status. Students in the fall 2010 cohort who took one or more online classes during their academic program were more likely to be in-state residents, Pell/Stafford recipients, female, first-generation students with lower SAT/ACT composite scores and higher first semester GPAs.

Table 3

Fall 2010 First-Time, Full-Time Cohort Demographics by One or More Online Class Variable

	All students	**No online classes**	**One or more online class**
All students	12,840	7,666	5,174
Resident students	10,087 (79%)	5,614 (73%)	4,473 (87%)
Pell/Stafford recipient	6,554 (51%)	3,717 (49%)	2,837 (55%)
Female	7,196 (56%)	4,038 (53%)	3,158 (61%)
Underrepresented minority	1,942 (15%)	1,155 (15%)	787 (15%)
First generation	3,915 (31%)	2,101 (27%)	1,814 (35%)
Average age	18.9	18.9	18.9
Average SAT/ACT composite score	1100	1125	1063
Average first semester GPA	2.84	2.75	2.98
Students completing degree in 6 years	7,525 (59%)	3,971 (52%)	3,554 (69%)

Research Question 1: Does taking one or more online classes during a student's program of study increase the likelihood that a first-time, full-time undergraduate student will complete their degree on time? To determine whether taking an online class had an impact on earning a degree for the fall 2010 cohort, a logistic regression analysis was conducted for each campus type to predict degree completion using "taking one or more online class" as a predictor. Other predictors included in the model were Pell/Stafford status, gender, underrepresented minority status, first-generation student status, age at time of enrollment, SAT/ACT composite score, and first semester GPA. Residency was removed from the final results because it did not improve the model due to the high percentages of resident students at the urban research and regional campuses (95% and 98%, respectively). The regression models with the variables summarized in Table 4 correctly predicted student degree completion at the rate of 81% for the flagship campus, 76% for the urban campus, and 78% for the regional campuses. The power of explanation of the models as measured by Nagelkerke's R^2 for each campus type were 0.279 (flagship), 0.474 (urban), and 0.435 (regional), indicating that the model was the best fit for the urban campus.

Table 4

Variables in the Logistic Regression Models With Significance and Odds Ratio

	Flagship		Urban		Regionals	
Variable	**Sig.**	**Odds ratio**	**Sig.**	**Odds ratio**	**Sig.**	**Odds ratio**
Age at time of enrollment	.204	0.927	.001	0.827	.048	0.921
SAT/ACT composite score	.354	1.000	.025	1.001	.007	1.001
First semester GPA	.000	3.935	.000	3.516	.000	3.219
Earned at least one online class credit	.000	2.667	.000	8.060	.000	6.185
Pell/Stafford recipient	.000	0.696	.047	0.799	.138	0.853
Gender (female)	.052	1.144	.015	0.765	.771	0.969
First-generation student	.001	0.746	.000	0.613	.003	0.736
Underrepresented minority	.977	0.822	.852	1.027	.000	0.553

Research Question 2: Is there a difference in student performance, as measured by course grades, between online and on-campus classes? Nondirectional dependent *t*-tests were carried out to examine whether the student GPAs in their online classes were different from GPAs in their on-campus classes. For all students at all campuses, the results indicated a significant difference between online and on-campus GPAs, with lower GPAs in on-campus courses (M = 2.79, SD = 0.65) than GPAs in online courses (M = 2.84, SD = 1.19), $t(5167) = -4.24$, $p < .05$, CI (-0.08, -0.02) = .95. Following this initial analysis, grades were examined by campus type, with additional *t*-tests showing significant differences in online and on-campus GPAs for traditional flagship, urban, and regional campus students. For the flagship campus, on-campus GPAs (M = 2.90, SD = 0.51) were lower than online GPAs (M = 3.04, SD = 1.11), $t(2008) = -6.35$, $p < .05$, CI (-0.18, -0.10) = .95. The result for the urban campus also showed that on-campus GPAs (M = 2.78, SD = .71) were lower than online GPAs (M = 2.87, SD = 1.14), $t(1677) = -4.5$, $p < .05$, CI (-0.13, -0.05) = .95. The results for the regional campuses, however, indicated that on-campus GPAs (M = 2.66, SD = 0.71) were higher than online GPAs (M = 2.56, SD = 1.29), $t(1480) = 3.80$, $p < .05$, CI (0.05, 0.15) = .95. These results are summarized in Table 5.

Table 5

Mean Online and On-Campus GPAs (Range = 0.0 to 4.0) by Campus Type

	Online		On-campus	
Campus type	***M***	***SD***	***M***	***SD***
All campuses	2.84	1.19	2.79	0.65
Traditional flagship	3.04	1.11	2.90	0.51
Urban	2.87	1.14	2.78	0.71
Regional	2.56	1.29	2.66	0.71

Discussion

The purpose of this study was to investigate whether online classes have an impact on degree completion for first-time, full-time undergraduate students. Within the cohort studied at this multicampus university, taking online classes indicated a significant positive impact on student degree completion at all three campus types, with the biggest effect on students at the urban research and regional campuses, where graduation rates overall are typically lower than the traditional flagship campus. As presented in Table 4, students who took an online class at the flagship campus were 2.7 times more likely to complete, students at the regional campuses were 6.2 times more likely to complete, and students at the urban campus were 8.1 times more likely to complete their degree within 6 years.

In the urban research campus and regional campus regression models, earning at least one online class credit was the variable that increased the likelihood of degree completion the most, with first semester GPA as the second most important variable. These variables were reversed at the flagship campus, with first semester GPA as the variable with greatest impact followed by taking one or more online classes. These findings are consistent with studies by Shea and Bidjerano (2016), James et al. (2016), and Shea and Bidjerano (2017) that focused on community college students and found positive impacts on degree completion for these less traditional students.

With respect to the impact on student grades when students took one or more online classes during their undergraduate program of study, the differences between student GPAs in online classes and student GPAs in on-campus classes showed mixed results. At the flagship and urban campuses, students had slightly higher GPAs in online classes. At the regional campuses, online GPAs were slightly lower than on-campus GPAs, which may support the results of studies on community college students that show lower pass rates for online students (Xu & Jaggars, 2011; Jaggars & Xu, 2010; Johnson et al., 2015; Shea & Bidjerano, 2017; Hart et al., 2018). While statistically significant, the differences found in this study could be considered practically insignificant, since the difference between the means of the online and on-campus GPAs was 0.10 or less at all three campus types. This would support James et al. (2016), who found no impact on course completion among 2- and 4-year students. Concerns that some faculty have regarding student performance or quality in online classes may be alleviated by these results that show student performance overall between online and on-campus classes is almost equivalent.

Similar to Shea and Bidjerano (2014), the students in this study who took online classes during their degree were more likely to be women and more likely to be financial aid recipients, an indication of lower socioeconomic status, than those who did not take online classes. The students taking online classes also had significantly lower SAT/ACT composite scores than those who did not take online classes, yet the students who took online classes graduated at higher rates than those who did not. This supports Shea and Bidjerano (2014), who observed that at the national level, distance education students were somewhat less prepared for college, yet they still had a greater chance of graduating than their peers who did not take online classes. In this study, students at the campuses with the lowest graduation rates—the urban and regional campuses—showed the most benefit from taking online classes with regard to degree completion. This is an important finding given that state-performance funding models often use metrics such as overall degree completion, on-time degree completion, and/or degree completion for at-risk students as a fundamental component.

The authors of this current study agree with Shea and Bidjerano (2014) and Ortagus (2017) that online learning may provide greater access to certain populations of students, particularly those with work responsibilities, family obligations, or even physical/mobility impairments that make coming to a traditional campus class difficult. This points out an important limitation of the current study, however. While the regression model incorporated student academic and demographic factors into the analysis, student behavioral factors, student motivation, and external factors, such as employment and family responsibilities, were not measured or accounted for in this study. While student work schedules, family commitments, athletic schedules, or even other class obligations may make online learning an imperative for some students, it is also very possible that online classes simply have a greater appeal for some students. Jaggars (2014) asked students to identify their reasons for taking online courses, receiving the expected key reasons of flexibility and convenience, but “a handful of students preferred the learning environment of online learning” (Jaggars, 2014, p. 28). If today’s students prefer to consume other services (e.g., music, books, and games) digitally, it follows that they may also have a preference for consuming education in a digital format. Understanding today’s students’ demands and motivations for choosing online education may help guide the development of online programs and courses as well as inform the types of student services and support needed to help students succeed in their online classes and complete their degrees timely.

While this study had the advantage of large sample sizes from three different types of campuses, the study population was from a single multicampus university and included only first-time, full-time students. Additional research should examine if and how transfer students consume online education to complete their degrees. This study also did not consider the student program of study or the subject areas of the courses taken online, which could have an impact on student grades and completion rates. Some studies have considered the timing of when students take their online classes with mixed results (Jaggars & Xu, 2010; Xu & Jaggars, 2011; Shea & Bidjerano, 2014). It would be helpful for advisors to know, for example, if taking online classes in the freshman year was more problematic than if the student waits until later. It is possible that taking online classes in the summer has a particularly important impact. The current study did not consider the timing of when students took their online classes, and also did not distinguish whether students took some of their classes online versus all of their classes online. Another potential area of research is to consider the percentage of online classes taken, as studied by Shea and Bidjerano (2017). As they suggest, perhaps there is a “tipping point” at which students are negatively impacted by taking too many of their classes online. If so, what are the implications for students who are enrolled in a fully online program, and how can colleges support fully online students to improve their levels of completion?

The results of this study showed that for undergraduate first-time, full-time students at a 4-year institution, online classes may play an important role in supporting degree completion. There are specific populations, such as women and lower income students, for whom online classes play a bigger role than they do for their male and higher income counterparts. Further research designed to understand the populations that online education is helping and why it helps is important for administrators and faculty alike. It is possible that the growth in online learning can be attributed not only to the fact that online classes facilitate degree completion for populations most at risk of not completing their degrees, for a variety of reasons, but also that online learning is becoming a preferred choice among today’s learners who are digital natives more comfortable learning in the online space.

References

Allen, I. E., & Seaman, J. (2008, November). *Staying the course: Online education in the United States, 2008*. Needham, MA: The Sloan Consortium.

Allen, I. E., & Seaman, J. (2015, February). *Grade level: Tracking online education in the United States, 2014*. Babson Survey Research Group and Quahog Research Group, LLC.

Allen, I. E., & Seaman, J. (2017, May). *Digital learning compass: Distance education enrollment report 2017*. Babson Survey Research Group.

Aragon, S. R., & Johnson, E. S. (2008). Factors influencing completion and noncompletion of community college online courses. *The American Journal of Distance Education, 22*(3), 146–158. doi:10.1080/08923640802239962

Carr, S. (2000). As distance education comes of age, the challenge is keeping the students. *The Chronicle of Higher Education*, *23*, 39–46.

Engle, J., & Tinto, V. (2008). Moving beyond access: College success for low-income, first generation students. *Pell Institute for the Study of Opportunity in Higher Education.* Retrieved from http://www.eric.ed.gov/PDFS/ED504448.pdf

Grossman, A. M., & Johnson, L. R. (2015, March). Faculty perceptions of online accounting coursework. *American Journal of Business Education, 8*(2), 95–106.

Gutman, D. (2012). Six barriers causing educators to resist teaching online, and how institutions can break them. *Distance Education, 9*(3), 51–56.

Harrell, I. L., & Bower, B. L. (2011). Student characteristics that predict persistence in community college online courses. *American Journal of Distance Education, 25*(3), 178–191.

Hart, M. D. C., Friedmann, E., & Hill, M. (2016). Online course-taking and student outcomes in California community colleges. *Education Finance and Policy, 13*, 1–58.

Jaggars, S. S. (2014). Choosing between online and face-to-face courses: Community college student voices. *American Journal of Distance Education, 28*, 27–38.

Jaggars, S. S., & Xu, D. (2010). *Online learning in the Virginia community college system*. New York: Community College Research Center, Teachers College, Columbia University.

James, S., Swan, K., & Daston, C. (2016). Retention, progression and the taking of online courses. *Online Learning, 20*(2), 75–96.

Kaupp, R. (2012). Online penalty: The impact of online instruction on the Latino-White achievement gap. *Journal of Applied Research in the Community College, 19*(2), 8–16.

McNeil, J., Long, R., & Ohland, M. W. (2014). Getting better with age: Older students achieve higher grades and graduation rates. *2014 IEEE Frontiers in Education Conference (FIE) Proceedings, Frontiers in Education Conference (FIE), 2014 IEEE. 1*, 1–5.

National Center for Educational Statistics (2016). 2016-17 Survey materials: Glossary. *IPEDS 2016-2017 data collection system*. Retrieved from https://surveys.nces.ed.gov/ipeds/VisGlossaryAll.aspx

Ortagus, J. C. (2017). From the periphery to prominence: An examination of the changing profile of online students in higher education. *Internet and Higher Education, 32,* 47–57.

Ortagus, J. C. (2018). National evidence of the impact of first-year online enrollment on postsecondary students' long-term academic outcomes. *Research in Higher Education, 59*(8), 1035–1058.

Picciano, A., Seaman, J., & Allen, I. E. (2010). Educational transformation through online learning: To be or not to be. *Journal of Asynchronous Learning Networks, 14*(4), 17–35.

Pontes, M., & Pontes, N. (2012). Distance education enrollment is associated with greater academic progress among first generation low-income undergraduate students in the US in 2008. *Online Journal of Distance Learning Administration, 15*(1).

Shea, P., & Bidjerano, T. (2014). Does online learning impede degree completion? A national study of community college students. *Computers & Education, 75*, 103–111.

Shea, P., & Bidjerano, T. (2016). A national study of differences between online and classroom-only community college students in time to first associate degree attainment, transfer, and dropout. *Online Learning, 20*(3), 14–25.

Shea, P., & Bidjerano, T. (2017). Online learning in the 30 community colleges of the State University of New York: Differences in outcomes between classroom and online coursework. In Johnston (Ed.), *Proceedings of EdMedia: World Conference on Educational Media and Technology 2017* (pp. 1192–1198). Washington, DC: Association for the Advancement of Computing in Education (AACE). Retrieved from https://www.learntechlib.org/p/178436/

Shea, P., & Bidjerano, T. (2018). Online course enrollment in community college and degree completion: The tipping point. *International Review of Research in Open and Distributed Learning, 19*(2), 282–293.

Wisneski, J., Ozogul, G., & Bichelmeyer, B. (2017). Investigating the impact of learning environments on undergraduate students' academic performance in a prerequisite and post-requisite course sequence. *The Internet and Higher Education, 32*, 1–10.

Xu, D., & Jaggars, S. S. (2011). *Online and hybrid course enrollment and performance in Washington State community and technical colleges*. (CCRC Working Paper No. 31). New York, NY: Columbia University, Teachers College, Community College Research Center.

Xu, D., & Jaggars, S. S. (2013). The impact of online learning on students' course outcomes: Evidence from a large community and technical college system. *Economics of Education Review, 37*, 46–57.

Xu, D., & Jaggars, S. S. (2014). Performance gaps between online and face-to-face courses: Differences across types of students and academic subject areas. *The Journal of Higher Education, 85*(5), 633–659.

Educational Leadership Doctoral Students' Perceptions of the Effectiveness of Instructional Strategies and Course Design in a Fully Online Graduate Statistics Course

Mei Jiang, Julia Ballenger, and William Holt
Texas A&M University-Commerce

Abstract

In the past several decades, higher education has witnessed the exponential growth of online learning. New technology has dramatically transformed the way education is delivered compared to what takes place in the traditional classroom. It has enabled online delivery of course materials to students outside of face-to-face classroom in an asynchronous manner and provide them with self-paced flexibility. Given the abstract nature of statistics content, effectiveness of the instructional strategies and course design in online statistics instruction has become particularly important to students' learning success. In this qualitative study, the authors explored perceptions of the Educational Leadership doctoral students towards an online graduate level introductory statistic course in terms of whether the online course instructional strategies and course design helped them learn statistics. The authors assessed effectiveness of the instructional strategies and design of the online statistics course as well as students' needs, so more effective instructional strategies could be used for online statistics teaching. Students identified the PowerPoint presentations with recorded lectures to be the most useful strategy. This strategy, along with live Q&A sessions and guided practices and activities, helped to connect the textbook information and its application to the real world.

Keywords: instructional strategy, online course design, statistics, Competency-Based Education

Jiang, M., Ballenger, J., & Holt, W. (2019). Educational leadership doctoral students' perceptions of the effectiveness of instructional strategies and course design in a fully online graduate statistics course. *Online Learning, 23*(4), 296-312. doi:10.24059/olj.v23i4.1568

Educational Leadership Doctoral Students' Perceptions of the Effectiveness of Instructional Strategies and Course Design in a Fully Online Graduate Statistics Course

Since the first online education program that utilized the U.S. mail in 1982 (Hamilton & Feenberg, 2012), we have witnessed the exponential growth of online education. According to Babson Survey Research Group, more than 6.3 million students in the U.S. took at least one online course in Fall 2016 (Seaman, Allen, & Seaman, 2018). Public colleges and universities in the U.S. had a 7.3 percent increase in online course enrollment between fall 2015 and 2016, while private nonprofit schools had a 7.1 percent increase. Internet and digital technologies such as electronic mail, Instant Messaging, Interactive video conferencing, mobile/smartphones, and social networks have dramatically transformed the way education is delivered (Cook & Sonnenberg, 2014; Friedman, 2018). Such new tools have enabled online delivery of course materials to students outside of brick-and-mortar classrooms in an asynchronous manner. In the field of Educational Administration/leadership, students with full-time leadership positions in public education benefit from online programs as they provide self-paced flexibility. Indeed, flexibility and convenience are so important that 40 (75.4%) of 53 doctoral level Educational Leadership programs in public universities in Texas are either 100% online, fully online (86%-99%), or hybrid/blended/electronic to group (THECB, 2018).

Despite the popularity of online education, past research has noted that online instruction in the field of statistics may not produce comparable performance among lower preforming students as in face-to-face teaching (Lu & Lemonde, 2013). Given the abstract nature of statistics content, near-to-zero or even negative effect sizes were identified in online delivery with computer-assisted instruction (Larwin & Larwin, 2011). Thus, effectiveness of the instructional strategies and course design of online statistics instruction becomes particularly important to students' learning success. Bonk and Dennen (2003) described instructional strategies as the curriculum and instructional styles and pedagogical means used to guide the development of course content, student engagement, and learning activities. Online course design features such as sequence of course content, communication modes, and assignment structure are considered the most influential factors impacting successful online teaching and learning (Baldwin, 2017). The purpose of this study was to determine how doctoral level students in a fully online Educational Leadership Doctoral program perceived the effectiveness of instructional strategies and course design features of a graduate-level introductory statistics course in a mid-sized, doctoral-granting public institution.

As one of the two required statistics courses in the program, this introductory statistics course covers fundamental statistical concepts and focuses on the application of various statistics tests (i.e., *t*-test, one-way ANOVA, chi-square, correlation, and simple regression) in educational research. In order to prepare students for dissertation and further research, this introductory statistics course adopted the ideology of competency-based learning (Spady, 1977) that focuses on fulfilling clearly defined learning skills and competencies in course design rather than solely learning abstract concepts. Spady defined Competency-Based Education (CBE) as "a data-based, adaptive, performance-oriented set of integrated processes" (p. 10) in an outcome-driven pedagogy. CBE emphasized the importance of clearly defining robust and valid competencies in program development (Johnstone & Soares, 2014; Rivenbark & Jacobson, 2014). To create a successful CBE program, learning outcomes are first established, followed by the alignment of instructional pedagogy with outcomes, the development of a structured assessment to evaluate student success and, finally, curriculum adjustments once outcomes are evaluated. When implementing CBE in this online statistics course, the instructor carefully balanced the conceptual knowledge and the acquisition of the skills so that students could master skills to write methodology and data results in their dissertations. Particularly, the Community of Inquiry (COI) Framework (Garrison, Anderson, & Archer, 2000), the Course Life Cycle and Competency (CLCC) Framework (Shankararaman & Elmaleh, 2016), and the Quality Matters (QM) standards were used to guide the design of this graduate level online statistics course.

Review of Literature

The Community of Inquiry (COI) Framework

Based on the constructivist theoretical principles, Garrison et al. (2000) proposed the Community of Inquiry (CoI) framework that represents a process of developing a collaborative learning experience as an online learning tool. The CoI framework consists of three elements (social, cognitive, and teaching presence) that takes place in the interaction of individual learners and their instructor, as well as the categories and indicators that are to define each presence and to code the transcripts. The element of social presence was defined by Garrison et al. as "the ability of participants in a community of inquiry to project their personal characteristics into the community, thereby, presenting themselves to others as real people" (p. 89). Effective communication, open communication, and group cohesion are three major aspects of social presence. To achieve educational goals, online course design should create the environment for inquiry to allow quality, open educational communication between learners and the instructor. Different approaches, including reflective discussions, one-on-one, and small group virtual audio and visual venues, can be used to allow for educational interactions. Cognitive presence is "the extent to which the participation in any particular configuration of a community of inquiry are able to construct meaning through sustained communication" (Anderson et al., 2001, p. 12). One way to increase cognitive presence in online courses is to design activities that allow students to work together to understand, explore, solve, and apply problems. Teaching presence denotes the design elements of online course that "allows for instructor facilitation and pedagogical direction to learners in the social and cognitive processes" (Anderson, Rourke, Garrison, & Archer, 2001, p. 4). Teaching presence has been found to be critical in student satisfaction, perceived learning, and sense of community. Teaching presence is interrelated with social and cognitive presence, and all three elements of CoI work together to build a collaborative and coherent online learning community.

Course Life Cycle and Competency (CLCC) Framework

Course Life Cycle and Competency (CLCC) Framework (Shankararaman & Elmaleh, 2016) consists of leveraging learning outcomes and competencies throughout the life cycle of the course to increase students' success. Passow (2012) defined competency as the knowledge, skills, and abilities in the context of a specific subject area or domain to enable students to make decisions or take appropriate actions. Competencies could provide a structured approach for implementing continuous assessment of outcomes (Pinto, 2012). Corresponding to CBE (Spady, 1977), the implementation of the CLCC highlights how competencies are used to drive the development of various phrases of course development. The CLCC framework addresses the following five phases of a course, namely, content design, assessment design, content delivery and assessment, assessment feedback, and content review.

In *Content Design Phase*, the learning outcomes, unit goals, and objectives are usually included in the syllabus and modules of courses taught. Shankararaman and Elmaleh (2016) reported that the course instructor determined the topics and resources that would provide students the opportunity to master the competencies, assessments, and assignments. The careful selection of course topics and resources is critical to ensure the acquisition of the competencies. In *Assessment Design Phase*, the assessments are developed. It is important that the set of questions for the assessments, as well as grading scheme and rubrics, be aligned with course competencies. In *Content Delivery and Assessment Phase*, the instructor prepares course content to be delivered through a combination of lectures, discussions, videos, and other modalities. The competencies students are expected to acquire for the content are explicitly described to them. In this way, students know what competencies to acquire and the instructor understands what competencies to assess. In *Assessment Feedback Phase*, the instructor analyzes the assessment scores and presents feedback to students immediately. Immediacy of feedback is the key. The instructor should provide immediate small group or individual instruction to students who have not attained the competencies measured by this assessment. In the final phase, *Content Review Phase*, the instructor conducts a thorough analysis of the various assessments in the course and the competencies that have been mastered or not. This review can lead to course content modification, sequence adjustment of content taught, or assessment redesign.

Quality Matters: The Learning-Performance-Design Connection

Quality Matters is a nationally recognized, faculty-centered, peer process program designed to determine and certify the quality of online courses and learning in the U.S. ("Quality Matters", n.d.). Central to Quality Matters is the concept of alignment, when learning objectives, measurement and assessment, educational materials, interaction and engagement of learners, and course technology work together to ensure achievement of desired learning outcomes. Therefore, the use of QM standards when designing the content and delivery of the online course is essential. The essential components of the QM standards that guide the design of the online statistics course include:

- The instructor's plan for classroom response time and feedback on assignments is clearly stated.
- The requirements for learner interaction are clearly stated.
- The assessments measure the stated learning objectives or competencies.
- The course grading policy is clearly stated.
- Specific and descriptive criteria are provided for the evaluation of learners' work and are tied to the course grading policy.
- The instructional materials contribute to the achievement of the stated course and module/unit learning objectives or competencies (http://www.qmprogram.org/rubric).

Teaching Statistics Online: Instructional Strategies and Course Design

Empirical research has been conducted on the impact of instructional strategies and technology integration in teaching college statistics (Larwin & Larwin, 2011; Lu & Lemonde, 2013; Saadati, Tarmizi, Ayub, & Bakak, 2015; Sosa, Berger, Saw, & Mary, 2011). Yang (2017) explored students' perspectives on the effectiveness of online instructional strategies used in a fully online statistics course. Data, in the form of student reflection essays and an anonymous end-of-semester course evaluation, were collected from 39 K-20 teachers enrolled in an online statistics course. A deductive approach was used to identify the online instructional strategies and course designs that effectively helped students learn statistical concepts. Results indicated that effective online instructional strategies included case studies, video demonstrations, access to instructor notes, mini projects, and discussion forums. Additional strategies used by students included outside online resources, practicing textbook examples and chapter problems, seeking help from peers, colleagues and friends, and one-on-one discussions with the instructor. A consistent course structure, the variety of resources, and the real-world application cases were also considered helpful and effective.

Brown and Kass (2009) suggested that statistics instructors consider incorporating a "statistics way of thinking" in teaching statistics. It is not uncommon that students perceive statistics as memorization of "cookbook" methods/statements and rote application of hypothesis statistical procedures. To address such challenges, Horton (2015) proposed three methods: (a) broaden the role of multivariable methods in curricula; (b) develop data-related skills early; and (c) expand the role of simulation and computation.

First, Horton (2015) believed that multivariate ways of statistics thinking, the basics of confounding, and causal inference should be incorporated into course design. Students must be able to understand issues of design, confounding, and bias in order to succeed in statistics learning (Kaplan, 2012). Horton (2013) noted that a major limitation in many statistics courses is a lack of multivariable methods in working on data projects. He posited that students needed to understand design, confounding, and bias from a research design perspective, as these are the competencies that doctoral students need to master in order to design their research and analyze their data in dissertation. Second, Horton urged that data-related skills should be developed early. Students need experience analyzing larger, real-world data sets and to be aware of what techniques do and do not scale well. Similarly, Finzer (2015) noted that students should develop data habits of mind that allow them to think creatively about data and understand conceptions of "data tidying" (Wickham, 2014). When working with data, students must first determine the question, describe a solution in terms that a computer program can understand, and execute the commands to implement the solution. Particularly, doctoral students need to be able to manage challenging data sets of varying sizes and complexity (Horton, Baumer, & Wickham, 2015). Finally, Horton valued expansion of the role of simulation and computation. Graduate programs should provide a framework that encourages students to learn new topics, methods, and approaches, and to become life-long learners. For example, empirical problem-solving and computational tools should be incorporated into the program curriculum and prepare students to gain competency to find answers to problems.

Statistics Anxiety, Math Anxiety and Immediacy

Onwuegbuzie (2004) described statistics anxiety as the apprehension that an individual experiences in instructional situations, in assessments related to statistics, or when working on statistical assignments. Statistics anxiety was to a large degree responsible for the maintenance of a high anxiety level, which impaired students' academic performance (Macher, et al., 2013; Onwuegbuzie & Daley, 1999; Onwuegbuzie, Da Ros, & Ryan, 1997). Similarly, mathematics anxiety is expressed by feelings of apprehension and increased physiological reactivity when individuals must manipulate numbers and solve mathematical problems (Carey, Hill, Devine, & Szůcs, 2016; Hopko, Mahadeyan, Bare, & Hunt, 2003). It has been argued that the contents underlying both types of anxiety came from one domain of knowledge and, therefore, could not be regarded separately. Therefore, statistics anxiety has been treated as an affiliate function of mathematics anxiety. However, other studies considered statistics anxiety as being conceptually different from mathematics anxiety (Baloglu, 2003).

Onwuegbuzie et al. (1997) conducted an in-depth, qualitative study of statistics anxiety to explore graduate students' attitudes and experiences in an intermediate statistics class. The results revealed that students reported psychological symptoms such as depression, frustration, panic, and worry. In fact, Onwuegbuzie (2004) stated that many graduate students delayed enrolling in statistics classes because of their anxiety. Relatedly, instructor immediacy has been found to help alleviate statistics anxiety. Immediacy is the communicative behaviors that influence students' perceptions of physical and psychological closeness (Anderson, Norton & Nussbaum, 1981). Williams (2010) examined the effect of instructor immediacy on students' statistics anxiety in a control group design with 76 graduate students from a variety of academic disciplines enrolled in a graduate-level introductory statistics course. Williams found that instructor immediacy was significantly related to reduction in students' statistics anxiety, explaining between 6 - 20 percent of the variance in students' six factors of anxiety levels, with fear of statistics teachers being the most impacted one. This echoes with Mehrabian's (1971) statement on immediacy principle: "People are drawn toward persons and things they like and avoid things they dislike" (p. 1).

Methods

In this qualitative study, five reflection questions adopted from Yang (2017) were used to explore students' perceptions about the graduate level introductory statistics course in terms of whether instructional strategies and course design helped them learn statistics. The effectiveness of the current instructional strategies and the needs of students were assessed so that a more effective statistics course design could be adapted. As Spady (1977) noted, CBE programs are never "finally and officially in place and permanent" (p. 12).

Course Design Context

To better help students build the connection between statistics and actual dissertation research, this introductory statistics course aimed at installing a solid research sense in students so that students could master statistics from a research design perspective (Horton, 2015). CBE development principles were incorporated in this statistics course design (Johnstone, & Soares, 2014). The first task was to identify robust and valid competencies as the core of CBE curriculum. In this course, identified competencies focused on building research design knowledge base in Unit 1, followed by the SPSS basic descriptive data analysis skills in Unit 2. A series of statistical tests were then introduced , covering correlation, simple regression, independent samples *t*-test, dependent samples *t*-test, one-way Analysis of Variance, and Chi Square. In the design process, both content choices and the sequence of course contents were carefully assessed, along with academic expectations and student needs (Baldwin, 2017).

To ensure the alignment of course instructional pedagogy with the learning outcomes ("Quality Matters," n.d.; Rivenbark & Jacobson, 2014; Shankararaman & Elmaleh, 2016), all identified competencies were translated into explicit learning topics and then incorporated into course modules. In each unit, considering the nature of full-time working professionals' schedule, all asynchronous study materials were presented in small topics. Each topic was presented on a PowerPoint lecture video lasting 5-15 minutes. Students could review one or more topics from the list depending on their schedule. This is aligned to the CBE development principle that study materials translated from identified competencies should be explicit and of appropriate length and complexity. The explicit mapping among competencies, learning outcomes, and assessment was carefully considered in this course development. In designing learning activities for each unit, the instructor first used self-assessment quiz to enhance students' understanding on the knowledge base of statistics contents where students were allowed unlimited practice attempts before taking the quiz for a grade. In addition, mini-project assignments with real-world data were utilized to develop students' data-related skills (Horton, 2015). For each assignment, students determined a solution and executed the procedure to implement the solution, where they conducted a statistical test using variables of their choice from a dataset with multiple variables. Allowing students to make decisions on variables, instead of designating the variable to use, was to create a real-world scenario so students could practice skills needed in the actual hypothesis testing process and become life-long learners.

In addition, optional weekly synchronous Q&A live sessions were used in this introductory statistics course to build a sense of online community and enhance instructor immediacy (Williams, 2010). Cundell and Sheepy (2018) pointed out that passive online activities, including videos and readings, may not be as effective as having student working with each other. In this online statistics course, students were offered an optional, synchronous Q&A session so they could ask questions and share comments with peers "face-to-face" through Adobe Connect. Recordings of Q&A sessions were shared with the whole class so that all students were able to access Q&A discussions.

Method and Procedure

Purposeful sampling method was used in this qualitative study. All 15 students who enrolled in the doctoral-level introductory statistics course in Fall 2017 were invited through email about two months after they completed the course. Students were sent a Qualtrics survey link where they clicked to participate after signing the consent form on the first page. Students were asked to reflect on the learning experiences they had in the Fall 2017 statistics course and to answer five reflection questions, including as many details as possible. Participants' demographic information (i.e., gender, ethnicity, and age) was also collected at the end of the questionnaire. The five open-ended reflection questions are listed below.

1. What was the most effective instructional strategy (such as PowerPoint with lectures, documents, mini-project assignments, weekly Q&A sessions) that helped you learn?
2. How do you perceive the instructional strategies adopted or the course design in this online course?
3. Were there any other instructional strategies which were not adopted in this course and you used on your own?
4. Were the learning activities helpful for you to learn the concepts/materials? What kind of activity (activities) did you find the most helpful?
5. Do you have any other comments for the course? Please be specific.

Content analysis was used to code participants' reflections in this study. Content analysis has been considered a systematic coding and categorizing approach to analyze textual information to determine patterns of words used, their frequency, relationship, and trends of information (Gbrich, 2007; Mayring, 2000; Nagai, 2015; Stone, 2001). Further, Bloor and Wood (2006) posited that content analysis is designed to examine who says what, to whom, and with what effect. In the current study, content analysis was used to examine what students say about the effectiveness of the course design and instructional strategies used in this introductory statistics course.

Results

Nine out of 15 students participated in this study with a response rate of 60%. One participant did not complete all five questions but his/her response on Question 1 was recorded for analysis. Age distribution was fairly balanced in this study. Three out of eight (37.5%) participants were 25-39; three (37.5%) were 40-54; and two (25%) were 55 or older. There were seven female participants (87.5%) and only one male participant (12.5%). Six participants (75%) self-reported to be White/Caucasian, followed by one Hispanic (12.5%) and one Mixed (12.5%).

Perceptions on Effective Instructional Strategies and Course Design

The first and second research question asked participants to identify the most effective instructional strategies (i.e., PowerPoint with lectures, documents, mini-project assignments, weekly QA sessions) that helped them learn and their perceptions on the instructional strategies and course design. Most of participants considered PowerPoint with lectures as the most effective (see Figure 1) that helped them learn.

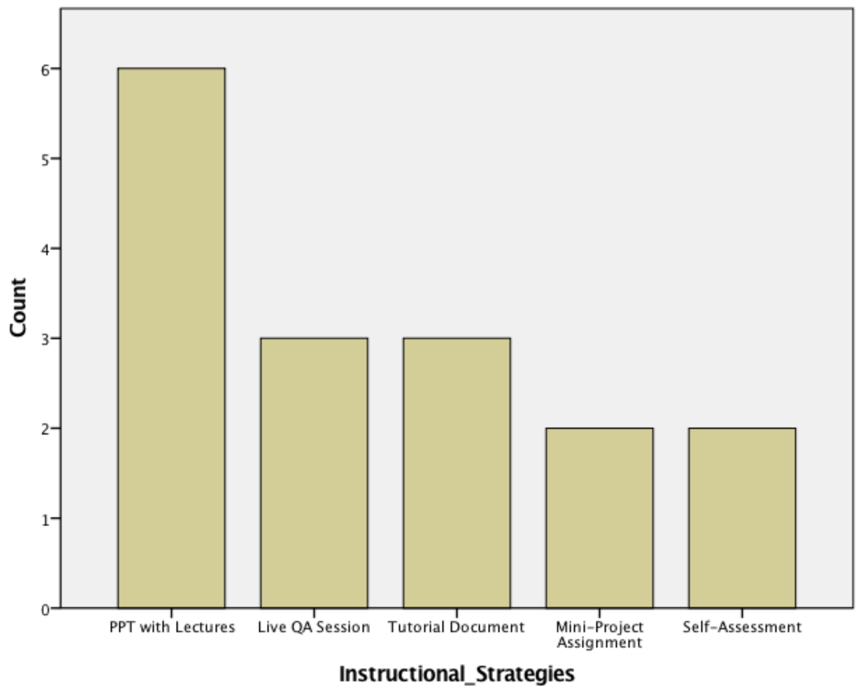

Figure 1. The most effective instructional strategies in students' perception.

One participant noted: "The most beneficial strategies for me were the PowerPoint with video lectures because I was able to go back to them over and over for clarification." Some students actually considered PowerPoint with Lectures and Live QA sessions inseparable and appreciated the design coherency where multiple strategies work together to help them learn. One participant said:

> The most effective instructional strategy which helped me to understand and learn statistics was the synchronous online weekly Q&A session which the professor used to explain her weekly PowerPoint. I realize these are actually two strategies, but I saw them as one. Just reading the PowerPoint was enough for complete understanding. It was the opportunity to ask questions and for Dr. J to more fully explore and explain the PowerPoint that led to my greatest 'ahas. Also, during the online Q&A session, other students were present and asked some questions which I had not thought of. These explanations provided by Dr. J then broadened my understanding of the statistical concepts for that week.

Another student saw all instructional strategies as one umbrella strategy and considered the course design as "spiraling of concepts."

> Dr. J provided some strategies each week to enhance our understanding of the course content. Each week, the routine of strategies was similar. This was important to me for continuity. The strategies were also in an order in which each strategy built on the next strategy. We were given information first, using both the text and the PowerPoints. We then had the opportunity to ask her questions face-to-face in our mid-week chats. We then had an application exercise to use the information that was presented. In addition, we could take pre-assessments as many times as we needed to understand the concepts. I used each pre-assessment to study the area(s) that I had not mastered. I became comfortable with this routine, and I felt less stress because of it.
>
> One aspect I liked about EDAD 603 was the spiraling of concepts from one lesson to the next. We continued to use the terminology and strategies week to week. Each week in IBM SPSS built upon a previous week. We even got to apply statistical thought to real situations, such as Type I and Type II errors in the context of the justice system. Each week, Dr. J provided additional websites for us to explore.

Other students echoed, "The assignments did well to build off each other. Likewise, the supplementary videos and documents were a great help." "They were consistent each week, which helped maintain pace through each unit. The development of writing was a challenge at the start, but later became more fluid."

On individual instructional strategies, students appreciated Live Q&A sessions: "The recorded live Q&A was helpful as Dr. J expanded on the written tutorials. It helped to have both the powerpoint and the recorded Q&A." Tutorial documents were provided in each unit to provide supplemental materials for students to understand step-by-step statistical procedures and thus, were considered a must-have by many students. Several students indicated that tutorial documents "were very helpful when working through the concepts" and "helped with trying to understand and learn statistics." For the self-assessment/quiz, many students considered it as a great opportunity to practice before earning a grade. A student wrote: "I also appreciated the quizzes being available for practice before taking the real quiz. I would often take a quiz 5-10 times to be sure I understood."

While mini-project assignments were considered "challenging" by many students, one student actually mentioned that "I enjoyed getting to try the cases out on the software (in mini-project assignment)." Another student found the mini-project assignment a necessary step to boost their confidence in the learning process:

> The learning activities were especially helpful. The assignments that we completed each week helped me to apply the concepts. The practice with the IBM SPSS program was very beneficial and actually enjoyable. When I completed a weekly assignment, I felt a great sense of accomplishment and understanding. Although I am not sure I recognize every time I should use a particular test, I am much more confident than I was when I began this course.

Some students added "assignment re-do" as an effective instructional strategy used in this course. "While it might not be a specific strategy, I really appreciated that we were sometimes able to re-do assignments. Statistics seemed to build on itself, so going back and doing the work again was helpful for those times when I was unsure." Another student wrote: "I felt that the course was well designed. The content was challenging, but I felt that the professor worked very hard to make it as accessible as possible." Many of them believed that the feedback provided on assignment helped them learn beyond the grade they earn: "I appreciate very much the way Dr. J graded our assignments. She highlighted any errors and explained why this was incorrect. We did not just get a grade and then have to figure it out ourselves."

Instructional Strategies Needed and Students' Suggestions

When asked about instructional strategies that were not adopted in this course and they used on their own, participants listed out *self-organized Study Group, supplemental books, YouTube videos, Google, and Khan Academy*. In some cases, they conducted google searches not to seek new information on the learning topics but just to enhance understanding from a different perspective. Most students joined voluntary study groups outside of class. Students wrote: "The weekly study groups were also VERY helpful. I would often make changes or adjustments to my assignments as a result of those sessions." "The online study group was very helpful. Occasionally we got to see examples of other students' work during the tutoring group and that helped tremendously." This is especially true when students are sensitive about course grades.

Discovering Statistics Using IBM SPSS Statistics (4th edition) by Andy Field was used in this course. While this book has been popular in statistics teaching with solid, systematic statistics knowledge and a great sense of humor, many students found it "intimidating." To tailor this textbook for educators in this statistics course, the instructor regularly directed students to certain key sections of this book for information. Even so, students still preferred a more hands-on, entry-level statistics course than Field's. One student wrote: "I did not care for the (Field's) textbook." Tutorial documents that was used to supplement what Field's book lacked were preferred by students: "The textbook chapters provided by Dr. J and the Morgan, Leech, Gloeckner, & Barrett IBM SPSS for Introductory Statistics (5th ed.) text explained the concepts better than the assigned text when we studied the actual statistical tests."

Students' self-reported emotions toward this statistics course were dichotomous, from one or two students being "frustrated" to some more feeling "enjoyable/beneficial." Some students showed concerns about course grading, whereas other students appreciated the facilitation and assistance received in this course. Some students indicated that they would welcome more APA writing example of statistical tests at the start of the course.

Discussion

As universities continue to move toward more online learning, it is imperative that faculty members understand and utilize effective instructional strategies in this unique setting. While some researchers argue that online instruction reduces the richness, interaction, and personal touch of the face-to-face classroom, market forces continue to push universities to offer this option to students. When available at this doctoral granting public university in Texas, online program enrollment expands exponentially compared to the traditional classroom setting enrollment. While many faculty members were educated in a traditional brick and mortar university setting, the latest generation of learners expects programs, professional community, and support to be available online. This changing demographic expectation alone drives the need to provide the best instruction possible in an online classroom. Additionally, nearly all students enrolled in

Educational Administration at the institution studied are full-time school administrators seeking higher education through asynchronous online classroom settings that can be worked into busy lives. The popularity of this program, and its expansion in the past five years, is evidence of the demand for online doctoral programs (THECB, 2018).

The Council of Graduate Schools (1977, cited in Bargar & Duncan, 1982) posited that the main purpose of doctoral training is "to prepare a student for a lifetime of intellectual inquiry that manifests itself in creative scholarship and research" (p. 1). The dissertation process has been considered the milestone in the scholarship training of students' transition to "independent scholars." Statistics is one of the scheduled tools courses for all doctoral students for degree completion, and knowledge of this subject matter is vital to their transition to independent scholar. However, in the real world, up to 60% of doctoral students ended up being All But Dissertation (ABD) across the broad (Ehrenberg, Zuckerman, Groen & Brucker, 2009; Johnson, Green, & Kluever, 2000), which indicates that the research skills components of the degree may be lacking in the training of doctoral students. Student success in this course is implicated in the measure of departmental graduation goals and the state measures of doctoral programs as outlined in the 18 Characteristics of Doctoral Programs (THECB, 2018). Under such circumstances, the current introductory statistics course was designed in the vein of Competency-Based Education (CBE) with the hope that students could master needed competencies and skills in this research tool class.

Reviewing the study results, it is not surprising that students identified PowerPoint presentations with recorded lectures as the most useful strategy. This strategy, along with other guided practical activities, helped students see how statistics could be applied in their workplace by making the textbook information more real-world and connecting the elements of statistics to applications. As noted by Johnstone and Soares (2014), one thing that separates CBE from others is that it highlights the application of knowledge and skills in the real world. Spady (1977) argued competency in CBE renders the concept of life-roles beyond institutional education. While theoretical learning is the cornerstone of higher education, CBE could bridge the gap between academics and working fields and a CBE-oriented course design should have a more direct impact on students' success in their work field. The current course focused on relating statistical concepts to real-world applications beyond the textbook through engaging students in real-data projects in assignments. Students' feedback to the current course design revealed that they were enlightened by the connection between statistics and their real work needs. Positive messages from the students confirmed the need for an outcome-oriented statistics course design that gears towards application and empower students' learning.

Students in this study found the spiraling nature of the lessons helpful in developing data habits of minds and providing logical building blocks for difficult subject matter such as statistics (Horton, 2015; Yang, 2017). In this course design, students were instructed to (a) study PowerPoint with Lectures and understand the statistical concept and learn how to perform statistical procedures; (b) study supplemental tutorial documents for step-by-step instructions and interpretation/writing up example; (c) attend or review synchronous live Q&A sessions (recording) to further their understanding; (d) practice on the statistical concepts in self-assessment/quiz; lastly and more importantly, (e) complete mini-project assignment. In students' learning process, mini-project assignment acted more like a summative achievement test, not a solo strategy. This message was well-received by students and they believed that all instructional strategies functioned with high degree of coherence as one unified umbrella strategy, rather than as separate pieces. As outlined in QM standards ("quality matter," n.d.), the design goal of a quality online course is to ensure alignment among the course objectives, the learning activities, instructional materials, and media resources. Based upon the feedback from the students in this study, it seems this goal has been well achieved.

One of the most useful strategies identified by students was the online Q&A sessions in which students were able to virtually interact with the instructor and peers regarding any questions. Synchronous responses were provided to students' questions and students had the chance to exchange ideas and learn from peers (Cundell & Sheepy, 2018). Thanks to the cohort structure of the program, students of this class were able to build bonds with each other and form an online learning community easily. Originated from Vygotsky's (1978) social constructivist theories of learning, the Community of Practice (CoP) theoretical framework (Wenger, 1998, 2010; Wenger, Trayner, & de Laat, 2011) posited that the learning partnership should be established so that people "learn from and with each other about a particular domain" (p. 9) and each individual's experience of practice can be used as a learning resource. Smith, Hayes, and Shea (2017) noted that alternative tools, beyond the most popular discussion board, should be integrated into the design in the online learning practices. Berry (2017) also suggested that a sense of community could be achieved by using technology in various ways, including a welcoming tone and much more. The positive feedback received in the current study revealed that synchronous Q&A sessions offered through virtual conference tools (e.g., Adobe connect) worked as one effective alternative in building a successful online learning community. More importantly, social, teaching, and cognitive presence were greatly enhanced by this synchronous tool for achieving a deep learning experience in a collaborative-constructive manner (Garrison et al., 2000). Norberg, Stockel, and Antti (2017) posited that synchronicity facilitated online classroom interaction between instructor and students with a feeling of presence and a balanced work rhythm. Many students in this study reported they had a great sense of security after interaction with instructor and peers and gained confidence about statistics towards the end of the course. In a supportive, trusting online learning community, learners were able to identify with the community, develop meaningful intellectual exchange, and achieve desired educational learning outcomes.

One interesting thing found in the participants' responses was their favor towards assignment re-do. Students reported that they saw how statistics started to build on itself in the process of redoing the assignment. They were allowed to try different variables to redo their assignment as in handling dataset in real research scenarios without late penalty. In fact, CBE promotes flexibility and encourages individualization in time (Spady, 1977). Time should be used flexibly in terms of "when, how long, and how often opportunities for both instruction and evaluation are provided" (p. 11). While Spady invited people to reconsider the "usual, fixed" instructional practices in most institutional settings forty years ago, the most recent teaching experience from Rush ("How one professor learned to stop worrying and drop the deadline," 2019) showed us it might not be a bad idea to get rid of rigid grading policies. In teaching first- and second year college students, Rush dropped all course assignment deadlines by telling students that they could turn in assignment late and redo it as many times as needed for a better grade. All due dates were gone except the ultimate due date of 5 p.m. on the Friday before the semester final. As a result, average grades in his courses went up with one or two fewer Fs per class. Active procrastination (Chu & Choi, 2005) might help us understand Rush's observation. Active procrastination is where an individual, capable of acting on their decision in a timely manner, deliberately chooses to postpone a task and divert attention on to more important ones. Active procrastinators normally enjoy working under pressure, meet deadlines and are satisfied with their outcome (Choi & Moran, 2009). In Rush's case, students were given the whole semester to better understand, and work with, their own time-management and may develop deep learning by managing their time with more flexibility. The feedback received in the current study regarding flexible assignment redo policy echoes Rush's experiment that students actually benefited from being allowed room for learning and growth at their own pace. This might be more important to those learning more difficult subjects, and those with busy lives. Further examinations on how to incorporate time flexibility into online course design, more importantly, to what extent flexibility should be offered, are needed.

Conclusion

This qualitative study examined doctoral level students' perception of the effectiveness of instructional strategies and course design features of a graduate-level introductory statistics course in a fully online Educational Leadership Doctoral program. The emphasis on competency learning, course design coherence, instructor immediacy, as well as students' confidence towards this statistics course, are evident in students' perceptions. It should be noted that, as this course mainly served doctoral-level students who were full-time professionals in the educational administration field, the conclusions made in this study may not be generalized to other programs with a different student body or other disciplines. Also, the interview questions used in this study were adopted from Yang (2017), where perceptions of students in a teacher training program were examined about their perspectives on the effectiveness of online instructional strategies used in a fully online statistics course. Additional questions could have been added to expand the research scope from different perspectives. For example, future research could explore students' statistics anxiety change before and after course taking and how self-efficacy plays a role in their online learning experiences. Social, teaching, and cognitive presence of CoI could be examined in this statistical online learning community (Garrison et al., 2000). Further research might also explore the textbook in statistics leaning for practitioners. With further research on the application of CBE in online statistics course design, higher education could improve course designs to ensure effective online instruction to meet the market needs.

References

Anderson, J. F., & Norton, R. W., Nussbaum, J. F. (1981). Three investigations exploring relationships between perceived teacher communication behaviors and student learning. *Communication Education, 20*, 377-392.

Arasaratnam-Smith, L. A., & Northcote, M. (2017). Community in online higher education: Challenges and opportunities. *Electronic Journal of E-Learning, 15*(2), 188-198.

Baldwin, S. J. (2017). *Adaptation and acceptance in online course design from four-year college and university instructors: An analysis using grounded theory (Doctoral dissertation).* Retrieved from http://scholarworks boisestate.edu/td/1241

Baloglu, M. (2003). Individual differences in statistics anxiety among college students. *Personality and Individual Differences, 34*, 855–865. doi: 10.1016/S0191-8869(02)00076-4

Bargar, R.R., & Duncan, J.K. (1982). Cultivating creative endeavor in doctoral research. *The Journal of Higher Education, 52,* 1-31. doi: 10.2307/1981536

Berry, S. (2017). Building community in online doctoral classrooms: Instructor practices that support community. *Online Learning, 21*(2), doi: 10.24059/olj.v21i2.875

Bloor, M., & Wood, F., (2006). *Keywords in qualitative methods.* London: Sage.

Bonk, C. J., & Dennen, V. P. (2003). Frameworks for research design, benchmarks, training and pedagogy in web-based distance education. In M. G. Moore, W. G. Anderson (Eds.). *Handbook of distance education* (pp. 245-260). Mahwah, NJ: Lawrence Erlbaum Associates.

Brown, E. N., & Kass, R. E. (2009). What is Statistics? *The American Statistician, 63*(2), 105-110.

Carey, E., Hill, F., Devine, A., & Szücs, D. (2016). The chicken or the egg? The direction of the relationship between mathematics anxiety and mathematics performance. *Frontier in Psychology, 6,* 1987. doi: 10.3389/fpsyg.2015.01987

Choi, J. N., & Moran, S.V. (2009). Why not procrastinate? Development and validation of new active procrastination scale. *Journal of Social Psychology, 149,* 195-211.

Chu, A. H. C., & Choi, J. N. (2005). Rethinking procrastination: Positive effects of 'active' procrastination behavior on attitudes and performance. *Journal of Social Psychology, 145*, 245–264.

Cook, C. W., & Sonnenberg, C. (2014). Technology and online education: Models for change, *Contemporary Issues in Education Research, 7*(3), 171-188.

Cundell, A., & Sheepy, E. (2018). Student perceptions of the most effective and engaging online learning activities in a blended graduate seminar. *Online Learning, 22*(3), 87-102. doi:10.24059/olj.v22i3.1467

Ehrenberg, R. G., Zuckerman, H., Groen, J. A., & Brucker, S. M. (2009). How to help graduate students reach their destination. *The Chronicle of Higher Education*, p. A38.

Finzer, W. (2015). The data science education dilemma. *Technology Innovations in Statistical Education, 7*(2). Retrieved from https://escholarship.org/uc/item/7gv0q9dc

Friedman, J. (2018). Study: More students are enrolling in online courses. Retrieved from https://www.usnews.com/higher-education/online-education/articles/2018-01-11/study-more-students-are-enrolling-in-online-courses?src=usn_tw

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, *2*(2-3), 87-105.

Gbrich C. (2007). *Qualitative data analysis: An introduction (1st ed.)*. London: Sage Publications.

Hamilton, E., & Feenberg, A. (2012). Alternative rationalisations and ambivalent futures: A critical history of online education. In Andrew Feenberg & Norm Friesen (Eds.), *(Re)inventing the internet*. Rotterdam: Sense.

Hopko, D. R., Mahadevan, R., Bare, R. L., & Hunt, M. K. (2003). The abbreviated math anxiety scale (AMAS): Construction, validity, and reliability. *Assessment, 10*, 178–182. doi: 10.1177/1073191103010002008

Horton, N. J. (2013). I hear, I forget. I do, I understand: A modified Moore-method mathematical statistics course. *The American Statistician, 67*(4), 219–228.

Horton, N. J. (2015). Challenges and opportunities for statistic and statistical education: Looking back, looking forward. *The American Statistician, 69*(2), 138-145.

Horton, N. J., Baumer, B., & Wickham, H. (2015). Setting the stage for data science: Integration of data management skills in introductory and second courses in statistics, *Chance, 28*(2), 40–50.

Johnson, E.M., Green, K.E., & Kluever, R.C. (2000). Psychometric characteristics of the revised procrastination inventory. *Research in Higher Education, 41*(2), 269–79.

Johnstone, S. M., Soares, L. (2014). Principles for developing competency-based education programs. *Change: The Magazine of Higher Learning, 46*(2), 12-19. doi: 10.1080/00091383.2014.896705

Kaplan, D. (2012). *Statistical Modeling: A Fresh Approach (2nd Ed.).* Retrieved from http://www.mosaic-web.org/go/StatisticalModeling

Larwin, K., & Larwin, D. (2011) A meta-analysis examining the impact of computer-assisted instruction on postsecondary statistics education. *Journal of Research on Technology in Education, 43*(3), 253-278. doi: 10.1080/15391523.2011.10782572

Lu, F., & Lemonde, M. (2013). A comparison of online versus face-to-face teaching delivery in statistics instruction for undergraduate health science students. *Advance in Health Sciences Education, 18*, 963–973. doi: 10.1007/s10459-012-9435-3

Macher, D., Paechter, M., Papousek, I., Ruggeri, K., Freudenthaler, H., & Arendasy, M. (2013). Statistics anxiety, state anxiety during an examination, and academic achievement. *British Journal of Educational Psychology, 83,* 535–549. doi: 10.1111/j.2044-8279.2012.02081.x

Mayring P. (2000). Qualitative Content Analysis. *Forum: Qualitative Social Research, 1,* 20.

Mehrabian, A. (1971). *Silent messages.* Belmont, CA: Wadsworth

Nagai, A. (2015). Content analysis: It's not bean-counting. *Academic Quest, 28,* 472-479.

Norberg, A., Stockel, B., & Antti, M. (2017). Time shifting and agile time boxes in course design. *International Review of Research in Open and Distributed Learning, 18*(6), 88-103.

Onwuegbuzie, A. (2004). Academic procrastination and statistics anxiety. Assessment *Evaluation Higher Education, 29,* 3-19. doi: 10.1080/0260293042000160384

Onwuegbuzie, A., & Daley, C. (1999). Perfectionism and statistics anxiety. *Personal Individual Difference, 26,* 1089-1102. doi: 10.1016/S0191-8869(98)00214-1

Onwuegbuzie, A., Da Ros, D., & Ryan, J.M. (1997). The components of statistics anxiety: A phenomenological study. *Focus on Learning Problems in Mathematics, 19,* 11–35.

Onwuegbuzie, A., & Wilson, V. (2003). Statistics anxiety: Nature, etiology, antecedents, effects, and treatments – a comprehensive review of the literature. *Teaching Higher Education, 8,* 195–209. doi: 10.1080/1356251032000052447

Passow, H. (2012). Which ABET competencies do Engineering graduates find most important in their work? *Journal of Engineering Education, 101*(1), 95-108.

Pinto, Y. (2012). A strategy, implementation and results of a flexible competency-based curriculum. *ACM Inroads, 1*(2), 54-61.

Quality Matters. (n.d.). Retrieved from https://www.qualitymatters.org/

Rivenbark, W. C., & Jacobson, W. S. (2014). Three principles of competency-based learning: Mission, mission, mission. *Journal of Public Affairs Education, 20*(2), 181-192.

Saadati, F., Ahmad, R., Mohd, A. F., & Abu, K. (2015). Effect of internet-based cognitive apprenticeship model (i-CAM) on statistics learning among postgraduate students. *PloS One*, *10*(7), doi:10.1371/journal.pone.0129938

Seaman, J.E., Allen, E., & Seaman J. (2018). *Great increase: Tracking distance education in the United States.* Babson Survey Research Group, Retrieved from http://onlinelearningsurvey.com/reports/gradeincrease.pdf

Shankararaman, V., & Elmaleh, J. (2016). Leveraging competency framework to improve teaching and learning: A methodological approach. *Education and Information Technologies, 21*(5), 1299-1327. Retrieved from: http://ink.library.smu.edu.sg/sis_research/2519.

Smith, S. U., Hayes, S., & Shea, P (2017). A critical review of the use of Wenger's Community of Practice (CoP) theoretical framework in online and blended learning research, 2000-2014, *Online Learning, 21*(1), 209-237. doi: 10.24059/olj.v21i1.963

Sosa, G., Berger, D., Saw, A., & Mary, J. (2011). Effectiveness of computer-assisted instruction in statistics: A meta-analysis. *Review of Educational Research*, *81*(1), 97-128. doi:10.3102/0034654310378174

Spady, W. G. (1977). Competency based education: A bandwagon in search of a definition. *Educational Research, 6*(1), 9-14.

Stone, P. (2001). Content Analysis. In *Encyclopedia of Sociology* (2nd ed., Vol. 1, pp. 417-422). New York: Macmillan Reference USA. Retrieved from http://link.galegroup.com.proxy.tamuc.edu/apps/doc/CX3404400067/GVRL?u=txshracd2565&sid=GVRL&xid=b241e461

THECB. (2018, Spring). *2018 Texas Public Higher Education Almanac*. Retrieved from http://www.thecb.state.tx.us/reports/PDF/10900.PDF?CFID=86738635&CFTOKEN=96628409

Vygotsky, L. S. (1978). *Mind in society.* Cambridge, MA: Harvard University Press.

Wenger, E. (1998). *Communities of practice: Learning, meaning and identity*. New York, NY: Cambridge University Press.

Wenger, E. (2010). Communities of practice and social learning systems: The career of a concept. In C. Blackmore (Ed.), *Social Learning Systems and Communities of Practice* (pp. 179–198). London: Springer. doi:10.1007/978-1-84996-133-2

Wenger, E., Trayner, B., & de Laat, M. (2011). *Promoting and assessing value creation in communities and networks: A conceptual framework*. Heerlen, The Netherlands*:* Ruud de Moor Centrum, Open University of the Netherlands.

Wickham, H. (2014). Tidy data. *Journal of Statistical Software, 59*(10). Retrieved from http://www.jstatsoft.org/v59/i10/

Williams, A. S. (2010). Statistics anxiety and instructor immediacy. *Journal of Statistics Education, 18*(2), doi: 10.1080/10691898.2010.11889495

Yang, D. (2017). Instructional strategies and course design for teaching statistics online: Perspectives from online students. *International Journal of STEM Education*, *4*(1). doi:10.1186/s40594-017-0096-x

Identifying Significant Personal and Program Factors that Predict Online EdD Students' Program Integration

Amanda J. Rockinson-Szapkiw
University of Memphis

Joe Holmes

Jacqueline S. Stephens
Mercer University

Abstract
Based on a synthesis of persistence theory and the empirical literature, an online doctoral program integration model was developed using data from 232 online EdD students. A predictive, correlation design and regression analysis were used to examine if personal factors (gender, race, age, marital status, and presence of children in the home) and program factors (stage in doctoral journey, synchronous interactions, cohorts, and orientations) could predict program integration. The entire model was significant. The variables of gender, race, participation in a cohort, and engagement in synchronous communication individually contributed to the variance in program integration.

Keywords: Doctoral persistence; online; social integration; academic integration; faculty

Rockinson-Szapkiw, A.J., Holmes, J., & Stephens, J.S. (2019). Identifying significant personal and program factors that predict online EdD students' program integration. *Online Learning, 23*(4), 313-335. doi:10.24059/olj.v23i4.1579

Identifying Significant Personal and Program Factors that Predict Online EdD Students' Program Integration

Persistence of doctoral students has been discussed throughout the literature for decades. This discussion ensues as researchers continue to consistently report high attrition rates across both residential and online doctoral programs. For example, residential, doctoral attrition rates have been reported to range between 40% and 60% (Cassuto, 2013; Council of Graduate Schools, 2008, 2012). Some studies conducted on Doctor of Education (EdD) programs have reported attrition rates as high as 70% (Bowen & Rudenstine, 1992; Nettles & Millett, 2006). Researchers have also purported that online program attrition rates are often 10% to 20% higher than programs offered in residence (Heyman, 2010; Holder, 2007; Rovai, 2002; Terrell, Snyder, & Dringus, 2009). Smith (2010) documented that online dropout rates across programs range from 40% to 80%, and Bawa (2016), in a review of the literature on retention in online courses, noted that online student dropout rates continue to exceed the residential student dropout rates. The persistently high attrition rates across distance education and doctoral programs necessitates understanding "the process of student retention [which] differs" (Tinto, 2006-2007, p. 4) across programs and mediums Castelló, Pardo, Sala-Bubaré, and SuñeSoler (2017), in a survey study of 724 social sciences doctoral students across 56 institutions, noted, that even though high doctoral attrition rates have been documented for decades, little is still known about the reasons for their persistence and attrition. However, students' integration is vital in preventing dropout, and more needs to be understood about how institutions can promote integration, and thus, persistence. This, therefore, the study explores factors related to online EdD students' integration which has been associated with degree completion in distance and doctoral programs (Davidson & Wilson, 2013; Rockinson-Szapkiw, L.S. Spaulding, & M.T. Spaulding, 2016; Rovai, 2003).

Theoretical Framework

Integration is a key factor associated with the decision to leave or stay in a doctoral program. The concepts of social and academic integration are central to Tinto's (1975) seminal persistence work. Tinto (1975) posited that in order to persist, undergraduate students need to integrate into academic (e.g., evidenced by GPA) and social systems (e.g., extracurricular activities) within the university. Later, extending his work to doctoral students, Tinto (1993) suggested that doctoral student persistence is "shaped by the personal and intellectual interactions that occur within and between students and faculty and the various communities that make up the academic and social systems of the institution" (p. 231). Researchers have applied Tinto's (1975, 1993) work to doctoral (Wao & Onwuegbuzie, 2011) and online education (Rovai, 2003). Many have found academic integration and social integration associated with online and doctoral student persistence (Castelló et al., 2017; Ivankova & Stick, 2007; Rockinson-Szapkiw et al, 2016). Yet, other researchers have questioned the validity of academic integration and social integration as mutually exclusive constructs (Braxton & Lien, 2000; Braxton, Sullivan, & Johnson, 1997), especially for doctoral students (Lovitts, 2001; Tinto, 1993).

In an instrument validation study, Holmes and Rockinson-Szapkiw (2019) found that academic and social integration are intertwined for doctoral students in online programs. They purported that persistence is related to the term identified as *program integration* and is distinguished by who or what the integration is with (Holmes & Rockinson-Szapkiw, 2019). In other words, program integration is comprised of three factors—faculty integration, student integration, and curriculum integration. Faculty integration is online, doctoral students' satisfaction with both the quality and nature of the interaction the student has with faculty. This includes the academic interactions (e.g., instruction, receiving timely feedback) as well as nonacademic interactions (e.g. social, empathy, care). Similarly, student integration is students' satisfaction with both the quality and nature of peer interactions within the program, both academic and non-academic. Finally, curriculum integration is the satisfaction a doctoral student has with the quality and relevancy of the doctoral curriculum (Holmes & Rockinson-Szapkiw, 2019). Drawing upon the work of Holmes and Rockinson-Szapkiw (2019), we examined the factors that predict the program integration of online, doctoral students enrolled in EdD programs.

Review of Literature

Literature on doctoral and online students has revealed a myriad of factors are associated with both integration and persistence (Tinto, 1975; Bean & Metzner, 1985; Rovai, 2003). Personal factors, such as family, gender, race, ethnicity, and age can influence student integration and impact persistence. Additionally, program factors, such as stage, cohort, technology, and orientation can also affect students' integration and persistence.

Personal Factors

Marital status and presence of children in the home. Doctoral literature, focusing on both online and residential students, has shown that familial factors are of great significance to doctoral students' pursuit, integration, and persistence. In a grounded theory study aimed at explaining the persistence of online, doctoral students from backgrounds of poverty, Rockinson-Szapkiw, Spaulding, Swezey, and Wicks (2014) found that doctoral students' family members were motivators to complete the program. These findings support previous doctoral persistence research establishing an association between the family and doctoral persistence (Lott, Gardner, & Powers, 2009; Rockinson-Szapkiw et al., 2016). Having a supportive spouse is documented as a factor in doctoral program cess success. In a phenomenological inquiry, Spaulding and Rockinson-Szapkiw (2012) analyzed data from 76 individuals who completed their doctoral degrees in education across both online and residential programs. They noted that a spouses' s encouragement and support can provide the motivation needed to integrate and persist (Spaulding & Rockinson-Szapkiw, 2012).

In addition to being a spouse or partner, an online doctoral learner can be a parent, guardian, and primary caregiver (Baker, 2014; West, 2014). While many doctoral students attribute persistence to family support, many also report poor degree progression and integration associated with balancing their doctoral studies and families (Dabney & Tai, 2013). In a number of qualitative studies, doctoral students, namely women, explained that being married and having children during a doctoral can be stressful and salient in their lack of academic integration and persistence (Oswalt & Riddock, 2007; Rockinson-Szapkiw, Spaulding, & Lunde, 2017; Rockinson-Szapkiw, 2019; Smith, Maroney, Nelson, Abel, & Abel, 2006). For example, Brown and Watsons (2010) interviewed nine women enrolled in a residential Ph.D. program who identified three primary stressors, which included (a) the conflict between their roles as mothers and students, (b) the consistent balancing act of home and academic responsibilities, and (c) time for academics being slighted by family demands and responsibilities. Doctoral work often gets in the way of familial obligations, with students missing children's sports activities, dinners out, and even vacations due to program requirements (Spaulding & Rockinson-Szapkiw, 2012). These conflicting demands can have negative physical and emotional effects, leading to burnout, a break down , and increased time-to-degree (Rockinson-Szapkiw, et al., 2017; Wao & Onwuegbuzie, 2011), causing students to make difficult choices between their conflicting demands (Tinto, 1993). Other researchers have found that students who report being satisfied with the balance between academic work and personal or familial domains are more motivated to persist (Tanaka & Watanabea, 2012) and are less likely to voice the intention to drop out (Castelló et al., 2017). Having or not having children may influence an online, doctoral students' program integration as numerous studies have shown an association with having children, particularly for women, and lower levels of doctoral success (Brown & Watson, 2010; Dabney & Tai, 2013; Rosser & Lane, 2002).

Race, gender, and age. Theories and models for attrition and persistence have revealed student characteristics, such as age, gender, and race, influence integration and persistence (Tinto, 1975; Bean & Metzner, 1985; Rovai, 2003). Ongoing research has supported demographic factors as salient to both persistence and attrition. In one study, questions drawn from critical race theory were used to elicit narratives from Black and Latinx doctoral students for an ethnographic study on everyday lived experiences of racial and ethnic minorities (Gildersleeve, Croom, & Vasquez, 2011). Findings demonstrated that barriers to integration at the program and course levels existed due to several factors, such as self-censorship, lack of confidence, and the pronounced expectation to conform to established rules and gender and racial norms. These factors hindered scholarly aspirations and presented barriers to persistence. The findings are consistent with persistence and attrition models (Tinto, 1993; Bean & Metzner, 1985; Rovai, 2003) that demonstrated students who do not feel they "fit in" due to their race or gender are more likely to withdraw due to isolation. Student age has also been recognized as a characteristic that can impact persistence in adult learners (Tinto, 1993; Rovai, 2003), and age is a common variable that can impact nontraditional student persistence (Bean & Metzner, 1985). Gender, race, and age are factors that are often included in studies where a better understanding of doctoral attrition and persistence is sought (Castello et al., 2017; Gardner, 2009; Ellis, 2001).

Program Factors

Program stage. Although Tinto (1993) was not specific to online doctoral students, he suggested and the that membership in a community is beneficial to all doctoral students, but that levels of integration varies across doctoral program stages (Tinto, 1993). Similarly, other researchers have contended that students should be integrated throughout each stage of the doctoral journey (Gardner, 2009; Grover, 2007; Terrell et al., 2009; Tinto, 1993; Wao & Onwuegbuzie, 2011); however, integration ateach stage may take a different form and be dependent upon different people. Stage one is comprised of the first one-to-two years (the initial coursework stage) when students begin to integrate into their program, building initial relationships with peers and faculty (Rockinson-Szapkiw & Spalding, 2014). In stage two, student integration becomes more localized as communities comprised of the same student and faculty groups develop, and students acquire the knowledge and skills needed in their respective fields of study. In stage three (from candidacy through defense), the communities generally shrink to the students and faculty involved in the dissertation (Tinto, 1993). As students transition from the coursework stage of their doctoral journey to the more independent structure of the dissertation phase, researchers have demonstrated over and over that integration with social networks and supportive faculty are primary to their persistence (Ali & Kohun, 2007; Terrell et al., 2009; Zahl, 2015). However, at this final stage, students are more likely to feel disconnected and drop out due to a lack in sense of belonging or community (Terrell et al., 2009).

Cohort. In doctoral programs, cohorts have been defined as "a group of about 10-25 students who begin a program of study together, proceed together through a series of developmental experiences in the context of that program of study, and end the program at approximately the same time" (Lei, Gorelick, Short, Smallwood, & Wright-Porter, 2011, pp. 497-498). Research has demonstrated that a cohort can support doctoral students by encouraging interaction, providing structure, fostering cohesiveness, and providing opportunities for scholarship and practice. In a case study of residential educational doctoral programs, Bista and Cox (2014) found that students reported the cohort model as a structure that enabled faculty and peer support throughout the program. In a qualitative case study, Berry (2017) explored how first and second-year students in an online EdD doctoral program created a community. Findings demonstrated that online doctoral students' sense of community was derived from participation in cohorts, class groups, small peer groups, and study group. Cohorts were described as the "largest social sphere of influence within the program" (Berry, 2017, p. 39). Berry (2017) further suggested that the cohort provided structure and cohesion for students. It is this form of the established community via cohorts that Tinto (1993) suggested increased the likelihood of academic and social integration.

Online Communication, Synchronous, and Asynchronous. Throughout the online education literature, it is documented that connection with faculty members in the online environment is vital to students' integration into learning communities (Provident et al., 2015; Rademaker et al., 2016), and teaching presence, with the associated social presence, can be supported online through the use of technology (Rockinson-Szapkiw, Baker, Neukrug, & Hanes, 2010). Ivankova and Stick (2007) conducted a mixed methods study, surveying 278 doctoral online students within Doctor of Education programs and following up with in-depth interviews. A significant finding of the study was that doctoral students who persisted felt a high level of comfort with technology and online systems; they held the belief that the online environment was able to provide a doctoral experience comparable to a residential programme. For many students who successfully matriculate, the asynchronous communication provided the opportunity for deep reflection and created a learning environment conducive to their learning preferences (Ivankova & Stick, 2007). However, online doctoral students in other studies have reported that balanced use of both synchronous and asynchronous communication enhanced their sense of connection with faculty and peers, and ultimately, persistence (Teng, Chen, Kinshuk, & Leo, 2012; Fuller, Risner, Lowder, Hart, & Bachenheimer, 2014). Maul, Berman, and Ames (2018), in an exploratory case study of online doctoral programs (e.g., DBA, EdD, and PhD) in the dissertation phase, found that the use of online video coaching improved academic success, belonging and integration, and ultimately retention. The researchers also noted that the frequency of use may influence a doctoral students' success.

Orientation. Research findings also support the inclusion of orientation activities centered on student integration with faculty, advisors, and other students (Motte, 2019; Rosenblatt & Christensen, 1993; Taub & Komives, 1998). One study into patterns of attrition found that while it is at its highest during the first two years of a program, it also occurred during other stages (Di Pierro, 2007). As a result, research has recommended that orientation programs incorporate integration opportunities that span the duration of the journey, from students meeting their peers and program faculty at the onset of the program (Motte, 2019) to regular contact with a program advisor and dissertation chair during the final stage (Gittings, Bergman, Shuck, & Rose, 2018).

Current Study

The literature, which has been primarily qualitative in nature and focused on residential doctoral students, suggests a myriad of factors may be associated with the integration of online, EdD students. While these studies provide insight into factors associated with online doctoral students' integration, there is a need to examine these factors from a quantitative perspective. Therefore, grounded in persistence theory (Tinto, 1975, 1987, 1993) and research on distance doctoral integration (Holmes & Rockinson-Szapkiw, 2019), a model was created to examine the personal and program factors associated with online EdD students' program integration (see Figure 1). A multiple regression, a common method of predicting and modeling in educational (Warner, 2013), was used.

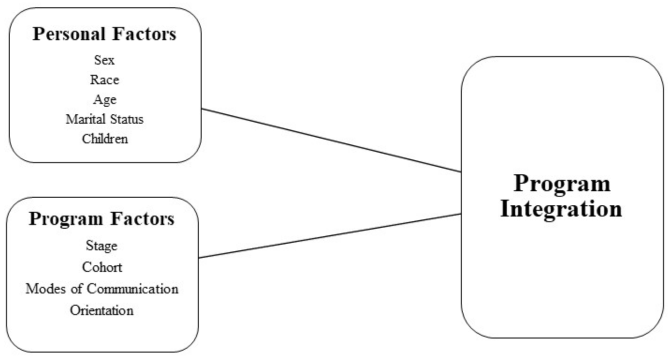

Figure 1. Model

Additionally, recognizing the variation across doctoral programs in education, we delimited this study to EdD programs who are part of the Carnegie Project for the Education Doctorate (CPED) initiative or have identified as professional EdD programs. For nearly 100 years, the debate has existed surrounding the distinction between the EdD and PhD in education (Perry, 2013). The Carnegie Project for the Education Doctorate (CPED) was created as "the first action-oriented effort to distinguish the EdD as a professional practice degree" (Perry, 2013, p. 113). Professional doctoral programs are distinguished as they bring together theory and practical application with the aim of creating a practitioner degree that better prepare leaders in education (Perry, 2013). The dissertation is often conducted in a practical application setting (Lee, Green, & Brennan, 2000; Maxwell, 2003).

Methods

Participants and Setting

Via a convenience and snowball sampling, in Spring of 2018, data were collected from 232 students enrolled in an online, professionally-focused Doctor of Education (EdD) programs at both public and private institutions. Researchers sent out emails and posted via professional organization listservs invitation to participate in an anonymous survey. In the invitation, the criteria for participation were outlined and students verified eligibility through a series of survey questions: 1) participation in a CPED or professional-focused EdD program and 2) participation in a program in which 80% of course work is taken online. Students reported that their online Doctor of Education (EdD) programs required between 54 and 63 credit hours.

The demographics of this sample were consistent with the National Science Foundation Report (2019) that demonstrates women and Caucasians were the primary recipients of social science and educational doctorates in the U.S. The majority of participants in this study were Caucasian (*n*=179, 77.2%) and women (*n* = 174, 75%). There were also 33 (14.2%) African American, 12 (5.2%) Hispanic, 3 (1.3%) Asian, 1 (.4%) American Indian, and 4 (1.7%) other classified participants. The majority reported their age range as 30-39 (*n* = 63, 27.2%) or 40-49 (*n* = 85, 36.6%). Most of the students were married (*n* = 187, 80.6%) with a little over half having children under 18 living in the home (*n* = 125, 53.9%). Almost all of the participants worked full time (*n* = 133, 89.9%) having positions as K–12 teachers, K–12 administrators, counselors, university staff, higher education faculty, and higher education administrators.

Instrumentation

The participants completed an online survey that consisted of validated instruments and researcher developed questions. Program integration served as the criterion variable and was measured using the Distance Doctoral Program Integration Scale (DDPIS; Holmes & Rockinson-Szapkiw, 2019). The 32-item self-report instrument measures *faculty integration*, *student integration*, and *curriculum integration*. Faculty integration represents satisfaction that doctoral students have with their faculty interactions, including both the quality and nature of those interactions. Student integration is the satisfaction level students feel with peer interactions. Finally, curriculum integration represents the level of satisfaction with the doctoral curriculum's quality and relevance. The results of an exploratory factor analysis demonstrated that the three subscales were latent dimensions of program integration. Cronbach's coefficient alpha for the full scale was .86. In the present study, the Cronbach alpha coefficient for full scale, which was used in this study to measure the criterion variable of program integration, is .93. The instrument contained statements such as *the personal relationships you developed with your fellow students* and *how you are finding the coursework in your program to be a good fit for you*. Respondents are asked to rate their level of satisfaction with the potential responses of highly satisfied (5) to highly dissatisfied (1). Scores ranged from 1-5, with higher scores indicating higher integration.

Program and personal variables served as the predictor variables in the study and each was assessed using single survey items. In some incidences the use of multiple items to measure a construct is preferable as it can increase the reliability (DeVellis, 2003); however, the precedent has been set that a well-worded item can measure a construct (e.g., Postmes, Haslam, & Jans, 2013). Moreover, it can be argued that the use of multiple items to measure a construct may result in common method variance, where "systematic error variance shared among variables measured with and introduced as a function of the same method and/or source" (Richardson, Simmering, & Sturman, 2009, p. 762). Considering the precedent and the literature, as well as the information we sought to ascertain, a single item was used to assess each program and personal variable. These predictor variables and the items used to measure each is summarized in Table 1.

Table 1.

Variables

Variable	Survey Question	Survey answer (dummy code or Likert-type scale)
Personal		
Gender	Please indicate your gender.	Male (1) Female (0)**
Race	Please indicate your race.	Caucasian (1) Black (0) Asian (0) Hispanic (0) American Indian (0) Other (0)
Age	Please indicate your age range.	Under 19 (1) 20-29 (2) 30-39 (2) 40-49 (4) 50-59 (5) 60-69 (6) 70-79 (7) 80-89 (8)
Marital Status	What is your marital status?	Married (1) Single (0) Widowed (0) Divorced (0) Other (0)
Children	Do you have children in your home under the age of 18?	Yes (1) No(0)
Stage	What stage of the program are you in?	Course work, year 1 (1) Course work (year 2 or 3) up to comprehensive exam (2) Dissertation (proposal) (3) Dissertation (research, passed proposal defense) (4)
Cohort	Are you part of a doctoral cohort?	Yes (1) No(0)
Synchronous Communication	How often do you participate in real-time (synchronous) program-related activities using web-based or mobile technology (e.g., live lectures, live discussions, live study groups, etc.)?	Weekly Monthly Every 2-3 months Every 4-6 months About 1-2 times a year Less than once a year Never
Orientation	Did you complete an orientation for your program?	Yes (1) No (0)

**Note. The other was included as an option, but it was not chosen as an answer by any participant.

Analysis and Findings

A hierarchical multiple regression analysis was conducted to examine how program integration can be explained by personal and program factors. This analysis was chosen as it is commonly used when researchers want to understand the relationship between predictor variables and a continuous criterion variable (Warner, 2013). Variables were entered into the model using temporal order and as guided by the literature. For example, personal factors were added into the model first as the students entered their doctoral program with these factors present. Assumption testing was completed prior to conducting the analysis. IBM SPSS version 25 was used to analyze the data.

Descriptive Statistics, Correlations, and Assumption Tests

Descriptive statistics for predictor and criterion variables are reported in Table 2. The mean and standard deviation for program integration is reported for each nominal variable.

Table 2.

Descriptive Statistics (N = 232)

Variable		*M*	*SD*	*n*
Program Integration (Criterion Variable)		2.32	.73	-
Personal Factors (Predictor Variables)				
Gender	Female	2.075	.159	174
	Male	2.433	.180	58
Race	Caucasian	2.448	.159	177
	Other	2.061	.181	55
Age	19 and under			0
	20-29	2.483	.186	16
	30-39	2.429	.101	63
	40-49	2.449	.101	85
	50-59	2.357	.124	46
	60-69	2.491	.178	20
	70-79	1.584	.668	1
	Over 80	1.986	.668	1
Marital Status	Married	2.233	.153	187
	Other	2.233	.153	45
Children	Yes	2.239	.180	125
	No	2.269	.160	107
Program Factors (Predictor Variables)				
Cohort	No	2.014	.159	180
	Yes	2.494	.182	52
Orientation	No	2.279	.166	134
	Yes	2.230	.171	98
Stage	Course work, year 1	2.205	.182	39
	Course work (year 2 or 3) up to the comprehensive exam	2.355	.182	63
	Dissertation (proposal)	2.203	.176	70
	Dissertation (research, passed proposal defense)	2.254	.184	60
Synchronous Communication	Weekly	2.433	.181	38
	Monthly	2.496	.185	27
	Every 2-3 months	2.211	.183	22
	Every 4-6 months	2.213	.281	8
	About 1-2 times a year	2.118	.211	43
	Less than once a year	2.052	.188	37
	Never	1.987	.194	57

A correlation matrix demonstrating the association among the predictor variables (see Table 3) was completed. While most of the bivariate correlation coefficients, including Pearson's *r*, Spearman ρ, and point-biserial correlation, were not statistically significant, some were. The bivariate correlation coefficients that were statistically significant had small effect sizes considering Cohen's (1992) conventions (i.e. $0.1 < | r | < .3$ = small, $0.3 < | r | < .5$ = moderate; and $| r | > .5$ = strong).

Table 3.

Correlation matrix (N = 232)

	1	2	3	4	5	6	7	8	9
1	—	.135*	0.0	0.1	0.0	-0.1	0.1	0.1	.151*
2		—	0.0	.137*	0.0	-0.1	0.0	0.1	0.1
3			—	0.1	.323**	.187**	-.150*	-0.1	0.1
4				—	-.268**	.234**	0.0	0.1	0.1
5					—	0.0	0.0	0.0	0.0
6						—	0.0	0.1	.170**
7							—	-0.1	0.0
8								—	.294**
9									—

Note: Predictor Variable (PV) Key: 1 = gender, 2 = race, 3 = age, 4 = marital status, 5 = children in home (18 or under), 6 = stage, 7 = synchronous communication, 8 = cohort, 9 = orientation.
*Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).

After calculating the descriptive statistics and prior to conducting the analyses, we conducted assumption tests for the six assumptions associated with a hierarchical multiple regression in order to ensure the robustness of the analysis with the data set, including (1) independence of observations, (2) linearity, (3) homoscedasticity, (4) multicollinearity, (5) no significant outliers, and (6) normality. No gross assumption violations were found, so the chosen parametric analyses were deemed robust and we continued by conducting the hierarchical linear regression analysis.

Results

We found that personal factors played a significant role in explaining program integration (F (5, 226) = 8.56, p <.001). Examination of the coefficient demonstrated that 15.9% (R^2 =.159) of the variance in program integration was explained by personal factors. When the program factors were added to the regression model, the model improved significantly (F_{change} (4, 222) = 8.21, p <.001, $R^{2\text{change}}$ =.108). The entire model containing the combination of the personal and program variables was significant (F (9, 222) = 9.01, p <.001), explaining 26.8% of the variance in online EdD students' program integration. Several variables made individual significant contributions to explaining program integration, including gender, race, participating in a cohort, and participating in synchronous meetings (see Table 4). Examination of the mean scores demonstrated that men and Caucasians on average had higher program integration scores than their women and minority counterparts (see Table 1). Online EdD students who participated in cohorts also perceived higher program integration than those that did not. Finally, as the frequency of synchronous communication increased, so did the student's program integration.

Table 4.

Hierarchical Regression Analysis Results for Both Blocks

	R^2	*F* Ratio	*B*	*SE*	β	*t*	*p*
Block 1*	.159	8.56					<.001
Block 2*	.268	9.01					<.001
Gender*			.388	.099	.232	3.901	<.001
Race*			.374	.101	.219	3.715	<.001
Age			-.030	.043	-.045	-.690	.491
Marital Status			-.053	.117	-.029	-.455	.649
Children			.036	.094	.025	.384	.701
Stage			-.007	.043	-.010	-.170	.865
Synchronous*			.072	.019	.220	3.748	<.001
Cohort*			.483	.106	.278	4.539	<.001
Orientation			-.013	.091	-.009	-.140	.889

Note. * $p < .05$

Discussion

Predictors examined included the personal variables (i.e., gender, race, age, marital status, and presence of children in the home) and the program variables (i.e., stage in the program, the presence of synchronous interaction, use of a cohort model, and participation in an orientation). The entire model was found to significantly predict online EdD students' program integration; thus, the findings cohere with previous research (e.g., Earl-Novell, 2006; Wao & Onwuegbuzie, 2011) and theory (Tinto, 1993). The variables of gender, race, being part of a cohort, and participating in synchronous meetings made significant individual contributions in explaining the variance in program integration.

Men and Caucasians were found to have higher program integration scores than their peers who were women and minorities. These findings are not surprising. While women may be the majority in online education doctoral programs, women and racial and ethnic minorities may experience difficulty integrating into the male-dominant and White social structures that dominate the online and higher education environment similar to the residential environment (Gardner, 2013; Rockinson-Szapkiw, Spaulding, & Lunde, 2017; Ward & Wolf-Wendel, 2017; von Prummer & Rossie, 2001). For example, in a qualitative study of women enrolled in an online EdD program, Rockinson-Szapkiw et al. (2017) purported that gendered norms and gendered communications negatively influenced women's integration and persistence. Within the findings, the researchers relayed the story of one participant who reported thoughts of leaving after experiencing several negative, gendered interactions with a male dissertation chair. Despite the fact that some researchers have noted that stereotypes are reduced in the online environment, other researchers have documented that minority student's experience in doctoral education has also been characterized as oppressive and dehumanizing (Gay, 2004), Underrepresented minority students and women across STEM and non-STEM doctoral programs report experiencing macroaggressions, which negatively influences students' sense of belonging and integrations (O'Meara, Griffin, Kuvaeva, Nyunt, & Robinson, 2017). This lack of integration related to negative stereotype and representation of races and gender has been found to influence doctoral degree completion rates (Ostrove et al., 2011) Moreover, scholars have noted that the online environment is "yet another institution where gender and power differences are constructed, and to ignore the ways that gender is under construction online is to ignore many difficult experiences of real people" (Kramarae, 2003, p. 269).

Normative gender roles associated with women may also make integration difficult. Expectations to do the majority of emotional (Erikson, 2005), material (Hochschild & Machung, 2012) and familial work often are placed upon women. Throughout the doctoral literature, women have more readily articulated the struggle between having a family and being a doctoral student (Hyun, Quinn, Madon, & Lustig, 2006; Rockinson-Szapkiw, Spaulding, & Lunde, 2017). Reportedly, women are advised by social systems, both internal and external to the higher education institution, to drop out of their doctoral programs when their doctoral responsibilities come in conflict with their familial ones. This is in contrast to the experience of men. A man's family members, not the man, is encouraged to sacrifice for the sake of the doctoral program (Carter, Blumenstein, & Cook, 2013). Consistent with previous theories, models, and literature on doctoral and online students (Tinto, 1975; Bean & Metzner, 1985; Rovai, 2003), the findings of this study demonstrated that both personal factors, as well as program factors, affect students' integration. Women and minority populations may experience struggles related to gender and racial norm online similar as they so in residential programs, leading to poorer program integration.

Online EdD students who participated in cohorts also perceived higher program integration than those that did not. These findings also similar with previous research on doctoral program structure (Bhandari et al., 2013; Shacham & Od-Cohen, 2009). Cohort models provide a structure that facilitates peer and faculty interactions; thus, increasing students' satisfaction with the nature and quality of interactions they have throughout the program (Bista & Cox, 2014). Those online EdD students not in a cohort may find it more difficult to connect with peers, for they may only have the opportunity to interact with a particular peer in one or two classes (Garrison & Arbaugh, 2007; Moore, 1989; Terrell et al., 2009).

Finally, as the frequency of synchronous communication increased so did students' program integration. Technologies offer opportunities for sustained communication and interaction between faculty and students (Rockinson-Szapkiw, et al., 2010); therefore, integration in an online course can be supported through the frequent use of synchronous web technologies, such as video conferencing software as previous research has found (Maul et al., 2018).

While the factors of age, marital status, stage in the program, and participation in an orientation did not make significant individual contributions, they were part of the model that was found to be significant. Although the regression analysis provided a useful tool for modeling the dependence of the program integration variable on the multiple variables, the analysis did not allow for complex modeling of interactions among variables. Therefore, more sophisticated modeling in future research is needed to further understand the significance and interaction of each variable in predicting program integration.

Implications

The results of this research indicated personal factors (i.e., gender, race, age, marital status, and presence of children in the home) and program factors (i.e., stage in the program, the presence of synchronous communication, use of a cohort model, and participation in an orientation) significantly predicted online EdD students' program integration. Doctoral conferring institutions and educators have the responsibility to support their online students' program integration and, thus, promote their persistence. By understanding how personal and program factors influence program integration, decision-makers can develop and implement interventions designed to increase satisfaction levels with the curriculum, peer integration, and faculty integration, thereby increasing doctoral student persistence.

The results in this study suggested that doctoral students in a cohort have higher program integration. While arguments have been made that implementing a cohort model can reduce the flexibility of a program for busy adult learners, a cohort provides a structure that supports peer connectedness. This connectedness can increase the likelihood of integration and persistence (Lovitts, 2001; Rovai, 2003). These authors, like Shulman (2010), argue for the use of a cohort experience in professional doctoral programs as the experience help doctoral students to integrate academically and provide social support throughout the degree process.

Findings also supported the frequent use of synchronous meeting to support connection and integration with peers and faculty, which many online doctoral students find difficult (Garrison & Arbaugh, 2007; Moore, 1989; Terrell et al., 2009). Therefore, specific actions to promote student-student, student-faculty, and student content are needed. Ivankova and Stick (2007) posited frequent interactions using online methods to interact promotes the creation of virtual communities. Rockinson-Szapkiw (2011) suggested creating "collaborative web-based workspace[s] to share documents and to facilitate ongoing discourse" (p. 1166) can increase factors associated with integration with peers, faculty, and the curriculum. Without connections and interactions, doctoral students may begin to feel isolated, and feelings associated with isolation have been found to be "the most frequently cited integration-related reasons" (Lovitts, 2001, p. 177) for departure. These findings also suggested that program and course level synchronous meetings should also be integrated into the program and curriculum to decrease isolation and increase integration.

Results in this study indicated women and monitories scored lower in their program integration than their Caucasian and male peers. As such, it is imperative to educate faculty on gender and racial differences. Specifically, institutions should develop programs that help faculty understand social, economic, political, educational, and cultural effects, internal and external to the institution, that race and gender may have had and may continue to have, and how those differences may affect integration and persistence. Consideration of gendered communication (Rockinson-Szapkiw et al., 2017), having a "personal touch" (Zhao et al., 2007), and recognizing and the unique experiences of women and underrepresented minorities in research training (McGee, 2016) are central to the doctoral students' satisfaction with the advisory relationship, which ultimately influences belonging and integration into the institution and discipline. Therefore, race and gender need to be considered in advising or mentoring relationship faculty develops with online doctoral students.

Numerous studies have found the fit between faculty advisor and student greatly influences doctoral students' integration and persistence (Golde, 2005; Leijen, Lepp, &

Remmik, 2016; Litalien & Guay, 2015; Lovitts, 2008), so diversity in faculty teaching in online programs should be ensured. For example, women may benefit from women advisors, mentors, committee members, and chairs they perceive to be more understanding of their life challenges (Rockinson-Szapkiw et al., 2017). By understanding personal and program factors that influence program integration, educators and doctoral students can better address integration-related issues and promote online doctoral student persistence.

Finally, race and gender should also be considered in supports developed for online doctoral students. For example, Rockinson-Szapkiw, Sosin, and Spaulding (2018) and Rockinson-Szapkiw et al. (2017), in studying women in online professional doctoral programs, noted that persistence and integration are connected to a women's ability to navigate the struggles of balancing family and academic work as well as integrate racial and gender identity dimensions with the developing scholar identity. Women and minorities in classes or via online support groups should be encouraged to share sacrifices, struggles, and accomplishments, which can be sources of inspiration and support for others (Marso, 2006). Sharing stories may also be a way to shed light on choices and structures that are perpetuating racial and gendered norms in the program, online environment, or within the homes of students. This may help students make conscious decisions to improve personal actions and to address cultural and social barriers.

Conclusion

Results of this study indicated both personal (i.e., gender, race, age, marital status, and presence of children in the home) and program variables (i.e., stage in the program, the presence of synchronous interaction, use of a cohort model, and participation in an orientation) influence program integration of the online doctoral students in this study. Further, the variables of gender, race, being part of a cohort, and participating in synchronous meetings made significant individual contributions in explaining the variance in student satisfaction with program integration. Nearly 30% of the variability in program integration was predicted by the identified personal and program variables. While this study provides insightful findings and implications for doctoral faculty and their role in supporting doctoral students' program integration, it is important to acknowledge this study has limitations and further research is needed.

We delimited this study to online doctoral students in professional EdD programs where at least 80% of the program was delivered online. Further research should be conducted with a wider audience to improve generalizability. Consideration should be given to exploring additional non-STEM and STEM online programs as well as PhD programs.

This was a correlational study that used multiple regression analysis. Thus, only an association among variables can be asserted. Further research and more complex modeling are needed to understand the interaction of all the variables in the model, especially those that were not significant individual contributors. This research only examined five personal and four program variables. Other personal and program factors should be examined. For example, self-motivation, employment obligations, and financial obligations have been identified as potential potentially influencing integration of doctoral and online students (Bean & Metzner, 1985; Earl-Novell, 2006; Ivankova & Stick, 2007, Spaulding & Rockinson-Szapkiw, 2012; Rovai, 2003; Tinto, 1993; Wao & Onwuegbuzie, 2011).

Experimental research is needed to examine the cause and effect relationship between specific doctoral program experiences and students' program integration. Additionally, variables in this study were measured using self-report items; thus, self-report bias may have been present. For example, participants may have avoided negative judgments and agreed with the statements more than they disagreed (Couch & Keniston, 1960). Future research may explore objective measures of program evaluation. Finally, consideration should be given to a longitudinal study to identify how personal and program factors influence program integration as students navigate the program stages.

Doctoral attrition rates are high (Cassuto, 2013; Council of Graduate Schools, 2008), and rates increase in online programs (Holder, 2007; Rovai, 2002; Terrell et al., 2009). The literature is clear that integration is a predictor of doctoral student persistence (Ivankova & Stick, 2007; Lovitts, 2001; Rockinson-Szapkiw et al., 2016; Wao & Onwuegbuzie, 2011). The results of this study add insight into the personal and program variables that influence program integration of doctoral students studying at a distance. Doctoral conferring institutions have an obligation to identify factors and develop interventions that promote program integration of their online doctoral students. Identifying specific personal and program variables, and how they influence the program integration of doctoral students in online programs, can go a long way in reducing the high online doctoral student attrition rates.

References

Ali, A., & Kohun, F. (2006). Dealing with isolation feelings at IS doctoral programs. *International Journal of Doctoral Studies, 1,* 21-33. Retrieved from http://ijds.org/Volume1/IJDSv1p021-033Ali13.pdf

Ali, A., & Kohun, F. (2007). Dealing with social isolation to minimize doctoral attrition: A four-stage frame-work. *International Journal of Doctoral Studies*, *2*(1), 33-49.

Ames, C., Berman, R., & Casteel, A. (2018). A preliminary examination of doctoral student retention factors in private online workspaces. *International Journal of Doctoral Studies, 13*, 79-107.

Bawa, P. (2016). Retention in online courses: Exploring issues and solutions—A literature review. *SageOpen,* 1-11, DOI: 10.1177/2158244015621777. Retrieved from https://journals.sagepub.com/doi/full/10.1177/2158244015621777#articleCitationDownloadContainer

Bean, J. P. & Metzner, B. S. (1985). A conceptual model of nontraditional student attrition. *Review of Educational Research, 55,* 485-540.

Berry, S. S. (2017). Student support networks in online doctoral programs: Exploring nested communities. *International Journal of Doctoral Studies*, 12, 33-48.

Bhandari, N. A., MacDonald, B. L., Martin, J. M., Modena, A., Simmons, J. M., Turner, W. D., & Asselin, S. (2013). Professional seminar: Valuing a one-credit course through the lens of doctoral students. *International Journal of Teaching and Learning in Higher Education, 25*, 346-357

Bista, K., & Cox, D. (2014). Cohort-based doctoral programs: What we have learned over the last 18 years. *International Journal of Doctoral Studies, 9*, 1-20. Retrieved from http://ijds.org/Volume9/IJDSv9p001020Bista0425.pdf

Bowen, W., & Rudenstine, N. (1992). *In pursuit of the Ph.D.* Princeton, NJ: Princeton University Press.

Braxton, J. M., & Lien, L. A. (2000). The viability of academic integration as a central construct in Tinto's interactionalist theory of college student departure. In J. M. Braxton (Ed.), *Reworking the student departure puzzle* (pp. 9-18). Nashville, TN: Vanderbilt University Press.

Braxton, J. M., Sullivan, A. S., & Johnson, R. (1997). Appraising Tinto's theory of college student departure. In J. Smart (ed.), *Higher education: Handbook of theory and research*, vol. 12 (pp. 107-164). New York, NY: Agathon.

Brown, L., & Watson, P. (2010). Understanding the experiences of female doctoral students. *Journal of Further and Higher Education*, *34*(3), 385-404. doi:10.1080/0309877X.2010.484056

Carter, S., Blumenstein, M., & Cook, C. (2013). Different for women? The challenges of doctoral studies. *Teaching in Higher Education, 18*(4), 339-351.

Cassuto, L. (2013). Ph.D. attrition: How much is too much? *The Chronicle of Higher Education*. Retrieved from http://chronicle.com/article/PhD-Attrition-How-Much-Is/140045/

Castelló, M., Pardo, M., Sala-Bubaré, A., & Suñe-Soler, N. (2017). Why do students consider dropping out of doctoral degrees? Institutional and personal factors. *Higher Education,* 1-16. https://doi.org/10.1007/s10734-0160106-9

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*(1), 155.

Couch**,** A. & Keniston, K. (1960). Yeasayers and nay-sayers: Agreeing response set as a personality variable. *Journal of Abnormal and Social Psychology, 60*, 151–174.

Council of Graduate Schools. (2008). *Ph.D. completion project: Program completion and attrition data*. Retrieved from http://www.phdcompletion.org/quantitative/book1_quant.asp

Council of Graduate Schools. (2012). *Attrition and completion*. Retrieved from http://www.cgsnet.org/attrition-and-completion

Dabney, K. P., & Tai, R. H. (2013). Female physicist doctoral experiences. *Physical Review Special Topics-Physics Education Research*, *9*(1). doi:010115-1-010115-10.

Davidson, C., & Wilson, K. (2013). Reassessing Tinto's concepts of social and academic integration in student retention. *Journal of College Student Retention: Research, Theory & Practice, 15*(3), 329-346. doi:10.2190/CS.15.3. b

DeVellis, R.F. (2003). *Scale development: Theory and application* (2nd ed.). Thousand Oak, CA: Sage Publication.

Di Pierro, M. (2007). Excellence in doctoral education: Defining best practices. *College Student Journal*, *41*(2), 368–375.

Earl-Novell, S. (2006). Determining the extent to which program structure features and integration mechanisms facilitate or impede doctoral candidate persistence in mathematics. *International Journal of Doctoral Studies*, *1,*45-57. Retrieved from http://www.ijds.org/Volume1/IJDSv1p045-057Earl16.pdf

Ellis, E. M. (2001). The impact of race and gender on graduate school socialization, satisfaction with doctoral study, and commitment to degree completion. *The Western Journal of Black Studies, 25*, 30-45.

Erikson, R.J. (2005). Why emotion work matters: Sex, gender, and the division of household labor. *Journal of Marriage and Family, 67*(2), 337-351.

Fuller, J., Risner, M., Lowder, L., Hart, M., & Bachenheimer, B. (2014). Graduates' reflections on an online doctorate in educational technology. T*echTrends: Linking Research & Practice to Improve Learning, 58*(4), 73–80.

Gardner, S. K. (2009). Student and faculty attributions of attrition in high and low-completing doctoral programs in the United States. *Higher Education, 58,* 97-112. https://doi.org/10.1007/s10734-008-9184-7

Gardner, S. K. (2010). Contrasting the socialization experiences of doctoral students in high and low completing departments: A qualitative analysis of disciplinary contexts at one institution. *The Journal of Higher Education, 81*(1), 61–81.

Gardner, S. K. (2013). Women faculty departures from a striving institution: Between a rock and a hard place. *Review of Higher Education, 36*, 349-370. https://doi.org/10.1353/rhe.2013.0025

Garrison, R. D., & Arbaugh, J. B. (2007). Researching the community of inquiry framework: Review, issues, and future directions. *The Internet and Higher Education 10*(3), 157-172. doi:10.1016/j.iheduc.2007.04.001

Gay, G. (2004). Navigating marginality en route to the professoriate: Graduate students of color learning and living in academia. *International Journal of Qualitative Studies in Education, 17,* 265–288. doi:10.1080/09518390310001653907

Gildersleeve, R. E., Croom, N. N., & Vasquez, P. L. (2011). "Am I going crazy?!": A Critical Race Analysis of doctoral education. *Equity & Excellence in Education, 44*(1), 93-114.

Gittings, G., Bergman, M., Shuck, B., Rose, K. (2018). The impact of student attributes and program characteristics on doctoral degree completion. *New Horizons in Adult Education and Human Resource Development, 30*, 3-22.

Golde, C. M. (2005). The role of the department and discipline in doctoral student attrition: Lessons from four departments. *The Journal of Higher Education, 76,* 669-700. https://doi.org/10.1353/jhe.2005.0039

Grover, V. (2007). Successfully navigating the stages of doctoral study. *International Journal of Doctoral Studies, 2*, 9-21. https://doi.org/10.28945/54

Herbert, M. (2006). Staying the course: A study in online student satisfaction and retention. *Online Journal of Distance Learning Administration, 9*(4). Retrieved from http://www.westga. edu/~distance/ojdla/winter94/herbert94.htm

Heyman, E. (2010). Overcoming student retention issues in higher education online programs: A Delphi study (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (ProQuest document ID: 748309429). Retrieved from http://search.proquest.com/docview/748309429?accoun tid=13360

Hochschild, A. & Machung, A. (2012). *The second shift: working families and the revolution at home*. New York, N.Y.: Penguin Books.

Holder, B. (2007). An investigation of hope, academics, environment, and motivation as predictors of persistence in higher education online programs. *The Internet and higher education*, *10*(4), 245-260.

Holmes, J. L., & Rockinson-Szapkiw, A. J. (2019, in press*).* The development and validation of the Distance Doctoral Program Integration Scale*. Online Learning Journal*.

Hyun, J. K., Quinn, B. C., Madon, T., & Lustig, S. (2006). Graduate student mental health: Needs assessment and utilization of counseling services. *Journal of College Student Development, 47*(3), 247-266.

Ivankova, N. V., & Stick, S. L. (2005). Collegiality and community-building as a means for sustaining student persistence in the computer-mediated asynchronous learning environment. *Online Journal of Distance Learning Administration, 8*(3).

Kramarae, C. (2003). Gender equity online, when there is no door to knock on. In M. G. Moore & W. G. Anderson (Eds.), *Handbook of Distance Education* (pp. 261-272). Mahwah, NJ; Erlbaum.

Lee, A., Green, G. & Brennan, M. (2000), Organisational knowledge, professional practice and the professional doctorate at work. In I. Garrick & C. Rhodes (Eds), *Research and Knowledge at Work: Perspectives, Case Studies and Innovative Strategies* (pp. 117-136). London: Routledge.

Lei, S., Gorelick, D., Short, K., Smallwood, L., & Wright-Porter, K. (2011). Academic cohorts: Benefits and drawbacks of being a member of a community of learners. *Education, 131*(3), 497-504. Retrieved from http://eric.ed.gov/?id=EJ996368

Leijen, Ä., Lepp, L., & Remmik, M. (2016). Why did I drop out? Former students' recollections about their study process and factors related to leaving the doctoral studies. *Studies in Continuing Education, 38*(2), 129-144. https://doi.org/10.1080/0158037X.2015.1055463

Litalien, D., & Guay, F. (2015). Dropout intentions in PhD studies: A comprehensive model based on interpersonal relationships and motivational resources. *Contemporary Educational Psychology, 41*, 218-231. https://doi.org/10.1016/j.cedpsych.2015.03.004

Lott, J. L., Gardner, S., & Powers, D. A. (2009). Doctoral student attrition in the STEM fields: An exploratory event history analysis. *Journal of College Student Retention: Research, Theory & Practice*, *11*(2), 247-266.

Lovitts, B. E. (2001). *Leaving the ivory tower: The causes and consequences of departure from doctoral study*. Rowman & Littlefield.

Lovitts, B. E. (2008). The transition to independent research: Who makes it, who doesn't, and why. *The Journal of Higher Education*, 79, 296-325. https://doi.org/10.1353/jhe.0.0006

Marso, L. J. (2006). *Feminist thinkers and the demands of femininity: The lives and work of intellectual women.* New York: Routledge, Taylor & Francis.

Maul, J., Berman, R., & Ames, C. (2018). Exploring the psychological benefits of using an emerging video technology to coach and retain doctoral learners. *International Journal of Doctoral Studies, 13*, 49-78. https://doi.org/10.28945/3954

Mason, M. & Maxwell, T. (2003). From first to second generation professional doctorate. *Studies in Higher Education, 28*(3), 279-291.

Moore, M. G. (1989). Editorial: Three types of interaction. *The American Journal of Distance Education, 3*(2), 1-7. doi:10.1080/08923648909526659

Motte, K. (2019). A grounded theory study of the ideal components of an orientation for a distance education doctor of education program: The perspectives of students, non-per sisters, alumni, faculty, and administrators. Unpublished doctoral dissertation, Liberty University, Lynchburg, VA.

Nettles, M. T., & Millett, C. M. (2006). *Three magic letters: Getting to Ph.D.* Baltimore, MD: John Hopkins University Press.

National Science Foundation. (2019). *Women, minorities, and persons with disabilities in science and engineering*. Retrieved from https://ncses.nsf.gov/pubs/nsf19304/digest

O'Meara, K., Griffin, K. A., Kuvaeva, A., Nyunt, G., & Robinson, T. (2017). Sense of belonging and its contributing factors in graduate education. *International Journal of Doctoral Studies, 12,* 12, 251-279. https://doi.org/10.28945/3903

Oswalt, S. B., & Riddock, C. C. (2007). What to do about being overwhelmed: Graduate students, stress and university services. *College Student Affairs Journal*, *27*(1), 24.

Ostrove, J. M., Stewart, A. J., & Curtin, N. L. (2011). Social class and belonging: Implications for graduate students' career aspirations. *The Journal of Higher Education, 82*(6), 748-774.

Perry, J. A. (2013). Carnegie Project on the Education Doctorate: The education doctorate-a degree for our time. *Planning and Changing, 44*(3), 113-126.

Provident, I. M., Salls, J., Dolhi, C., Jodi, S., Mattila, A., & Eckel, E. (2015). Design of an online curriculum promoting transformative learning in post professional doctoral students. *Online Learning Journal, 19*(3), 1-16.

Postmes, T., Haslam, S. A., & Jans, L. (2013). A single-item measure of social identification: Reliability, validity, and utility. *British Journal of Social Psychology*, *52*(4), 597-617.

Rademaker, L., Duffy, J. O., Wetzler, E., & Zaikina-Montgomery, H. (2016). Chair perceptions of trust between mentor and mentee in online doctoral dissertation mentoring. *Online Learning Journal, 20*(1), 1 – 13.

Richardson, H. A., Simmering, M. J., & Sturman, M. C. (2009). A tale of three perspectives: Examining post hoc statistical techniques for detection and correction of common method variance. *Organizational Research Methods*.

Rockinson-Szapkiw, A. J. (2010). Improving doctoral candidates' persistence in the online dissertation process. Retrieved from https://digitalcommons.liberty.edu/educ_fac_pubs/184

Rockinson-Szapkiw, A. J. (2019). Toward understanding factors salient to doctoral students' persistence: The development and preliminary validation of the Academic-Family Integration Inventory. *International Journal of Doctoral Studies, 14*, 237-258. https://doi.org/10.28945/4248

Rockinson-Szapkiw, A. J., Baker, J. D., Neukrug, E., Hanes, J. (2010). The efficacy of computer-mediated communication technologies to augment and support effective online helping profession education. *Journal of Technology in Human Services, 28,* 161-177.

Rockinson-Szapkiw, A. J., Sosin, L. S., & Spaulding, L. (2018). Does family matter? A phenomenological inquiry exploring the lived experiences of women persisting in distance education, professional doctoral programs. *International Journal of Doctoral Studies, 13*, 497-515. https://doi.org/10.28945/4157

Rockinson-Szapkiw, A. J., & Spaulding, L. S. (2014). Navigating the doctoral journey: A handbook of strategies for success. Lantham, MD: Rowman & Littlefield.

Rockinson-Szapkiw, A. J., Spaulding, L. S., & Spaulding, M. T. (2016) Identifying significant integration and institutional factors that predict online doctoral persistence. *The Internet and Higher Education, 31*, 101-112.

Rockinson-Szapkiw, A. J., Spaulding, L. S., & Lunde, R. M. (2017). Women in distance doctoral programs: How they negotiate their identities as mothers, professionals, and academics in order to persist. *International Journal of Doctoral Studies, 12*(7), 50-72. Retrieved from http://ijds.org/Volume12/IJDSv12p049-072Szapkiw2916.pdf

Rockinson-Szapkiw, A. J., Spaulding, L. S., Swezey, J. A., & Wicks, C. (2014). Poverty and persistence: A model for understanding individuals' pursuit and persistence in a doctor of education program. *International Journal of Doctoral Studies, 9*, 181–190 Retrieved from http://ijds.org/Volume9/IJDSv9p181-203Rockinson0606.pdf.

Rockinson-Szapkiw, A. J., & Walker, V. L. (2009). Web 2.0 technologies: Facilitating interaction in an online human services counseling skills course. *Journal of Technology in Human Services, 27*, 175-193.

Rosenblatt, H. S., & Christensen, C. (1993). "Welcome to the whole family": A graduate student orientation. *College Student Journal,* 27, 502–505.

Rosser, S. V., & Lane, E. O. N. (2002). Key barriers for academic institutions seeking to retain female scientists and engineers: Family-unfriendly policies, low numbers, stereotypes, and harassment. *Journal of Women and Minorities in Science and Engineering, 8*(2). https://doi.org/10.1615/JWomenMinorScienEng.v8.i2.40

Rovai, A. P. (2002). Sense of community, perceived cognitive learning, and persistence in asynchronous learning networks. *Internet and Higher Education, 5*, 319-332.

Rovai, A. P. (2003). In search of higher persistence rates in distance education online programs. *Internet and Higher Education, 6*, 1-16.

Rovai, A. P. (2014). Creating a scholarly community and collegial support system. In A. J. Rockinson-Szapkiw & L. S. Spaulding (Eds.), *Navigating the doctoral journey: A handbook of strategies for success* (pp. 9-18). Lantham, MD: Rowman & Littlefield.

Shea, P., Li, C., & Pickett, A. (2006). A study of teaching presence and student sense of learning community in fully online and web-enhanced college courses. *Internet and Higher Education, 9*(3), 175–190.

Smith, B. (2010). E-learning technologies: A comparative study of adult learners enrolled on blended and online campuses engaging in a virtual classroom (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database

Smith, R. L., Maroney, K., Nelson, K. W., Abel, A. L., & Abel, H. S. (2006). Doctoral programs: Changing high rates of attrition. *The Journal of Humanistic Counseling*, *45*(1), 17.

Shulman, L., (2010). Doctoral education shouldn't be a marathon. *Chronicle of Higher Education,* B9-B12.

Tanaka, M., & Watanabea, Y. (2012). Academic and family conditions associated with intrinsic academic motivation in Japanese medical students: A pilot study. *Health Education Journal, 71*, 358-364. https://doi.org/10.1177/0017896911401004

Taub, D., & Komives, S. R. (1998). A comprehensive graduate orientation program: Practicing what we preach. *Journal of College Student Development,* 39, 394–398.

Teng, D., Chen, N., Kinshuk, & Leo, T. (2012). Exploring students' learning experience in an international online research seminar in the Synchronous Cyber Classroom. *Computers & Education, 58*, 918–930.

Terrell, S. R., Snyder, M. M., & Dringus, L. P. (2009). The development, validation, and application of the doctoral student connectedness scale. *Internet and Higher Education*, 112-116.

Terrell, S. R., Snyder, M. M., & Dringus, L. P. (2012). Grounded theory of connectivity and persistence in a limited residency doctoral program. *The Qualitative Report 17*(62), 1-14.

Terrell, S. (2005). A longitudinal investigation of the effect of information perception and focus on attrition in online learning environments. *The Internet and Higher Education, 8*(3), 213-219

Tinto, V. (1975). Dropout from higher education: a theoretical synthesis of recent research. *Review of Educational Research, 45*(1), 89-125.

Tinto, V. (1987). *Leaving college.* Chicago, IL: The University of Chicago Press.

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of candidate attrition* (2nd ed.). Chicago, IL: The University of Chicago Press.

Tinto, V. (2006-2007). Research and practice of student retention: what next? *Journal of College Student Retention: Research, Theory & Practice, 8*(1), 1-20.

Tinto, V. (2012). *Completing college: Rethinking institutional action.* Chicago, IL: University of Chicago Press.

Ward, K. A., & Wolf-Wendel, L. E. (2017). Mothering and professing: Critical Choices and the Academic Career. *NASPA Journal About Women in Higher Education, 10*(3), 229-244, doi: 10.1080/19407882.2017.1351995

Warner, R. M. (2013). *Applied statistics: from bivariate through multivariate techniques: from bivariate through multivariate techniques*. CA: Sage Publications.

Wao, H. O., & Onwuegbuzie, A. J. (2011). A mixed research investigation of factors related to time to the doctorate in education. *International Journal of Doctoral Studies*, *6*, 115-134. Retrieved from http://ijds.org/Volume6/IJDSv6p115-134Wao320.pdf

Zahl, S. B. (2015). The impact of community for part-time doctoral students: How relationships in the academic department affect student persistence*. International Journal of Doctoral Studies, 10*, 301-321. Retrieved from http://ijds.org/Volume10/IJDSv10p301-321Zahl0672.pdf

Zhao, C. M., Golde, C. M., & McCormick, A. C. (2007). More than a signature: How advisor choice and advisor behaviour affect doctoral student satisfaction. *Journal of Further and Higher Education, 31*, 263-281. https://doi.org/10.1080/03098770701424983

A Professional Learning Program for Novice Online Teachers Using Threshold Concepts

Maria Northcote, Peter Kilgour, and Daniel Reynaud
Avondale University College, Lake Macquarie, NSW, Australia

Kevin P. Gosselin
HonorHealth Research Institute, Scottsdale, Arizona, USA, and A.T. Still University, Mesa. Arizona, USA

Catherine McLoughlin
Australian Catholic University, Canberra, Australian Capital Territory, Australia

Abstract
The professional development of online teachers is now commonplace in higher education. Alongside the relatively straightforward decision to provide professional learning support for novice and experienced online educators within universities, decisions about the nature and content of such support are not always as clear cut. The study aimed to gather evidence about the online teaching and learning experiences and views of current students and staff which, in turn, informed a set of pedagogical guidelines that could be used as the basis of professional learning programs for novice online teachers. Using a mixed methods research design, data were gathered using questionnaires, reflective journals, and focus groups to determine the threshold concepts about online teaching and perceptions of ideal online learning environments. As well as identifying threshold concepts about online teaching and perceptions of teachers' and students' ideal views of online learning contexts (reported elsewhere), the study produced curricular guidelines to inform the design of professional development outputs for online teachers in higher education. This article reports on an example of how these professional development guidelines, based on identified threshold concepts of online pedagogy, were implemented at one higher education institution to provide wide-scale implementation of a professional development program for academic staff engaged in online teaching.

Keywords: threshold concepts, online teaching, professional development curricula

Northcote, M., Gosselin, K.P., Kilgour, P., Reynaud, D., & McLoughlin, C. (2019). A professional learning program for novice online teachers using threshold concepts. *Online Learning, 23*(4), 336-353. doi:10.24059/olj.v23i4.1573

A Professional Learning Program for Novice Online Teachers Using Threshold Concepts

The professional development (PD) of online teachers is now commonplace in most universities. While the nature and delivery mechanisms of PD programs vary across institutions and countries, it is typically acknowledged by university administrators that faculty staff engaged in online course design, development, and teaching require support. For novice online educators, this support is crucial in that it not only can *make or break* the quality of the teacher's experience when facilitating online courses, it also has a direct impact on the quality of students' learning experiences in online courses. Support for the development of skills and knowledge about online teaching can be offered in the form of on-campus or online activities (such as workshops, guest speakers, mentoring programs) and resources (such as self-help and "how-to" instructions, and exemplars of good practice). Such provisions seek to maximise faculty staff engagement (Elliott, Rhoades, Jackson, & Mandernach, 2015). In many cases, the provision of activities and resources is structured within a goal-driven PD program, often administered by a central learning and teaching centre of a university. Other educators have used reflection models about teacher knowledge to evaluate their own online practices (Baran, Correia, & Thompson, 2013). While the actual need for professional learning support for novice and experienced online educators within universities is usually undisputed, decisions about the nature and content of such support are not always as clear. Furthermore, the evidence for such decisions is not always based on evidence or research findings (Hill, Beisiegel, & Jacob, 2013).

The authors of this paper have previously published in the area of establishing threshold concepts about online learning and their application to online teaching. A research-based method of identifying threshold concepts has been developed (Kilgour, Reynaud, Northcote, McLoughlin, & Gosselin P, 2018) and used to explain the connection between threshold concepts and the development of professional development for teachers in the online area (Northcote, Gosselin, Reynaud, et al., 2017) as well as how threshold concepts about online pedagogy can be used to improve the online learning environment (Gosselin, Northcote, Reynaud, et al., 2016). This paper contains our recommendations for practice and provides a specific example of how the prepared guidelines have been implemented on a college-wide basis for academic staff involved in online learning. Previous publications that have reported on earlier stages of the study have been used as building blocks to identify professional development recommendations.

More specifically, this article presents an example of how PD guidelines, drawn from investigating the threshold concepts of experienced online teachers, have been implemented in one specific institutional context especially for novice online teachers. Within this institution, threshold concepts were viewed as transformed ways of thinking about online teaching that can enable the teacher to progress to more advanced ways of thinking about and practising online teaching. This interpretation of threshold concepts is based on Meyer and Land's (2003) definition of a threshold concept as "akin to a portal, opening up a new and previously inaccessible way of thinking about something … a transformed way of understanding, or interpreting, or viewing something without which the learner cannot progress" (p. 1). The identification of threshold concepts associated with online pedagogy formed a framework that was used to inform pedagogical guidelines to transform the capacities of novice online teachers in a specific institution. As well as using threshold concepts about online teaching as the basis of these guidelines, students' and teachers' perceptions of ideal online contexts were also considered. Together, the threshold concepts and perceptions of online environments informed a set of PD guidelines that were applied at one small higher education institution, Avondale University College, in NSW, Australia.

The article that follows outlines a brief literature review that presents recent ways of thinking about PD and the use of threshold concepts to identify key points of PD curricula. The idea of using threshold concepts to identify key curricula components has been extended into the area of PD, with a particular emphasis on online teaching in higher education. Following the literature review, the methodology adopted in this research study is outlined, followed by the findings identified from an analysis of data gathered from higher education teachers and students through questionnaires, focus groups, and reflective journals. Finally, a set of PD guidelines is presented along with a description of how these guidelines were applied in the design of a professional learning program for novice online teachers in one higher education institution.

Review of Literature

Threshold concepts (Meyer & Land, 2005, 2006) and troublesome knowledge (Perkins, 2006) have been used as lenses through which to identify core knowledge in the curricula of a range of disciplines. This approach to analysing curricula in courses designed for university students has the potential to determine the most difficult or challenging concepts encountered during the learning process. Such concepts have been noted across many learning contexts as being especially significant or troublesome for learners in the past. Knowledge about these concepts has been used in a variety of disciplines, such as mathematics, economics, and physics (Davies & Mangan, 2008; Jooganah, 2010; Mills & Wilson, 2012), to assist teachers in the design of course curricula. Cousin (2006) suggests the study of threshold concepts can be used to overcome a "stuffed" curriculum by identifying "jewels in the curriculum" (pp. 4-5). While this approach has been used in the design of courses for students, the pedagogical lens of threshold concepts can be used to pinpoint the concepts that form the basis of knowledge held by experienced online teachers in relation to PD for faculty teaching staff. Consequently, this knowledge can be used to inform the design of PD curricula for novice online teachers, an important subset of faculty teaching staff.

In the past few decades, many researchers and educators engaged in PD have created best practice recommendations for the design and teaching of online courses. These have typically been put forward by educators who have investigated the experiences of teachers transitioning into online education (for example, Baran, Correia, & Thompson, 2011; Bonk & Dennen, 2003; Garrison & Anderson, 2000). Yet, apart from Boyd and Lonsbury's (2016) recent investigation into the threshold concepts associated with course design and the three phases of an earlier project conducted by some of the researchers in this project (Gosselin, Northcote, Reyaud, et al., 2016; Northcote, Gosselin, Reynaud, Kilgour, & Anderson, 2015; Northcote, Reynaud, Beamish, Martin, & Gosselin, 2011), research is lacking about the specific threshold concepts held by online educators who design and teach university courses. To contextualise online teachers' threshold concepts, the features of these need to be defined within a PD setting that recognizes, firstly, the unique nature of online education and, secondly, the transformative process that novice online teachers experience as they move from teaching in a traditional, on-campus mode to an online mode of teaching.

Nevertheless, a considerable amount of related literature on essential elements of online learning design can be connected to and augment the current perspective of the threshold concepts framework. This literature, based on empirical research, has also aimed to explore high quality teaching and learning approaches in order to improve student learning outcomes and the associated implications for professional learning. This literature helped us to consider the learner's experience where the learner is the novice online educator developing PD processes, a perspective essential for online teachers who espouse constructivist, learner-centred, online teaching pedagogies. For students new to online learning, they often encounter challenging situations or learning thresholds that are associated with communicating meaningfully using online communication tools (Conole, De Laat, Dillon, & Darby, 2008). These practices link to the Community of Inquiry model (CO1) by Garrison, Anderson, and Archer (2000), a robust learner-centred approach to creating a deep and meaningful (collaborative-constructivist) learning experience through the development of three interdependent elements: social, cognitive, and teaching presence.

Following the seminal work of Garrison et al. (2000) we can see that theories and models of effective online teaching and learning agree on the fundamental qualities and features that differentiate online from face-to-face learning. By far the most recognised has been Laurillard's Conversational Framework (1993) which, again, provides an overarching framework for the design of online learning. For Laurillard, students are active participants constantly in the process of acquiring "ways of seeing the world" (in other words, grappling with threshold concepts) as they engage and learn how to learn in online spaces. Associated pedagogic strategies for teachers to teach online necessarily involve consideration of different forms of communication and associated interactive activities designed for students to engage in conversation through discussion, adaptation, interaction, and reflection using multiple media. Significantly, these elements are fundamental to the transformation of learner mindsets and practices, and also apply to teachers who need to learn how to engage students with social media, enabling creation of content and use of multiple media to express ideas and collaborate online. These practices require a transformation in how both teachers and students think and learn and therefore "can be considered as akin to a portal, opening up a new and previously inaccessible way of thinking about something. It (sic) represents a transformed way of understanding, or interpreting, or viewing something without which the learner cannot progress" (Meyer & Land, 2003, p. 1). Similarly, frameworks for e-learning created by Gilly Salmon (2013) are based on the assumption that teacher mindsets must be transformed to adopt new practices.

Novice online educators, like the students they will teach, must transform their thinking and online practices in the light of these principles. This pedagogic transformation, to create learning environments where social, cognitive, and teaching presence are essential, is a vital element of the teaching and learning process in virtual learning spaces and has underpinned the perspectives of the current researchers as they developed PD concepts and processes for novice online teachers.

In addition, the perceptions of teachers and students about online learning environments also need to be considered. Earlier studies on perceptions of teachers towards online education have revealed the reluctance of teachers to teach online because of concerns that web-based delivery may have an impact on the quality of pedagogy, learning, and student-teacher interaction (Ward, Peters, & Shelley, 2010). Similar studies identified other factors that tend to contribute to teachers' concerns about online teaching: entrenched approaches to instruction and/or lack of confidence with online pedagogy, and perceived inadequacies of online environments to enable effective learner engagement (Green et al., 2010).

The current investigation into threshold concepts relating to online education and the preceding investigations of the distinct features of online learning are based on evidence-based inquiry into what constitutes effective web-based pedagogy. The earliest instruments were advocated by Fraser (1998) as a means of investigating learning environment perceptions in guiding pedagogy and taking into consideration students' preferences. Later, Trinidad, Aldridge, and Fraser (2005) reported on how the development and use of an instrument (Online Learning Environment Survey, OLES) was designed to help educators assess the quality of e-learning environments that they were creating. The OLES used eight scales that were considered important in an e-learning environment, including 1) computer usage; 2) teacher support; 3) student interaction and collaboration; 4) personal relevance; 5) student autonomy; 6) authentic learning; 7) equity; and 8) asynchronicity. A revised version of this instrument was developed in the current study, with permission from the original authors, to assess instructors' perceptions of effective online pedagogy and, from this perspective, to develop threshold concepts as they could be applied to online pedagogy. Young and Norgard (2006) reiterated the need for universities to pay close attention to learner perceptions in order to ensure retention and active participation in online education. Later recommendations regarding effective instructor pedagogy have emphasised personalisation and the need to foster self-regulation among learners (McLoughlin & Lee, 2009). More recently, Ashong and Commander (2012) and Mbati and Minnaar (2015) have emphasised the unique features of online learning and the need to take into consideration how students learn and the challenges they experience when transitioning to online delivery of courses.

In light of recent developments in PD programs for online teachers within universities and the lack of clarity regarding decisions about the selection of content for these programs, there remains a need to establish an evidence-based, research-informed approach to guide the development of professional learning programs for novice online teachers. The method by which a set of PD guidelines for online novice teachers was developed has been outlined in a previous publication (Northcote, Gosselin, Kilgour, McLoughlin, & Boddey, 2017); this article outlines an example of how these guidelines have been applied in one higher education institution. Consequently, the research reported in this article answers the following research question: Having identified teachers' threshold concepts about online teaching, and students' and teachers' perceptions of online learning contexts, how can a set of PD guidelines be applied to design PD curricula to transform the capacities of novice online teachers in higher education?

Method

This article reports on the culmination of a series of investigations that systematically derived a set of threshold concepts that are seen to be essential for beginning online higher education teachers. From the start, this project adopted a mixed methods multiphase design (Creswell & Plano Clark, 2011) which ensured that each phase was linked and that the combined qualitative and quantitative data were connected as they were gathered, analysed, and interpreted. The research aimed to address the following overarching research questions:

1) What are the threshold concepts that teaching staff encounter when they learn about online learning and teaching?
2) Is there a difference between self-efficacy and threshold concepts encountered by staff who are experienced or inexperienced in online learning and teaching?
3) How can the identification of the threshold concepts be used to inform future academic staff development programs and processes?

The entire study took place across three phases. The specific methodology, participants, and outcomes are provided to inform the current study aim of describing the initial application of professional development guidelines.

Phase 1: Threshold concepts about online teacher were identified by using the OTSEI (Online Teaching Self-Efficacy Inventory) questionnaire (Gosselin, 2009) together with reflective journals kept by faculty staff. Ninety-five faculty staff completed the OTSEI and 70 faculty staff completed reflective journals. By triangulating these sources of data, a set of threshold concepts for novice online teachers was developed. Using a modified version of the Delphi Method (Keeney, Hasson, & McKenna, 2006, 2011; Powell, 2003), this collection of threshold concepts was then distributed to 16 specialists with expertise in the area of threshold concepts and online learning who were asked to indicate their agreement or disagreement with each threshold concept that had been developed. Where 80% or more of the experts agreed with each proposed threshold concept, it was adopted into the list of threshold concepts for novice online higher education teachers.

During this phase of the study, data were gathered from higher education faculty staff and students to discern their views of ideal online learning environments. Permission was sought from the original researchers of the OLES (Online Learning Environment Survey) instrument (Pearson & Trinidad, 2005; Trinidad et al., 2005) to modify the existing questionnaire for Australian culture and practice. This instrument was administered to teachers and students. As well as this quantitative measure, focus groups were conducted with experienced and novice teachers in the online domain. The OLES data were analysed using factor analysis, descriptive statistics and correlations while content analysis was used for the focus group data.

Phase 2: For the second phase, the threshold concepts were considered individually by the research team through the lens of novice online teachers, and questions were asked about each threshold concept as to whether it would help novice teachers "know, apply, understand, or accept." PD curriculum guidelines were then developed using the data collected across earlier project phases from 54 faculty participants. These were categorised into two groups, including guidelines at the: 1) institutional level; and 2) academic staff level.

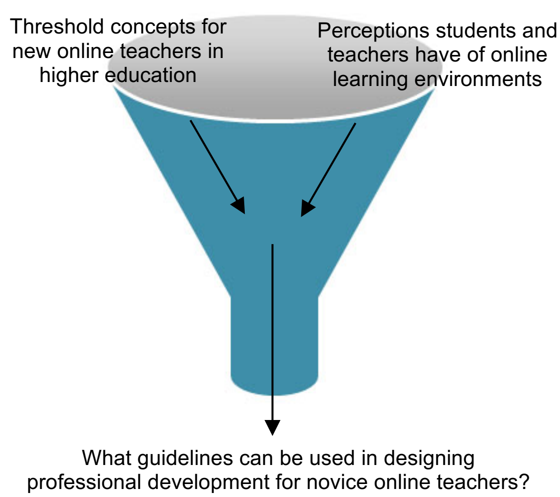

Figure 1. Arriving at PD guidelines using results from data collected earlier in the project

As can be seen from Figure 1, establishing guidelines for a PD curriculum for novice online teachers in higher education was the outcome of considering the threshold concepts developed in the study's first phase, along with student and teacher perceptions of online learning environments arrived at during the second phase of the study. Results were identified from the earlier stages of the study by triangulating data gathered from two validated quantitative questionnaires, teacher reflective journals, focus groups, and an international panel of experts to arrive at recommendations for developers of curriculum materials to upskill novice teachers of online courses in higher education.

Phase 3: Phase 3 is the focus of this article and reports on the initial implementation of derived evidence-based PD program. Although this article reports on the use of these PD guidelines in one higher education institution, outcomes from this final phase of the study were arrived at by collating and building upon data gathered from the earlier phases, including a consultation with a group of experts in the field of threshold concepts during Phase 1.

For the purposes of this article, the earlier stages of the project were used to guide the content and format of an institutional PD program, including relevant resources and activities, that were designed to further develop the capacities of novice higher education online teachers.

Results: Application of the PD Guidelines

The research processes described above have drawn together diverse sets of data from the voices of many stakeholders in online education including students, teachers, experts, administrators, and researchers. These varied views were used to produce a set of pedagogical design guidelines for novice online educators in universities. The construction of these guidelines drew upon the twelve threshold concepts that were identified early in the project (Kilgour et al., 2018). For example, these threshold concepts of online pedagogy were grouped into three clusters, including preparation and course design, online presence, and interaction and relationships. The PD guidelines also reflected these three main areas of online teaching. Some of the threshold concepts about online pedagogy have been noted below, in relation to the most relevant PD guidelines.

The PD guidelines produced from this project are intended to provide advice to PD staff and university administrators about support for novice online teachers in their ongoing professional learning about being a course designer and teacher, both tasks being integral to the work of a university educator involved in virtual education. Specifically, these guidelines provide advice for how to support the development of the capacities of novice online teachers by attending to both wide-scale institutional support mechanisms, such as policies and support services, as well as support at the academic staff level, including assisting novice teachers, to develop their capacity to prepare and design courses, to establish presence in online courses, and to promote interaction and the development of relationships in their courses. When considering the context in which to apply these guidelines, educators, administrators, and researchers are encouraged to note two levels of influence in which these guidelines are presented; they are intended to cross-link at both the institutional *and* academic staff level, as outlined in an earlier publication associated with this project (Northcote, Gosselin, Kilgour, et al., 2017).

To date, the PD guidelines have been applied to one higher education context, at the institutional level to some extent and to the academic staff level. These guidelines, published in full elsewhere (Northcote, Gosselin, Kilgour, et al., 2017), are summarised below alongside a selection of illustrative examples that demonstrate how each of these recommendations has been applied in practice in one institution. The wide-scale recommendations that have been applied across the institution have been grouped into the following five categories, with some examples of the threshold concepts of online pedagogy identified in an earlier stage of the project (Kilgour et al., 2018).

1) Manage student expectations about engaging in online courses

Example 1: Student expectations are articulated and integrated into course outlines, course expectations and assessment task instructions.

Example 2: Assessment-related policies have been revised to establish student expectations regarding participation in online courses.

Relevant threshold concepts:

- Students can learn without the teacher being present.
- Students need to be encouraged to be more self-regulated in an online course than in an on-campus course.

2) Course equity across on-campus and distance courses

Example 1: Separate on-campus and distance courses have now been combined, enabling fluidity between modes of study.

Example 2: Alternative but equitable learning experiences and materials are offered for distance and on-campus students within the combined courses, with some overlaps.

Relevant threshold concept:

- Online presence is different from on-campus presence.

3) Instructor Support enabling teachers time and resources to practise online skills

Example 1: Online tutorials and on-campus workshops have been offered to faculty staff to learn and practice their online communication skills.

Example 2: Videoconferencing software has been installed across the institution, with supporting manuals being available for teaching staff. This change in the institution's infrastructure facilitates online "face-to-face" interaction between distance and on-campus lecturers and students.

Relevant threshold concept:

- Preparation for designing and planning online teaching may take longer than preparation for on-campus teaching.

4) Set clear expectations for students about receiving communication from teachers

Example 1: Online courses provide information to students at the beginning of the semester regarding expectations of communication reply times.

Example 2: Students are provided modelled guidelines about corresponding with other students and their teachers.

Relevant threshold concepts:

- Students can learn without the teacher being present.
- Students need to be encouraged to be more self-regulated in an online course than in an on-campus course.
- Synchronous communication methods in online learning contexts, while sometimes challenging to facilitate, have many learning benefits.

5) Workload planning and allocation for online teaching staff

Example 1: Workload allocations for academic teaching staff allow for additional time to design and facilitate online courses.

Example 2: Academic teaching staff are encouraged to set time aside for teaching online students, equivalent to time allocated for teaching on-campus students.

Relevant threshold concepts:

- Online course design is critical to the success of online teaching and learning.
- Preparation for designing and planning online teaching may take longer than preparation for on-campus teaching.

Based on the wide-scale recommendations implemented across the institution, current polices were updated and new policies were developed to address assessment, attendance, and technology for online teaching and learning. To support the implementation of wide-scale institutional recommendations, several recommendations regarding support services have been instituted. These support services are particularly useful to provide training to novice online teachers in why, how, and when to teach online. The recommendations regarding support services applied at the institution have been grouped into the following seven categories, with an example that illustrates how each of these recommendations has been applied in practice.

1) Online communication software and tools

Example: Introduction of video-conferencing software across the institution

Relevant threshold concepts:

- Online presence requires interactive elements.
- Online learning requires a new mode of interaction between facilitators, students and resources.
- Online teaching requires facilitating interaction, not only presenting content.
- Synchronous communication methods in online learning, while sometimes challenging to facilitate, have many learning benefits.

2) Online assessment and feedback-provision tools

Example: Introduction of Turnitin software and staff training for how to use assessment feedback provision tools.

Relevant threshold concept:

- An online course must be designed to have specific mechanisms to communicate, monitor and give feedback to groups of students as well as individual students.

3) Meet needs of online and on-campus students in the same LMS

Example: Combined courses (for distance and on-campus students) have been implemented for all courses.

Relevant threshold concepts:

- Students can learn without the teacher being present.
- Online presence is different from on-campus presence.
- Students need to be encouraged to be more self-regulated in an online course than in an on-campus course.

4) Ensure courses are structured in an engaging manner

Example: Professional development on-campus workshops, online tutorials, and showcases have been provided to instruct faculty staff how to structure an online course.

Relevant threshold concepts:

- Online course design is critical to the success of online teaching and learning.
- Online course design needs alignment between learning activities, assessment tasks and feedback mechanisms to ensure student engagement.
- Online presence requires interactive elements.
- Online teaching requires facilitating interaction, not only presenting content.
- Synchronous communication methods in online learning, while sometimes challenging to facilitate, have many learning benefits.

5) Professional development about clarifying instructions

Example: Support for faculty staff about how to clarify instructions and expectations in online courses has been integrated into many PD materials and activities.

Relevant threshold concept:

- Students can learn without the teacher being present.

6) Develop an online teaching presence that does not dominate

Example: Online course templates have been developed and made available for all teaching staff, with modifications to suit different disciplines.

Relevant threshold concepts:

- Online presence is different from on-campus presence.
- Online presence, while elusive, must be pursued.
- Online presence requires interactive elements.

7) Scaffold, guide and stage learning activities and processes

Example: Provision of PD materials including instructions on how to scaffold, guide and stage learning activities.

Relevant threshold concept:

- Online course design needs alignment between learning activities, assessment tasks and feedback mechanisms to ensure student engagement.

Finally, to further support the implementation of wide-scale institutional recommendations and the recommendations regarding support services, a set of guidelines at the academic staff level were also employed at the institution. These have been grouped into three curriculum-related categories with some examples of how these guidelines have been applied in practice.

1) Preparation and course design

Example 1: Peer-review templates and checklists have been developed to ensure alignment to course learning outcomes.

Example 2: Current policies and PD activities are currently being developed that clarify expectations regarding regular interactive nature of communication between lecturers and their students.

Relevant threshold concepts:

- Online course design is critical to the success of online teaching and learning.
- Online course design needs alignment between learning activities, assessment tasks and feedback mechanisms to ensure student engagement.
- Online teaching requires facilitating interaction, not only presenting content.

2) Online presence

Example 1: Faculty staff are regularly offered PD in the methods associated with monitoring online students' participation.

Example 2: Increasing numbers of faculty staff are engaging in PD activities in which they learn how to engage students in the process of leading online discussions and communication interactions, both synchronously and asynchronously.

Relevant threshold concepts:

- Online presence is different from on-campus presence.
- Online presence, while elusive, must be pursued.
- Online presence requires interactive elements.

3) Interaction and relationships

Example 1: Increased use of formative evaluation mechanisms in online courses has been implemented to ensure that student and teacher expectations can be aligned as much as possible earlier, rather than at the close of, in the semester.

Example 2: A number of research projects are currently underway that are investigating successful forms of communication in online courses.

Relevant threshold concepts:

- Online course design needs alignment between learning activities, assessment tasks and feedback mechanisms to ensure student engagement.
- Online presence requires interactive elements.
- Online learning requires a new mode of interaction between facilitators, students and resources.
- Online teaching requires facilitating interaction, not only presenting content.
- Synchronous communication methods in online learning contexts, while sometimes challenging to facilitate, have many learning benefits.

Furthermore, to enable the application of the recommendations related to support services, the institution has employed a part-time Professional Development Officer whose role incorporates many of the above PD activities and development of PD resources which are incorporated into the institution's self-help resource, *Moodle's Little Helper*.

Discussion

Curricular and programmatic development and implementation challenges highlight the need for targeted, adaptable, and effective services for faculty teaching in online environments. Ambiguity and contradictions surrounding academic PD has been cited as potential shortfalls (Lee & McWilliam, 2008) along with differing conceptions of leading and management in the areas of instruction and learning (Marshall, Orrell, Cameron, Bosanquet, & Thomas, 2011). Academic PD needs to focus on quality, inclusion of offerings, and support to part-time, casual faculty, and sustainability of program efforts to support ongoing excellence in education (Hitch, Mahoney, & Macfarlane, 2018). Despite the need for research-informed professional training program development, decisions associated with PD have not always been informed by evidence.

Consideration of the guidelines and method of application reported in this investigation may serve as an initial framework from which other organizations may approach PD development and refinement, especially in relation to the design and facilitation of online education by faculty staff. The results of this investigation can inform discussions and considerations related to PD training programs and materials for other online educational institutions, but do not replace the obligation to tailor PD to the specific needs and expectations of nascent online instructors within unique educational environments by first determining their specific threshold concepts. In a Delphi study to delineate the best practices for professional development of faculty teaching online, Mohr and Shelton (2017) highlighted the application of professional, organizational, and topic-specific areas as standards for consideration. It was noted, however, that each identified standard was not evidence based and that research is needed to substantiate the efficacy of each application. The results of this investigation provide an example of how research-informed guidelines can be applied as a foundation for developing curricula for PD activities, resources, and programs aimed at novice online teachers in higher education institutions.

While threshold concepts have been applied to assist the design of student learning (Boyd & Lonsbury, 2016; Bunnell & Bernstein, 2012; Carmichael, 2012; Mills & Wilson, 2012), the innovation of the research reported here has been its focus on how to improve the skill set of novice online teachers who, in the context of online delivery, were themselves learners. Recognising that novice teachers and novice learners faced similar hurdles was a conceptual breakthrough that permitted significant progress in identifying the issues facing these novice teachers during professional learning programs, and the processes best adapted to overcoming the threshold conceptual challenges.

At Avondale University College, the home institution of three of this paper's authors, the research was used to customize the PD programs for novice online educators in the institution. Rather than attempting to implement the recommendations of generic research on the topic, the specific needs identified in the research at Avondale became the fulcrum for the College's professional development. Using such targeted research permitted the intervention to address three separate but interlocking issues. First, by isolating needs in a particular context, the PD could more effectively provide appropriate and highly targeted intervention and support at the actual rather than the theoretical point of need. This approach also ensured that that the PD offered was able to encompass both the institution's needs and the individual academics' needs in designing the nature, quality, and timing of the support. Second, by recognizing the various levels of experience in those it was seeking to support, this approach proved both more effective and more efficient in delivering appropriate intervention. In doing so, the research recognizes that its specific interventions are not necessarily applicable models for other institutions; rather, the fact that the interventions were customized to local needs identified by local research is the key takeaway point. The methodology and methods outlined in this article may be replicated in other universities to establish foundational research-informed evidence for tailored PD programs for online teachers. Future research should aim to identify commonalties for effective implementation and assessment of outcomes for both educators and their students.

Conclusions

The main purpose of this study was to develop guidelines to inform the design of PD curricula to transform the capacities of novice online teachers in higher education. This article outlines an example of how these PD curricula guidelines were applied for one specific higher education institution. The investigation was built around evidence-based data gathered in several phases over two years of a substantial, international investigation of the threshold concepts about online teaching and learning held by novice teachers and students as they engaged with a new and, at times, challenging, mode of learning. From in-depth, qualitative and quantitative data gathered from a number of universities, evidence was gathered to inform and direct recommendations about the threshold concepts experienced by teachers and learners regarding online learning. In this study the context was online pedagogy. Although much has been written about the practice of teaching and learning online, the study adopted a different and insightful theoretical lens (that of threshold concepts), as described in the literature review section.

The research methodology was multidimensional, drawing together multiple perspectives and diverse views relating to online pedagogy. These included both expert and practitioner views of stakeholders including students, instructional designers, administrators, and researchers. This data led to the production of curriculum design guidelines intended for application in PD programs. The guidelines are developmental insofar as they aim to support novice teachers in developing their capacity, not only to teach and assess learning in online courses, but also to design online environments which foster student-to-student engagement and interaction. The guidelines can be flexibly aligned to provide support at the institutional and faculty and individual academic staff level. An important caveat to mention is that the guidelines are not prescriptive, but instead offer a flexible framework enabling the development of timely and relevant professional development to faculty staff teaching online. The application of these guidelines in one institution has been outlined in the Results section of this article to serve as a potential framework for initial implementation of an evidence-based program in other institutions and organizations. To have wide-reaching and lasting impact, the dissemination of evidence-based programs needs to be paired with strategies that build educators' capacity to adopt and implement guidelines within their diverse and dynamic instructional contexts. The processes provided offer much needed guidance about customizing capacity-building strategies that address individual and institutional variations in teaching and learning. However, ongoing evaluation and research is needed to address challenges related to implementation such as sustainability, capacity, and institutional alignment.

A further significant contribution of this research was the finding that teachers new to online pedagogy face similar hurdles to novice learners, for example, feelings of disconnection, lack of visual cues and the challenge of creating a feedback loop that enables relationships to be established. This finding was a conceptual breakthrough that enabled the research team to gain insight into the challenges and threshold concepts experienced by teachers and students alike, and thereby provide a grounded, evidence-based framework for professional development aimed at improving the online experience for both teachers and learners. These insights further assisted in the application of the PD guidelines in the design and development of the PD program at Avondale.

Acknowledgements

The research project reported in this article was supported by the Office for Learning and Teaching (OLT), Australia under the Seed Grant Program, grant no. SD15-5203, grant title: *Using online teaching threshold concepts in transformative professional learning curricula for novice online educators*. In-kind research support was provided by the following institutions: Avondale University College, NSW, Australia; Texas A&M University, Texas, USA; and Australian Catholic University, ACT, Australia.

References

Ashong, C. Y., & Commander, N. E. (2012). Ethnicity, gender, and perceptions of online learning in higher education. *Journal of Online Learning and Teaching, 8*(2), 98.

Baran, E., Correia, A.-P., & Thompson, A. (2011). Transforming online teaching practice: Critical analysis of the literature on the roles and competencies of online teachers. *Distance Education, 32*(3), 421-439.

Baran, E., Correia, A.-P., & Thompson, A. (2013). Tracing successful online teaching in higher education: Voices of exemplary online teachers. *Teachers College Record, 115*(3), 1-41.

Bonk, C. J., & Dennen, V. (2003). Frameworks for research, design, benchmarks, training, and pedagogy in web-based distance education. In M. G. Moore & W. G. Anderson (Eds.), *Handbook of distance education* (pp. 331-348). Mahwah, NJ: Lawrence Erlbaum Associates.

Boyd, D. E., & Lonsbury, J. (2016). *Guiding on the Edge: Online and F2F course design as a threshold process*. Paper presented at the 6th Biennial Threshold Concepts Conference: Thresholds on the Edge, Dalhousie University, Halifax, Canada.

Bunnell, S. L., & Bernstein, D. J. (2012). Overcoming some threshold concepts in scholarly teaching. *Journal of Faculty Development. Special Issue: Threshold Concepts in Educational Development, 26*(3), 14-18. doi:https://eric.ed.gov/?id=EJ998691

Carmichael, P. (2012). Tribes, Territories and Threshold Concepts: Educational materialisms at work in higher education. *Educational Philosophy and Theory: Special Issue: The Future of Educational Materialism, 44*(Supplement s1), 31–42.

Conole, G., De Laat, M., Dillon, T., & Darby, J. (2008). 'Disruptive technologies', ‘pedagogical innovation’: What’s new? Findings from an in-depth study of students’ use and perception of technology’. *Computers & Education, 50*(2), 511-524.

Cousin, G. (2006). An introduction to threshold concepts. *Planet, 17*(1), 4-5. doi:https://doi.org/10.11120/plan.2006.00170004

Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.). Thousand Oaks, CA: Sage.

Davies, P., & Mangan, J. (2008). Embedding threshold concepts: From theory to pedagogical principles to learning activities. In R. Land, J. H. F. Meyer, & J. Smith (Eds.), *Threshold concepts within the disciplines*. Rotterdam: Sense.

Elliott, M., Rhoades, N., Jackson, C. M., & Mandernach, B. J. (2015). Professional development: Designing initiatives to meet the needs of online faculty. *Journal of Educators online, 12*(1), 160-1888.

Fraser, B. J. (1998). Classroom environment instruments: Development, validity and applications. *Learning environments research, 1*(1), 7-34.

Garrison, D. R., & Anderson, T. (2000). *Transforming and enhancing university teaching: Stronger and weaker technological influences*. London: Kogan Page.

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2*(2-3), 87-105.

Gosselin, K. P. (2009). *Development and psychometric exploration of the online teaching self-efficacy inventory.* (PhD), Texas Tech University.

Gosselin, K. P., Northcote, M., Reyaud, D., Kilgour, P., Anderson, M., & Boddey, C. (2016). Development of an evidence-based professional learning program informed by online teachers' self-efficacy and threshold concepts. *Online Learning Journal, 20*(3), 178-194. doi:http://dx.doi.org/10.24059/olj.v20i3.648

Gosselin, K. P., Northcote, M., Reynaud, D., Kilgour, P., Anderson, M., & Boddey, C. (2016). Development of an evidence-based professional learning program informed by online teachers' self-efficacy and threshold concepts. *Online Learning Journal, 20*(3), 178-194.

Green, N. C., Edwards, H., Wolodko, B., Stewart, C., Brooks, M., & Littledyke, R. (2010). Reconceptualising higher education pedagogy in online learning. *Distance Education, 31*(3), 257-273. doi:https://doi.org/10.1080/01587919.2010.513951

Hill, H. C., Beisiegel, M., & Jacob, R. (2013). Professional development research: Consensus, crossroads, and challenges. *Educational Researcher, 42*(9), 476-487.

Hitch, D., Mahoney, P., & Macfarlane, S. (2018). Professional development for sessional staff in higher education: A review of current evidence. *Higher Education Research & Development, 37*(2), 285-300. doi:https://doi.org/10.1080/07294360.2017.1360844

Jooganah, K. (2010). *Student transition to advanced mathematical thinking: A focus on 'proof 'as a threshold concept*. Paper presented at the 3rd Biennial Threshold Concepts Symposium: Exploring transformative dimensions of threshold concepts, University of NSW and University of Sydney.

Keeney, S., Hasson, F., & McKenna, H. (2006). Consulting the oracle: Ten lessons from using the Delphi technique in nursing research. *Journal of Advanced Nursing, 53*(2), 205-212. doi:https://doi.org/10.1111/j.1365-2648.2006.03716.x

Keeney, S., Hasson, F., & McKenna, H. (2011). *The Delphi Technique in nursing and health research*. Oxford: Wiley-Blackwell.

Kilgour, P., Reynaud, D., Northcote, M., McLoughlin, C., & Gosselin P, K. (2018). Threshold concepts about online pedagogy for novice online teachers in higher education. *Higher Education Research and Development*. doi:https://doi.org/10.1080/07294360.2018.1450360

Laurillard, D. (1993). *Rethinking university teaching: A framework for the effective use of educational technology*. London: Routlege.

Lee, A., & McWilliam, E. (2008). What game are we in? Living with academic development. *International Journal for Academic Development, 13*(1), 67-77. doi:https://doi.org/10.1080/13601440701860284

Marshall, S. J., Orrell, J., Cameron, A., Bosanquet, A., & Thomas, S. (2011). Leading and managing learning and teaching in higher education. *Higher Education Research & Development, 30*(2), 87-103.

Mbati, L., & Minnaar, A. (2015). Guidelines towards the facilitation of interactive online learning programmes in higher education. *The International Review of Research in Open and Distributed Learning, 16*(2). doi:http://dx.doi.org/10.19173/irrodl.v16i2.2019

McLoughlin, C., & Lee, M. J. W. (2009). *Personalised learning spaces and self-regulated learning: Global examples of effective pedagogy.* Paper presented at the Same places, different spaces: ASCILITE Conference 2009, Auckland.

Meyer, J. H. F., & Land, R. (2003). *Threshold concepts and troublesome knowledge: Linkages to ways of thinking and practising within the disciplines*. Retrieved from Edinburgh: http://www.etl.tla.ed.ac.uk//docs/ETLreport4.pdf

Meyer, J. H. F., & Land, R. (2005). Threshold concepts and troublesome knowledge (2): Epistemological considerations and a conceptual framework for teaching and learning. *Higher Education, 49*(3), 373–388. doi:https://doi.org/10.1007/s10734-004-6779-5

Meyer, J. H. F., & Land, R. (2006). Overcoming barriers to student understanding: Threshold concepts and troublesome knowledge. New York: Routledge.

Mills, R., & Wilson, A. (2012). *There's a right answer but only some students can get it: Threshold concepts in the professional development of physics demonstrators*. Paper presented at the Fourth Bienniel Conference on Threshold Concepts: From personal practice to communities of practice, Trinity College, Dublin. https://files.eric.ed.gov/fulltext/ED558533.pdf

Mohr, S. C., & Shelton, K. (2017). Best practices framework for online faculty professional development: A Delphi study. *Online Learning, 21*(4), 123-140.

Northcote, M., Gosselin, K., Kilgour, P., McLoughlin, C., & Boddey, C. (2017). Using threshold concepts about online teaching to support novice online teachers: Designing professional development guidelines to individually assist academic staff ("me") and collectively guide the institution ("us"). In H. Partridge, K. Davis, & J. Thomas (Eds.), *Me, Us, IT! Proceedings ASCILITE2017: 34th International Conference on Innovation, Practice and Research in the Use of Educational Technologies in Tertiary Education* (pp. 328-336). University of Southern Queensland, Toowoomba, Queensland: ASCILITE.

Northcote, M., Gosselin, K. P., Reynaud, D., Kilgour, P., & Anderson, M. (2015). Navigating learning journeys of online teachers: Threshold concepts and self-efficacy. *Issues in Educational Research, 25*(3), 319-344.

Northcote, M., Gosselin, K. P., Reynaud, D., Kilgour, P., Anderson, M., & Boddey, C. (2017). Reversing the tyranny of distance education: Using research about threshold concepts in online teaching to humanize online course design. In M. Northcote & K. P. Gosselin (Eds.), *Handbook of research on humanizing the distance learning experience* (pp. 232-255). Hershey, PA: IGI Global.

Northcote, M., Reynaud, D., Beamish, P., Martin, T., & Gosselin, K. P. (2011). Bumpy moments and joyful breakthroughs: The place of threshold concepts in academic staff development programs about online learning and teaching. *ACCESS: Critical Perspectives on Communication, Cultural & Policy Studies, 30*(2), 75-90.

Pearson, J., & Trinidad, S. (2005). OLES: An instrument for refining the design of e-learning environments. *Journal of Computer Assisted Learning, 21*(6), 396-404.

Perkins, D. (2006). Constructivism and troublesome knowledge. In J. Meyer & R. Land (Eds.), *Overcoming barriers to student understanding: Threshold concepts and troublesome knowledge* (pp. 33-47). New York: Routledge.

Powell, C. (2003). The Delphi technique: Myths and realities. *Journal of Advanced Nursing, 41*(4), 376-382.

Salmon, G. (2013). *E-tivities: The key to active online learning* (2nd ed.). London and New York: Routledge.

Trinidad, S., Aldridge, J., & Fraser, B. (2005). Development, validation and use of the Online Learning Environment Survey. *Australasian Journal of Educational Technology, 21*(1), 60-81.

Ward, M. E., Peters, G., & Shelley, K. (2010). Student and faculty perceptions of the quality of online learning experiences. *The International Review of Research in Open and Distributed Learning, 11*(3), 57-77.

Young, A., & Norgard, C. (2006). Assessing the quality of online courses from the students' perspective. *The Internet and Higher Education, 9*(2), 107-115. doi:https://doi.org/10.1016/j.iheduc.2006.03.001

A Cross-Institutional Study of Instructional Characteristics and Student Outcomes: Are Quality Indicators of Online Courses Able to Predict Student Success?

Tanya Joosten and Rachel Cusatis
National Research Center for Distance Education and Technological Advancements
University of Wisconsin-Milwaukee

Abstract

A study was conducted to examine instructional characteristics of quality in online courses and their relationship to student outcomes in online courses at a National Research Center for Distance Education and Technological Advancements 2-year and a 4-year higher educational institution. Instructional characteristics included learner support, course design and organization, content design and delivery, interactivity (student–instructor and student–student), and assessment. A student survey instrument was created that captures student perceptions of the instructional characteristics of their courses, their learning, and their satisfaction with the courses. The data collected from the student survey was merged with data from institutional student information systems (e.g., demographics and course grade). This article examines the relationship between these instructional characteristics, sometimes referred to as *indicators of online course quality*, and their relationship to student outcomes for all students and for underrepresented students. Additional analyses were conducted to examine differences among underrepresented students (e.g., minorities, first-generation, low-income, students with impairments or disabilities) using MANOVA. Significant findings are reported.

Keywords: online, online learning, online courses, online programs, course quality, interactivity, distance education, learner support, course design, content, organization, assessment, evaluation, student success, learning, performance, student satisfaction, DETA

Joosten, T., & Cusatis, R. (2019). A cross-institutional study of instructional characteristics and student outcomes: Are quality indicators of online courses able to predict student success? *Online Learning, 23*(4), 354-378. doi:10.24059/olj.v23i4.1432

Author Note

The contents of this article were developed under grant #84.116Q, P116Q140006, from the U.S. Department of Education. However, the contents do not necessarily represent the policy of the U.S. Department of Education, and one should not assume endorsement by the federal government.

A Cross-Institutional Study of Instructional Characteristics and Student Outcomes: Are Quality Indicators of Online Courses Related to Student Success?

As educational opportunities in an online environment have grown over the past several decades, institutions and instructors have developed ways to determine quality in online courses. Online courses are courses where learning is distanciated through space, or at a distance, and potentially time using various technologies, able to deliver instruction as effectively as face-to-face courses, and seeing continued growth in their demand. Although inconsistent findings in regard to the efficacy of online courses in comparison to face-to-face courses have been reported, meta-analyses indicate that online courses are just as effective if not more effective when it comes to student outcomes (e.g., Allen, Bourhis, Burrell, & Mabry, 2002; Allen, Mabry, Mattrey, Bourhis, Titsworth, & Burrell, 2004: Means, Toyama, Murphy, Bakia, & Jones, 2009). Not only are online courses effective, demand in online course offerings continues to grow as students require more flexibility in where and when they learn due to work, family, and other obligations. Allen and Seaman (2016) reported that “distance education enrollments continue to grow at a healthy rate, showing a 7% increase overall between fall 2012 and fall 2014” (p. 13). With increasing demand for online courses that have shown to be just as good as face-to-face courses, research efforts continue to develop an understanding of how to best design online courses and deliver instruction online to positively influence student outcomes.

Since online learning continues to grow in higher education, there is increasing demand and need for demonstrable effective practices to ensure quality in online courses and programs and to inform practice. While many practitioners identify practices through the gathering of instructor experiences and anecdotes, researchers conduct studies to identify evidence-based practices that can be implemented by instructors (e.g., Shattuck, 2007). There is a need to not only identify practices indicative of a quality course but to also demonstrate the relationship of these practices with student outcomes. This means that the link between these instructional practices and student outcomes needs to be better understood. The best practices research tends to be narrow in that it focuses on individual pedagogical interventions, such as online discussions, rather than showing the best instructional practices as determined by online quality indicators, to positively and significantly influence student outcomes. Notably, efforts have been undertaken to increase the quality and rigor of studies in online learning and advance research in the field (see Dziuban, Picciano, Graham, & Moskal, 2015).

There is a need for enhanced understanding as to what practices will positively influence outcomes for all students and for underrepresented students. Presently, there is a lack of research that examines student demographics (e.g., underrepresentation) and how those demographics influence student perceptions of their courses and/or the relationships of these to student outcomes. Jaggars and Bailey (2010) claim that they are unaware of any studies that examine the increase in enrollment of underrepresented students, and they note the significant barriers underrepresented students can face in enrolling and completing online courses. Johnson and Mejia (2014) reported that California community college students are 10–14% less likely to complete an online course than a traditional on-site course. Even lower rates were found in online courses among minorities (10–18% lower) than White students. The decrease in student success was attributed to inconsistency in course quality. However, Shea and Bidjerano (2014) reported in their national study that community college students who take courses online have a significantly better chance of obtaining a degree than students who only take courses taught in a physical classroom.

Therefore, it is important to ensure that instructional characteristics are effective in improving student outcomes for all students.

Institutionally, identifying effective, evidence-based practices to ensure the quality of courses in higher education is pertinent to meeting the needs of students, requirements of academic programs, and federal standards. How courses are structured and students' interactions within them can impact students' success in those courses (e.g., higher grades, greater learning, and higher rates of completion). Additionally, these structures and experiences can also lead to higher satisfaction in online courses and online programs, which can impact students' persistence, or continued enrollment in online courses. Despite the mode of instruction, academic programs need to provide a quality learning experience to ensure that students are fulfilling the required learning and program objectives. These objectives must meet the standards of the discipline and the labor market for which the student will obtain professional pursuits after graduation. Whether a course takes place online or on-site, the outcomes must be comparable. As Allen and Seaman (2016) reported, the majority of academic leaders through the years believe that learning outcomes in online courses are the same or superior to those in face-to-face courses. Online courses and programs continue to be a part of institutional strategy in higher education. Finally, because many times accrediting bodies of higher education institutions want to ensure the courses are being appropriately designed and supported when delivered at a distance or online, institutions need to ensure they are meeting federal regulations in delivering instruction to students. Quality of online courses and programs is paramount to institutional leaders.

Review of Literature

Institutions and instructors have worked to identify components or characteristics of successful instruction in distance education to improve the quality of course offerings provided to students and to ensure that the quality of courses offered to students at a distance or online is equal to or better than traditional classroom courses. In the early development of online courses, quality was a concern. This was, in part, due to the newness of the electronic media and associated scrutiny. Also, it may have been due to the instructional approaches used, which were mainly objectivistic and focused on knowledge transmission and summative assessment (e.g., Beare, 1989; Egan, Welch, Page, & Sebastian, 1992) rather than active learning. Creating lectures to broadcast was a more easily acquired pedagogical skill set that mirrored instructional approaches on-site. The broadcasts of lectures may have been delivered via radio, television, videotape, or compact disc.

As a result of this electronic media scrutiny and evolving pedagogical practices, tools were developed (e.g., Quality Matters rubric, Rubric for Online Instruction) to assist instructors and institutions in guiding and evaluating their online practices (Sener, 2006)—specifically, the tools emphasized the importance of interactions, active learning, and learner support, which often were lacking in early models of distance education. Although these approaches were as good as face-to-face (e.g., Allen et al., 2002; Allen et al., 2004), over time there was a transformation in online pedagogy due to the advancement in technologies and move towards more active learning. For instance, early research indicated that courses that embrace pedagogies that can enhance the virtual classroom experience for students can lead to more positive outcomes (Picciano, 2002).

With the new mode of online instruction, most instructors lacked the pedagogical and technological skills to take advantage of the media characteristics in online environments to create more interactive learning experiences and reverted to replicating the face-to-face instruction in the online environment (Kaleta, Skibba, & Joosten, 2009). Many of these instructors replicated the traditional classroom didactic model in the online environment or implemented correspondence models of continuing education. The focus on this didactic model of instruction placed attention on student interactions with content from reading and lecture. Teacher-centered models focused heavily on content or the idea of the "sage on the stage," where instructors focused on identifying an electronic or digital forum to deliver their lecture. A limited amount of time was spent on developing activities and materials that would help students prepare and interact in the online environment. As Fetherston (2004) discussed, there was increased acknowledgement that traditional models of learning may not be the best for learning nor the best for online learning. Moreover, few efforts were directed toward creating and incorporating student-centered activities or assessments that would provide more frequent low-stakes feedback rather than high-stakes assessments typical in a lecture model. Hence, faculty development programs were developed to better take advantage of the media and focus more on student interactions with each other and the instructor (Joosten, Barth, Harness, & Weber, 2014). Given these limitations, the transmission model of learning offered an opportunity for improvement to the quality of instruction in online environments.

As part of the online learning transformation that occurred in higher education, researchers and theorists began to identify practices that could enhance the online experience for instructors and students based on current and past studies. These practices tended to focus on student interactions and consisted of the implementation of active learning or student-centered pedagogical models. Notably, objectivistic models of learning were becoming less prevalent, while more subjectivist or social models of learning were being developed, such as constructivism (e.g., Hung, Tan, & Koh, 2006). Theories emerged that focused on student interactions, and researchers as well as practitioners began to enhance understandings of the importance of interactions for learning. For instance, Chickering and Gamson (1987) had already identified principles for education that focused on increasing interactivity between students and the instructor and among students themselves. They highlighted the importance of active learning and timely feedback. Yet many faculty were not implementing these practices on-site. Also, social scientists investigated computer-mediated communication to enhance online learning. Hiltz (1988, 1994) began exploring the effectiveness of computer-mediated communication and groups, particularly as they related to online learning. Hiltz and Meinke (1989) describe the virtual classroom as "a teaching and learning environment in a computer-mediated communication system" (p. 431) and reported increased access and improved learning in the virtual classroom through online interactions. Moreover, Moore (1989) discussed three types of interaction in distance education courses: students' interaction with content, each other, and the instructor. Later, she and Kearsley (2011) recommended that "to take advantage of [a virtual environment], instructional designers should create activities that involve interactions among each group" (p. 18). Interactions with the instructor and peers (e.g., discussions and groups) are key factors that can influence student outcomes in an online course.

Several of these explorations tended to take a systems approach to exploring interactions in online learning. A systems approach believes that there is a focus on an input-throughput-output model that will be used as a framework for this study. For instance, Moore (2009) noted that "interaction is key" (p. 79), including interaction with content, with instructors, and with classmates. Also, she noted that communication and community building should be emphasized in the course. Pedagogical models and quality measures incorporate students' interactions not only with content but also with each other and the instructor. The focus on a systems approach to identifying variables of interest in online learning is new since much of the early research focused on inputs and outputs rather than throughputs or student interactions. Specifically, early research focused on mode comparisons (online versus face-to-face inputs) while examining differences or comparability of output variables. Later, practice of and research on online learning transitioned to focusing on interaction, a throughput or process, as a primary indicator of quality pedagogy. Usually, these indicators are gathered through reviews of the literature and qualitative methods, such as document analysis and the gathering of faculty experiences. Several key indicators are commonly referred to when guiding instruction and course development, and evaluating course quality. These indicators are included in an array of tools to determine course quality, and each of these areas has been extensively explored, including student support (Paloff & Pratt, 2003; Crawley, 2012; Lehman & Conceição, 2014), design and organization (Vai & Sosulski, 2015; Ko & Rossen, 2010), content design and delivery (Joosten, 2012; Davis, 2015; Vai & Sosulski, 2015), interactivity (Palloff & Pratt, 2003; Hiltz & Goldman, 2004; Lehman & Conceição, 2010; Joosten, 2012), and assessment (Huba & Freed, 2000; Palloff & Pratt, 2008; Barkley & Major, 2015).

This study examined instructional characteristics to identify key components that positively influence student outcomes. Instructional characteristics are characteristics of course structure that influence student and instructor behaviors and student outcomes and are many times described as quality course indicators. The study included an examination of all students and then specifically analyzed those who are underrepresented. Little research examines underrepresented students in online courses and programs, which may be because of the lack of the underrepresented in online courses (see Cavanagh & Jacquemin, 2015), yet it is important to ensure that instructional practices do not disenfranchise certain groups. The instructional characteristics components include learner support, course design and organization, interactions with instructor, interactions with peers, and assessment. The instructional characteristics instrument developed captures student perceptions of their experiences within the course to determine the course structure that influences student outcomes. By gathering students' reports of their interactions (throughput), a better understanding regarding the relationship between the course structure (input) and student outcomes (output) can be determined. Reports of student interactions can illustrate the structure influencing such attitudes and behaviors. As previously described, these components were identified as important to online course quality through a review of the literature and existing course quality tools and indicators. Through this research, the components can be identified as effective or ineffective based on their relationships to student outcomes (learning, satisfaction, and academic performance). Those components identified as effective can, in turn, be used to develop new practices to be implemented into professional development programs for online course design and instructor preparation. Instructors can utilize these practices to ensure they are providing a quality learning experience.

Part 1: Instructional Characteristics and Student Outcomes for All Students

The overarching research question in this study examined the relationship between instructional characteristics and student outcomes of online courses, according to students' perceptions: Which instructional characteristics demonstrate a significantly positive relationship with student outcomes in an online course? The hypotheses including specific variables and measures were the following:

> Students' reports of instructional characteristics of online course quality, specifically learner support, design and organization, content design and delivery, interactivity with

> instructors, interactivity with peers, and assessment, will increase their perceptions of (H1a) learning, (H1b) satisfaction, and (H1c) academic performance (instructor-reported final grade retrieved from student information system [SIS] data) are positively associated with instructional characteristics, specifically (a) learner support, (b) design and organization, (c) content design and delivery, (d) interactivity with instructors, (e) interactivity with peers, and (f) assessment and evaluation. Also, as a result of exploratory factor analysis confirming a one-factor structure, (H1d) students' perceptions of instructional characteristics (full 64-item measure) will significantly increase their learning, satisfaction, and academic performance, as indicated by final grades from the SIS.

The between-group differences for underrepresented and represented students were also explored to determine if the two groups perceived the instructional characteristics differently. The research question to be tested was the following: Which instructional characteristics do underrepresented student populations perceive significantly differently than well-represented students?

Part 2: Instructional Characteristics and Student Outcomes for Underrepresented Students

Secondly, the study aimed to understand the outcomes of underrepresented students. The overarching research question explored was this: Which instructional characteristics do underrepresented student populations perceive significantly differently than their well-represented students counterparts? With such little attention to the experiences of underrepresented students in previous literature, the current study did not have any a priori hypotheses about which specific instructional characteristics would be significantly different between underrepresented students and their more privileged counterparts. However, the following hypotheses specific to underrepresented students mirrored those of the full sample:

> Underrepresented students' perceptions of (H2a) learning, (H2b) satisfaction, and (H2c) academic performance (instructor-reported grade) will be increased by instructional characteristics, specifically (a) learner support, (b) design and organization, (c) content design and delivery, (d) interactivity with instructors, (e) interactivity with peers, and (f) assessment and evaluation. Also, (H2d) underrepresented students' perceptions of the instructional characteristics (full 64-item measure) will significantly increase their *learning*, *satisfaction*, and *academic performance*, as indicated by instructor-reported final grades.

Methods

The study incorporated a survey instrument and institutionally warehoused data. A survey instrument was developed to enhance the understanding of students' perceptions of instructional characteristics and student outcomes. The survey requested that students report on the instructional characteristics of their online courses in six areas to assess the quality of courses in the areas of learner support, design and organization, content, interactivity with instructor, interactivity with peers, and assessment. Moreover, they were asked about their learning and satisfaction. The survey consisted of demographic items and Likert items to measure students' perceptions. Additionally, data was extracted from institutionally warehoused data (SIS data), including demographic and academic performance data (i.e., grades and course completion).

Instrumentation

Three primary tools were investigated for the development of the instrument utilized in this study: the California State University (CSU) Chico Rubric for Online Instruction (ROI; see http://www.csuchico.edu/eoi/the_rubric.shtml), the California State Quality Online Learning and Teaching (QOLT; see http://courseredesign.csuprojects.org/wp/qualityassurance/), and the Quality Matters (QM) rubric (see https://www.qualitymatters.org/). These tools were developed over the last several decades to guide course and instructional design and the evaluation of online courses. Concepts from the tools were converted to Likert items measuring students' perceptions of the instructional characteristics or quality indicators. A similar approach was taken by Ralston-Berg (2014), who developed an instrument based on items from the QM rubric and converted the items into student-centered language to gauge students' perspectives on quality. The development of these tools was based on identifying instructional characteristics of quality online courses. Expert feedback of the final instrument was gathered and incorporated.

The CSU Chico ROI was developed by a committee of faculty, administrators, staff, and students in 2003. The process included a review of the QM Rubric and other tools available at the time. The tool was a rubric with three levels of quality across six dimensions: learner support and resources, online organization and design, instructional design and delivery, assessment of student learning, innovative teaching with teaching that includes technology, and faculty use of student feedback.

According to Shattuck (2007), the QM rubric's development began in 2002 from materials produced by the faculty online training initiative based on Chickering and Ehrmann's (1996) *Implementing the Seven Principles: Technology as Lever* and the American Council on Education's (ACE; 1996) *Guiding Principles for Distance Learning in a Learning Society* to assure quality in online courses. The QM project received funding from the U.S. Department of Education Fund for the Improvement of Postsecondary Education to further develop and formalize a peer-review process for online course design and evaluation. The rubric was intended to guide reviewers and was first produced in 2004. It included eight standards: course overview and introduction, learning objectives, assessment and measurement, learning resources and materials, learner interaction, course technology, learner support, and accessibility. The QM rubric has had several iterations since its initial development.

The California State QOLT evaluation instrument was developed in 2014 after a review of literature and other tools including the CSU Chico ROI, QM rubric and program, Illinois Quality Online Course Initiative, National Survey of Student Engagement, Community of Inquiry, and Chickering and Gamson's (1987) *Seven Principles of Good Practice*. There are 10 dimensions included in the tool: course overview and introduction, assessment of student learning, instructional materials and resources utilized, student interaction and community, facilitation and instruction, technology for teaching and learning, learner support and resources, accessibility and universal design, course summary and wrap-up, and mobile platform readiness.

Participants

Participants (N = 501) were undergraduate and graduate students enrolled in a course section that was delivered online, at two Midwestern higher education institutions in the United States. Both institutions were public institutions with one being a 4-year doctorate-granting institution and the other a 2-year technical school. Data collection occurred for courses offered in spring 2016, fall 2016, spring 2017, fall 2017, and spring 2018 semesters and yielded a return rate on average of 9% of students emailed. Of the students who participated, 73% reported as women and 27% reported as men. Participation was solicited through an email that was sent to students enrolled in an online course. Students were asked to complete a Web-based survey.

The students included freshman (10%), sophomores (24%), juniors (21%), seniors (27%), and graduate students (19%). Of the students who participated, the majority were full-time students (65%) with other students reporting part-time (30%), less than part-time (4%), and overload (2%). Students reported on their employment status with the majority of the students reporting working part-time (43%). Others reported either working full-time (33%) or other (24%).

Underrepresented students were of interest in this study, including minorities, low-income students, first-generation students, and students with disabilities or impairments. The majority of the students responding were Caucasian or European American (63%) with other students reporting African American (15%), Latino (4%), Asian (4%), American Indian or Alaska Native (1%), Native Hawaiian or Pacific Islander (2%), a portion of students reported being of multiple races (10%), and others represented by the generic group *international* (2%). Minority status was determined by recoding institutionally warehoused data with nonminorities (Caucasian, European American) being the majority (N = 291, 63%) and minorities being Latino, African American, Asian American, American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, or other (N = 173, 37%). Low-income status was determined based on recoding of Pell Grant eligibility acquired from warehoused institutional data. The majority of students were expected income (N = 237, 53%) and fewer students were low income (N = 210, 47%). First-generation status was determined based on the recoding of warehoused institutional data. A majority of students were not first-generation (N = 227, 57%) and fewer students were first-generation (N = 172, 43%). A portion of students (N = 110, 22%) reported a learning, sensory, or physical impairment as well.

A range of disciplines was represented in the online courses in which the responding students were enrolled, including the social sciences (39%), professions (29%), natural sciences (14%), humanities (9%), and other disciplines (10%). The courses were lower level (67%) and upper level and graduate-level courses (33%).

Measures for Instructional Characteristics

Learner support. Learner support is a measure of students' perceptions of how well course materials are oriented to expectations, as well as the orientation of course policies, presence of clear directions and expectations, how accessible the instructor is, and how accessible are the course materials. Items included "The materials included activities, such as a scavenger hunt or quiz, to orient me to the course," "The instructions for the class were clear," and "Information about where to find technology assistance was provided." A total of 17 items were included in this measure with high internal consistency (α = .96).

Design and organization. Design and organization is a measure of students' perceptions of how well course items align with learning objectives, the types of learning objectives, and the overall organization of the course. Items included "The work was busy work," "All resources and materials were appropriately cited throughout the course," and "Course content was organized in a logical format." A total of 12 items were included in this measure with high internal consistency (α = .97).

Content. Content is a measure of students' perceptions of the materials and tools provided to them in their online course. Items included "The tools and media used were appropriate for the content being delivered," "The materials included annotations to the texts assigned," and "The materials included rich online materials, such as videos and images." A total of three items were included in this measure with high internal consistency (α = .85).

Interactivity with instructor. Interactivity with instructor is a measure of students' perceptions of their interactions with their instructors. Items included "I received responses to my emails in a timely manner," "The instructor helped focus online discussion on relevant issues," and "The instructor asked questions and provided new content to facilitate discussion." A total of 11 items were included in this measure with high internal consistency (α = .97).

Interactivity with peers. Interactivity with peers is a measure of students' perceptions of their interactions with other students. Items included "The course fostered online collaborations," "I had the opportunity to introduce myself to others," and "I participated in a group activity." A total of five items were included in this measure with high internal consistency (α = .87).

Assessment. Assessment is a measure of students' perceptions of how well the assessments, expectations, and grading were defined, communicated, and executed. Items included "Activities were clearly defined," "The grading policy was clearly stated," and "Clear standards were set for the instructor's posting of grades, activities, and resources." A total of 16 items were included in this measure with high internal consistency (α = .97).

Full instructional characteristics. Full instructional characteristics is a single measure of all items about instructional characteristics (learner support, design and organization, content, interactivity with peers, interactivity with instructors, and assessment). A total of 64 items were included in this measure with high internal consistency (α = .99).

Measures for Student Demographics

Disability. Disability is a student demographic that was drawn from a combination of institutionally warehoused data and student self-report in the survey. First, anyone who was identified as having a physical impairment or requiring assistance in SIS data was identified as a student with a disability. Yet this data could be underreported because students with a disability or their parents may not have reported their disability to their institution. Students were also asked a series of questions regarding ability to better determine whether they had an impairment or disability. If students responded "yes" to any one of the questions asking about physical, mental, or social disabilities, they were recognized as an individual with a disability.

First-generation status. First-generation status is a student demographic that was drawn from institutionally warehoused data. Some institutions keep records of whether or not students are first-generation. Others do not, and therefore recoding is necessary. For recoding, SIS data on parent's educational attainment was used (1 = middle school or less; 2 = high school; 3 = college or beyond). If both mother (parent 1) and father (parent 2) reported high school or less, students were identified as first-generation (1 = first-generation; 0 = not first-generation).

Minority status. Minority status was determined based on institutionally warehoused data. The measure was created by combining information from two items, one asking about ethnicity and a six-category measure of race. If students identified as Hispanic in the ethnicity measure, they received a 1 for minority status. The six-category race variable (1 = American Indian or Alaska Native, 2 = Asian American, 3 = African American, 4 = Native Hawaiian or Other Pacific Islander, 5 = White, 6 = two or more races) was collapsed into a dichotomous measure of minority status where those who were identified as White (5) received a 0 for minority status and all other races were considered a minority and received a 1 (1 = minority, 0 = not minority status).

Low-income status. Low-income status is a student demographic that was derived from institutionally warehoused data. The dichotomous measure was created from information on students' Pell Grant eligibility. Those who were identified as eligible were considered low income, while those who were not eligible were considered not low income (1 = low income/Pell Grant eligible, 0 = not low income/not Pell Grant eligible).

Measures for Student Outcomes

Learning. Learning was a combination of self-reported perceptions of knowledge that students acquired in the class and self-reported performance in the course. Items included "The class allowed me to better understand concepts," "The class helped me understand the course material," and "The class made it easy to connect ideas together." A total of 15 items were included in this measure, with higher scores indicating more learning ($\alpha = .95$). This student-reported learning measure was an appropriate operationalization of student learning, as the measure demonstrated high internal reliability.

Satisfaction. This measure centered on students' attitude toward the course and the instructor. The measure captured several dimensions of satisfaction, including technical support, recommendation of continuing to deliver the course online, and overall effectiveness. Items included "I would recommend that the instructor continue teaching this course," "I liked the course," and "I would not recommend this course to a friend." A total of 13 items were included in this measure, with higher scores indicating more satisfaction ($\alpha = .91$). This student-reported satisfaction measure was an appropriate operationalization of student satisfaction, as the measure demonstrates high internal reliability.

Academic performance. Institutionally warehoused final grades for each student's online course were merged with student survey reports. Final grade was operationalized as a continuous variable ranging from 1 to 12 (1 = F, 2 = D-, 3 = D, 4 = D+, 5 = C-, 6 = C, 7 = C+, 8 = B-, 9 = B, 10 = B+, 11 = A-, 12 = A). Students who did not receive an A through F were operationalized as missing.

Procedures

Students enrolled in an online course at either institution were emailed a link to the Web-based survey administered via cloud survey software for three semesters over a 2-year span. After accessing the survey through the link, students were presented with an online informed-consent form where they could indicate consent, confirm that they were age 18 or older, and voluntarily agree to participate in the research study by clicking on a button on the bottom of the first page to enter the survey. The survey took approximately 30–45 minutes to complete. Specifically, the survey requested that students report their (a) demographic information, (b) disability or impairment assessment, (c) perceptions of instructional characteristics, (d) perceptions of student outcomes of their class, including learning and satisfaction, and (e) open-ended questions. Additional variables, including demographic (e.g., Pell Grant eligibility) and academic performance (e.g., course grade) variables were collected from the student information system and merged with the survey data. Each measure is described below, including the number of items, sample items, and reliability.

Data Analysis

Statistical analyses included multiple regression analyses to examine the relationship between instructional characteristics and their ability to predict student outcomes in response to Hypothesis 1 (H1) for all students and Hypothesis 2 (H2) for underrepresented students. In order to address our hypotheses, hierarchical regressions were employed in order to account for the theoretical importance of instructional characteristics measures (i.e., learner support, assessment, etc.) as well as statistically establishing controls for student demographics (age, gender, academic performance [overall grade point average], ability [disability or impairment], income [low income or Pell Grant eligible], race [minority status], and postsecondary generation [first-generation]). This allowed our investigation to focus on the unique effects that student characteristics had on student outcomes. Three hierarchical regression analyses were conducted, with each containing a first regression block with the seven demographic variables and a second regression block with measures or factors of instructional characteristics depending on the research question or hypothesis. The first hierarchical multiple regression assesses the impacts on student learning, the second assesses the impacts on student satisfaction, and the third considers the impacts on student performance (final grade as derived from student information system data).

MANOVA was used to examine any differences between the vector of means in the four underrepresented groups for Research Question 1 (RQ1). MANOVAs were run with the six instructional characteristics measures serving as the dependent variables, and demographics of interest identifying underrepresented group status serving as the four separate independent variables, including ability (disability or impairment), income (low income as indicated by Pell Grant eligibility), race (minority status), and postsecondary education generation (first-generation status). These four dichotomous characteristics conceptualize the underrepresented populations of interest (students with disabilities or impairment, racial minority, low income, and first-generation students) in comparison to their traditional counterparts.

Results

Part 1: Instructional Characteristics and Student Outcomes for All Students

H1 examined the relationship between instructional characteristics and the ability to relate to student outcomes. Instructional characteristics have been shown to be indicators of the quality of course design and instructor and student behaviors that influence student outcomes in online courses. Multiple regression analyses were used to test if the instructional characteristics of learner support, design and organization, content, interactivity with instructors, interactivity with peers, and assessment significantly predicted student outcomes (learning, satisfaction, academic performance) as proposed in hypothesis one.

H1a examined the students' perceptions of instructional characteristics of their online course and perceptions of their *learning*. The results of the regression that indicated that the predictors explained about 81% of the variance in perceived learning ($R^2 = .90$, $F[13, 488] = 161.12$, $p < .0001$). It was found that design and organization, content, interactivity with instructor, and learner support significantly predicted learning ($\beta = .76$, $p < .0001$, $\beta = .11$, $p < .01$, and $\beta = .23$, $p < .0001$, respectively); however, it was found that learner support *negatively* impacted student learning ($\beta = -.16$, $p < .05$). The other two components, interactivity with peers ($\beta = .01$, $p = .800$) and assessment ($\beta = -.02$, $p = .767$), did not contribute significantly to the model.

H1b examined the students' perceptions of instructional characteristics for their online course and perceptions of their *satisfaction*. The results of the regression indicated the predictors explained 72% of the variance in student satisfaction ($R^2 = .73$, $F[13, 488] = 98.82$, $p < .0001$). It was found that learner support ($\beta = .26$, $p < .01$) and design and organization ($\beta = .50$, $p < .0001$) significantly predicted student satisfaction. The other four instructional characteristics, content ($\beta = .01$, $p = .859$), interactivity with instructor ($\beta = -.02$, $p = .777$), interactivity with peers ($\beta = .06$, $p = .064$), and assessment ($\beta = .07$, $p = .427$), were not found to be significant.

H1c examined the students' perceptions of instructional characteristics of their online course and *academic performance* or students' final grades in the course. The results of the regression indicated the predictors explained about 8% of the variance ($R^2 = .11$, $F[13, 488] = 4.39$, $p < .0001$). It was found that interactivity with instructor significantly and *negatively* impacted final grade ($\beta = -.30$, $p < .01$). The other five instructional characteristic measures learner support ($\beta = -.10$, $p = .528$), design and organization ($\beta = .23$, $p = .093$), content ($\beta = .17$, $p = .053$), interactivity with peers ($\beta = .06$, $p = .337$), and assessment ($\beta = .10$, $p = .508$) did not contribute significantly to the model.

Tests to see whether the data met the assumption of collinearity indicated that multicollinearity *was* a concern, specifically for learner support (tolerance = .97, VIF = 13.49), design and organization (tolerance = .97, VIF = 10.25), and assessment (tolerance = .96, VIF = 13.46). The three other measures did not demonstrate concern: content (tolerance = .95, VIF = 3.93), interactivity with instructor (tolerance = .96, VIF = 7.15), interactivity with peers (tolerance = .96, VIF = 1.97). To address the issue of multicollinearity, rather than simply note the unreliability of the model as Field (2013) acknowledged is "the safest although unsatisfactory remedy" (p. 797), steps were taken to remedy the issue. Additional data was collected for an additional year over two semesters. Several researchers have prescribed adding more cases to reduce the collinearity (Allen, Titsworth, & Hunt, 2009; Bowerman & O'Connell, 1999; Field, 2013). As Allen et al. (2009) described, "because the standard error for each variable is diminished" (p. 163). Yet this did not reduce the collinearity. Next, H1d and H2d that merged the variables into one instructional characteristics measure sought to address issues of multicollinearity. Allen et al. (2009) stated, "In some cases, you might be able to combine the variables. For instance, if you have several factors from the same scale, you might be justified in treating the scale as 1-dimensional rather than multi-dimensional" (p. 163). Thus, the issue of multicollinearity was resolved.

Table 1

Multiple Regressions for Instructional Characteristics and Student Outcomes

	β	*p*	Adj R^2	R^2	*df*	*F*	*p*
Criterion: Learning			.81	.90	13, 488	161.12	.000*
Learner support	-.16	.023*					
Design/organization	.76	.000*					
Content	.11	.004*					
Interactivity (instructor)	.23	.000*					
Interactivity (peer)	.01	.800					
Assessment	-.02	.767					
Criterion: Satisfaction			.72	.73	13, 488	98.82	.000*
Learner support	.26	.003*					
Design/organization	.50	.000*					
Content	.01	.859					
Interactivity (instructor)	-.02	.777					
Interactivity (peer)	.06	.064					
Assessment	.07	.427					
Criterion: Performance			.08	.11	13, 488	4.39	.000*
Learner support	-.10	.528					
Design/organization	.23	.093					
Content	.17	.053					
Interactivity (instructor)	-.30	.009*					
Interactivity (peer)	.06	.337					
Assessment	.10	.508					

H1d examined the students' perceptions of instructional characteristics of their online course and learning, satisfaction, and academic performance or students' final grades in the course. The results of three regressions indicated that the single factor explained about 76% of the variance ($R^2 = .76$, $F[8, 493] = 194.86$, $p < .0001$) in student-reported learning ($\beta = .87$, $p < .0001$). Second, the results indicated the single factor of instructional characteristics explained 70% of the variance ($R^2 = .71$, $F[8, 493] = 149.64$, $p < .0001$) in student-reported satisfaction ($\beta = .83$, $p < .0001$). Third, the results indicated that the single factor of instructional characteristics explained 7% of the variance ($R^2 = .08$, $F[8, 493] = 5.68$, $p < .0001$) in final grade ($\beta = .12$, $p < .01$).

Table 2

Multiple Regressions for Entire Instructional Characteristic Factor and Student Outcomes

	β	*p*	Adj R^2	R^2	*df*	*F*	*p*
Criterion: Learning			.76	.76	8, 493	194.86	.000*
Full instructional characteristics	.87	.000*					
Criterion: Satisfaction			.70	.71	8, 493	149.64	.000*
Full instructional characteristics	.83	.000*					
Criterion: Performance			.07	.08	8, 493	5.68	.000*
Full instructional characteristics	.12	.005*					

In relation to students' perceptions of instructional characteristics, RQ1 examined whether there was a significant difference between underrepresented student populations and students who are well represented at the institutions being studied. This research question explored whether underrepresented students' perceptions of the characteristics of the instruction were different than their counterparts. A MANOVA was calculated to determine whether there were differences in perceptions of the instructional characteristics of learner support, design and organization, content, interactivity with instructor, interactivity with peers, and assessment between students who identified as or reported as underrepresented and those who reported as well represented. Representation included ability (disability or impairment), income (low income as indicated by Pell Grant eligibility), race (minority status), and postsecondary education generation (first-generation status). After students with missing data on any of the four underrepresented demographic characteristics were listwise deleted, the final *N* for the MANOVA analysis was ($N = 365$).

The Box M test was significant at $p < .0001$. Box M = 458.99, $F = 1.69$ (231, 11237.29), $p < .0001$, and, subsequently, the multivariate tests showed significant difference between students who reported a disability or impairment and those students who did not, Pillai's trace = .04, $F = 2.31$ (6, 359), $p < .05$, partial $n^2 = .04$, first-generation and other generation, Pillai's trace = .05, $F = 3.25$ (6, 359), $p < .01$, partial $n^2 = .05$, and low-income and other income students, Pillai's trace = .04, $F = 2.52$ (6, 359), $p < .05$, partial $n^2 = .04$.

Follow-up univariate tests showed that there were significant differences between two groups on three dependent variables. Students with disabilities were significantly different than students who did not report having a disability in how they perceived their content ($F[1, 364] = 4.89$, $p < .05$, partial $n^2 = .01$), and low-income students were significantly different than other income students in how they perceived their content ($F[1, 364] = 5.61$, $p < .05$, partial $n^2 = .02$), interactivity with instructor ($F[1, 364] = 4.89$, $p < .05$, partial $n^2 = .01$), and interactivity with peers ($F[1, 364] = 4.11$, $p < .05$, partial $n^2 = .01$).

Post hoc tests revealed that students with disabilities reported significantly lower perceptions of their content than students who did not have a disability, and low-income students reported significantly higher perceptions of content, interactivity with instructor, and interactivity with peers (see Figures 1, 2, 3, and 4). No significant multivariate results were found between minorities and nonminorities, and no significant univariate tests were found between first-generation and other generation students.

Table 3

MANOVA Results for Instructional Characteristics

	Pillai's trace	*df*	*F*	*p*	Partial n^2
Ability (Disability/impairment or no)	.037	6, 359	2.31	.033	.04
Learner support		1, 364	.01	.937	.00
Design/organization		1, 364	.634	.427	.00
Content		1, 364	4.89	.028*	.01
Interactivity (instructor)		1, 364	.752	.387	.00
Interactivity (peer)		1, 364	.034	.854	.00
Assessment		1, 364	.162	.688	.00
Generation (first or no)	.051	6, 359	3.25	.004	.05
Learner support		1, 364	2.553	.111	.01
Design/organization		1, 364	.093	.761	.00
Content		1, 364	.019	.892	.00
Interactivity (instructor)		1, 364	.368	.544	.00
Interactivity (peer)		1, 364	.460	.498	.00
Assessment		1, 364	.328	.567	.00
Race (minority or no)	.019	6, 359	1.15	.334	.02
Learner support		1, 364	.294	.588	.00
Design/organization		1, 364	.253	.616	.00
Content		1, 364	2.32	.129	.01
Interactivity (instructor)		1, 364	1.30	.255	.00
Interactivity (peer)		1, 364	.078	.781	.00
Assessment		1, 364	.062	.803	.00
Income (Pell Grant eligible/ low income or no)	.040	6, 359	2.52	.021	.04
Learner support		1, 364	.693	.406	.00
Design/organization		1, 364	1.91	.168	.01
Content		1, 364	5.61	.018*	.02
Interactivity (instructor)		1, 364	4.89	.028*	.01
Interactivity (peer)		1, 364	4.11	.043*	.01
Assessment		1, 364	2.07	.152	.01

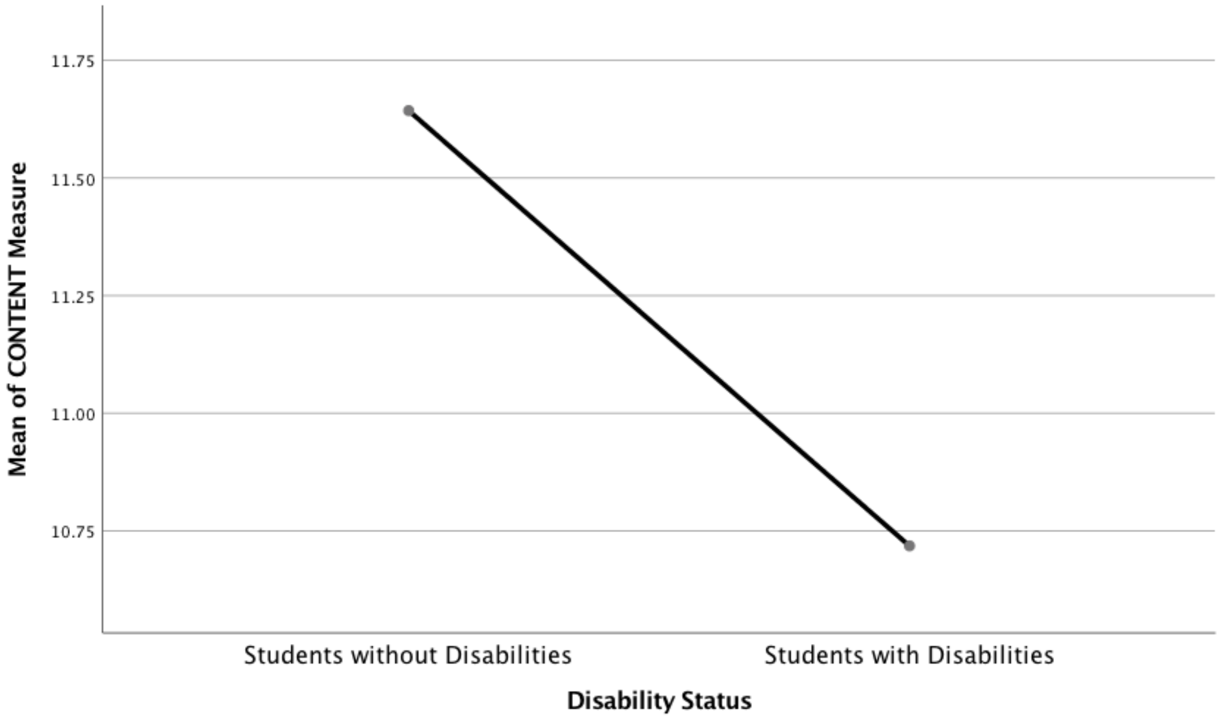

Figure 1. Means plot for content by disability status.

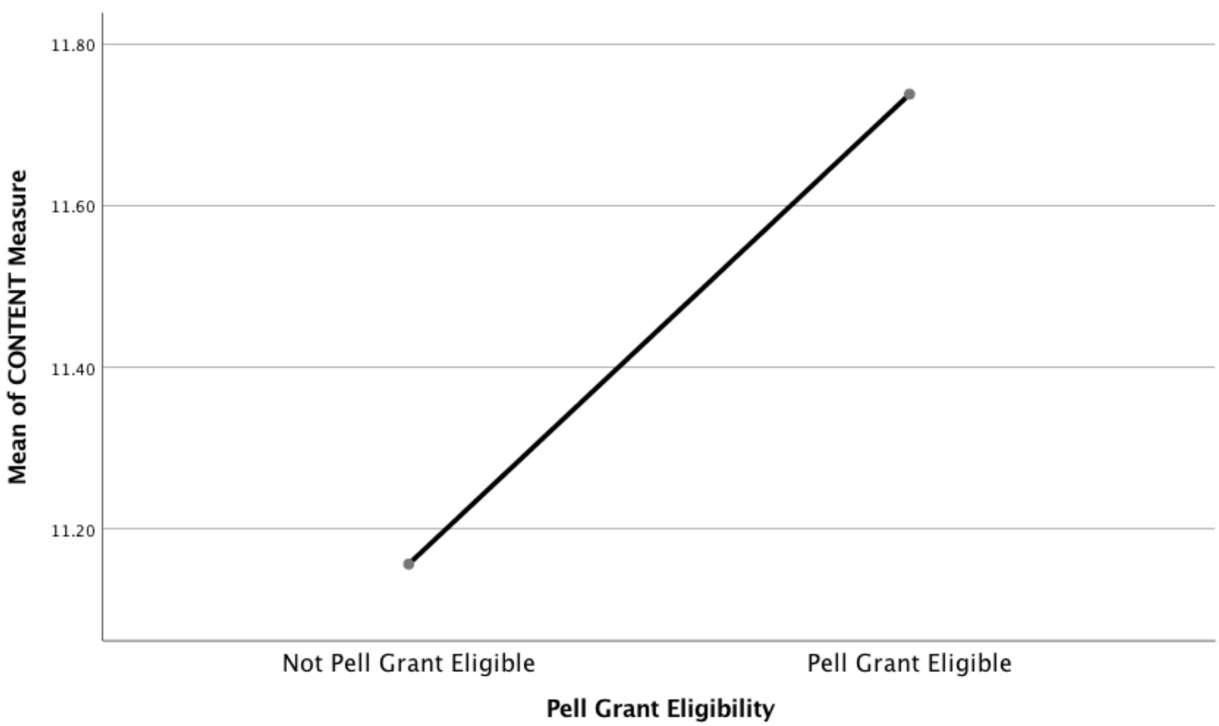

Figure 2. Means plot for content by Pell Grant eligibility.

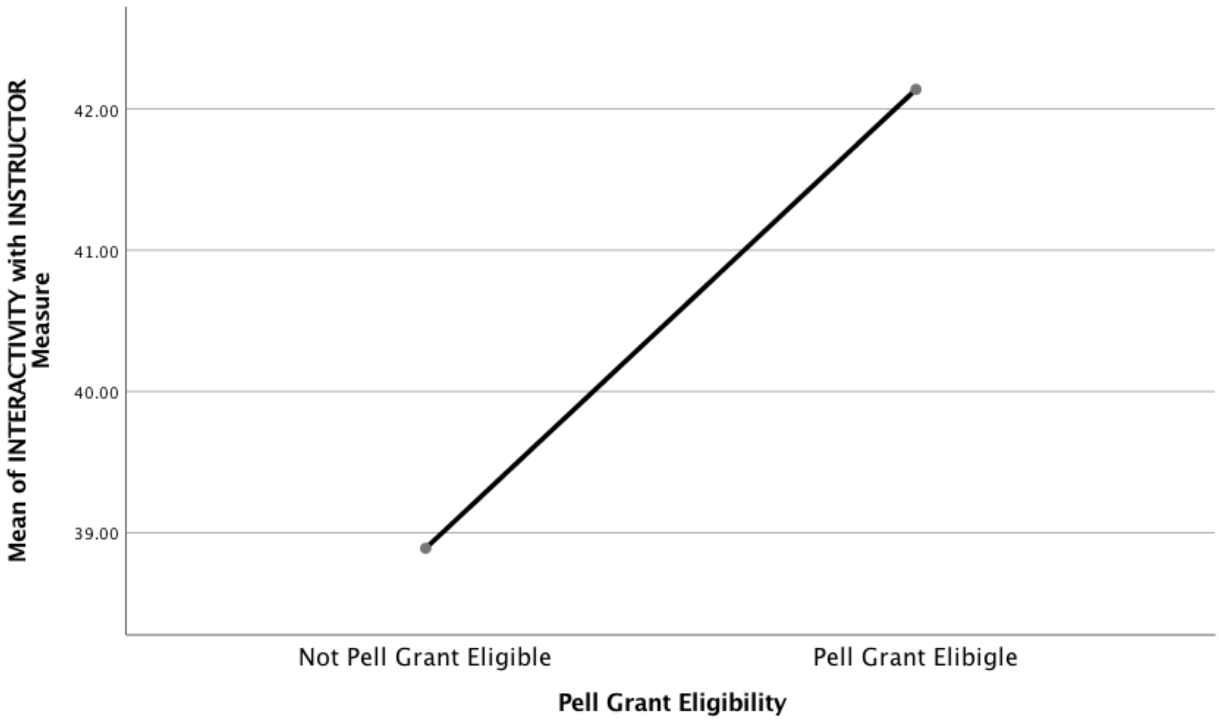

Figure 3. Means plot for interactivity with instructor by Pell Grant eligibility.

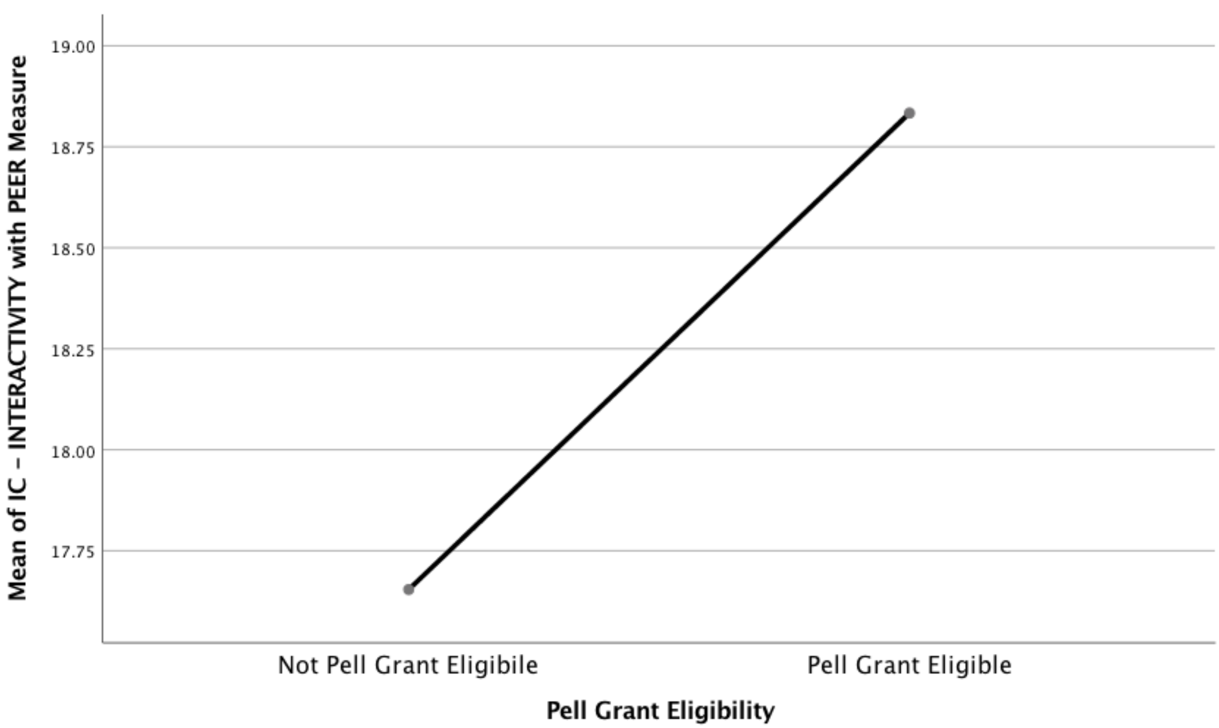

Figure 4. Means plot for interactivity with peers by Pell Grant eligibility.

Next, to determine whether there were significant differences in the 64-item factor of instructional characteristics between students who identified as underrepresented in comparison to the traditional group, a separate MANOVA was calculated. Univariate tests indicated that none of the underrepresented groups experienced the full measure of instructional characteristics significantly differently from their more privileged counterparts: students with disability and those who do not have a disability ($F[1, 377] = .38$, partial $n^2 = .00$, $p = .540$), first-generation students and those who are not ($F[1, 377] = .62$, partial $n^2 = .00$, $p = .430$), minority students and nonminority students ($F[1, 377] = .43$, partial $n^2 = .00$, $p = .511$), and Pell Grant eligible students (low income) and non–Pell Grant eligible students ($F[1, 377] = 2.77$, partial $n^2 = .01$, $p = .097$).

Table 4

MANOVA Results for Single Instructional Characteristics Factor

	df	***F***	***p***	**Partial *n*²**
Ability (disability/impairment or no)				
Full instructional characteristics	1, 377	.38	.540	.00
Generation (first or no)				
Full instructional characteristics	1, 377	.62	.430	.00
Race (minority or no)				
Full instructional characteristics	1, 377	.43	.511	.00
Income (Pell Grant eligible/low income or no)				
Full instructional characteristics	1, 377	2.77	.097	.01

Part 2: Instructional Characteristics and Student Outcomes for Underrepresented Students

H2 examined the relationship between students' perceptions of instructional characteristics and student outcomes, as did H1, yet H2 specifically examined underrepresented students. Here, analyses focused on a subset of the sample, those who identified as underrepresented ($n = 390$) or students who have identified as at least one of the following: minority, low income, first-generation, or a student with a disability. In H2, the multiple regression analyses were duplicated with only the underrepresented population.

H2a examined the impact of instructional characteristics on students' perceptions of learning for underrepresented students. Six measures of instructional characteristics and seven demographic control measures were regressed onto learning. The results of the regression indicated the predictors explained about 80% of the variance ($R^2 = .80$, $F[13, 377] = 118.80$, $p < .0001$). It was found that design and organization ($\beta = .74$, $p < .0001$), interactivity with instructors ($\beta = .26$, $p < .0001$), and content ($\beta = .10$, $p < .05$) significantly predicted learning. However, the other three components, learner support ($\beta = -.14$, $p = .104$), interactivity with peers ($\beta = -.02$, $p = .568$), and assessment ($\beta = -.03$, $p = .744$), did not contribute significantly to the model.

H2b examined the impact of underrepresented students' perceptions of instructional characteristics on students' satisfaction. As above, measures as above were regressed onto satisfaction. The results of the regression indicated the predictors explained about 71% of the variance ($R^2 = .72$, $F[13, 377] = 73.44$, $p < .0001$). It was found that design and organization ($\beta =$

.46, $p < .0001$) and assessment ($\beta = .22$, $p < .05$) significantly predicted satisfaction among underrepresented students. However, the other four components, learner support ($\beta = .16$, $p = .123$), content ($\beta = -.02$, $p = .700$), interactivity with instructor ($\beta = -.01$, $p = .931$), and interactivity with peers ($\beta = .06$, $p = .134$), did not contribute significantly to the model.

H2c examined the impact of underrepresented students' perceptions of instructional characteristics on students' academic performance (i.e., instructor-reported grade). Measures were regressed onto students' final grades. The results of the regression indicated the predictors explained about 7% of the variance ($R^2 = .10$, $F[13, 377] = 3.32$, $p < .0001$). It was found that content ($\beta = .21$, $p < .05$) and interactivity with instructor ($\beta = -.31$, $p < .05$) were included in the model, yet interactive with instructor had an inverse relationship with performance. The four characteristics, learner support ($\beta = -.14$, $p = .435$), design and organization ($\beta = .27$, $p = .094$), interactivity with peers ($\beta = .11$ $p = .129$), and assessment ($\beta = .03$, $p = .874$) did not contribute significantly to the model.

Table 5

Multiple Regressions for Instructional Characteristics and Student Outcomes for Underrepresented Students

	β	***p***	**Adj R^2**	**R^2**	***df***	***F***	***p***
Criterion: Learning			.80	.80	13, 377	118.80	.000*
Learner support	-.14	.104					
Design/organization	.74	.000*					
Content	.10	.025*					
Interactivity (instructor)	.26	.000*					
Interactivity (peer)	-.02	.568					
Assessment	-.03	.744					
Criterion: Satisfaction			.71	.72	13, 377	73.44	.000*
Learner support	.16	.123					
Design/organization	.46	.000*					
Content	-.02	.700					
Interactivity (instructor)	-.01	.931					
Interactivity (peer)	.06	.134					
Assessment	.22	.037*					
Criterion: Performance			.07	.10	13, 377	3.32	.000*
Learner support	-.14	.435					
Design/organization	.27	.094					
Content	.21	.027*					
Interactivity (instructor)	-.31	.018*					
Interactivity (peer)	.11	.129					
Assessment	.03	.874					

H2d examined underrepresented students' overall perceptions of the instructional characteristics of their online course and learning, satisfaction, and academic performance or students' final grades in the course. The results of the first regression indicated the single factor explained about 75% of the variance ($R^2 = .76$, $F[8, 382] = 150.47$, $p < .0001$) in student-reported learning ($\beta = .87$, $p < .0001$). Second, the results indicated the single factor of instructional characteristics explained 70% of the variance ($R^2 = .70$, $F[8, 382] = 113.67$, $p < .0001$) in student-reported satisfaction ($\beta = .83$, $p < .0001$). Third, the results indicated the single factor of instructional characteristics explained 6% of the variance ($R^2 = .08$, $F[8, 382] = 3.91$, $p < .0001$) in final grade. Instructional characteristics did not predict final grade ($\beta = .12$, $p < .05$).

Table 6

Multiple Regressions for Single Instructional Characteristics Factor and Student Outcomes for Underrepresented Students

	β	***p***	**Adj R^2**	**R^2**	***df***	***F***	***p***
Criterion: Learning			.75	.76	8, 382	150.47	.000*
Full instructional characteristics	.87	.000*					
Criterion: Satisfaction			.70	.70	8, 382	113.67	.000*
Full instructional characteristics	.83	.000*					
Criterion: Performance			.06	.08	8, 382	3.91	.000*
Full instructional characteristics	.12	.019*					

Discussion

There were significant relationships with instructional predictor variables (individual constructs and the instrument in its entirety) and each criterion variable. When we examined the instructional characteristics that influenced student outcomes, we saw evidence that the entire instructional characteristic factor positively predicted student academic performance, learning, and satisfaction. Instructional characteristics of a course that are indicative of quality indicators of online course design influence student success in a course and should be of great importance in the practice of instruction in online courses. Also, there was evidence that several individual instructional characteristic components influence students' learning, satisfaction, and academic performance in online courses. The results indicate that the instrument developed from this research regarding the quality of learning in online formats predicts students' learning, satisfaction, and academic performance. The individual constructs provide more details as to what areas of course structure may be influencing student outcomes as well as implications for practice.

First, the *design and organization* construct was a key factor in influencing student outcomes. Design and organization positively and significantly influenced students' perceptions of learning and satisfaction as indicated in the analysis of the individual constructs of instructional characteristics. There were positive and significant relationships between design and organization with learning and satisfaction accounting for the majority of the model. Therefore, a strong effort should be made to design online courses rather than move face-to-face materials of a course into the online environment.

Design is the most influential measure of instructional characteristics that potentially increases student outcomes. Specifically, efforts should be made to determine the types of learning objectives, align activities with learning objectives, and organize the overall course by instructors and instructional designers. This finding reinforces previous arguments made by other researchers and practitioners of online education (e.g., Ko & Rossen, 2010). Similar results were found for underrepresented students.

Second, learner support influenced students' perceptions of satisfaction for all students. To increase satisfaction in online courses, it is important that students be provided with an orientation to the course and associated policies. Moreover, students should be provided with clear directions and information to manage their expectations about the course and their interactions within it (e.g., how will they be graded, what the instructor's role is, and what is expected of students in activities). There also should be easy access to technology, support, and accessibility options.

Third, results indicated that *student interactions with the instructor* can predict student perceptions of learning. The degree to which students report instructors actively participate in their learning is important. The instructor's role is not only to design the structure of the course but connect to students and connect them to the course to enhance their learning. Moreover, the role is a complex one and the measure is of effective pedagogical practices of instructors in online courses. Thus, instructors should make an effort to show interest in student learning, maintain a productive dialogue, keep students engaged, encourage exploration of new concepts in online discussions without dominating, provide reminders and detailed feedback on assignments, and timely and effectively communicate ideas, email responses, and expectations. This finding reaffirms previous research that focused on the importance of instructors increasing their interactivity with students (e.g., Chickering & Gamson, 1987; Moore, 2009; Moore & Kearsley, 2011). Again, similar results were found for underrepresented students.

Fourth, *content design and delivery* was positively related to students' perceptions of learning for all students and to academic performance for underrepresented students. It is important here to note that content had the least statistical impact within the model. More importantly, content was not a measure of traditional methods of content delivery, such as online textbook or lectures, but a measure of pedagogically sound effective practices for online content delivery. Therefore, in designing and delivering content, effective pedagogical practices include only using short video to explain harder-to-grasp concepts and processes, using annotations in the texts, and including current and rich online materials (online articles, videos). Importantly, the leanness (text) or richness (audio or video) of the media should be appropriate for the content being delivered and have enough breadth and depth for learning. These practices should be implemented by faculty and instructional designers to improve student outcomes. They are of particular importance to ensure equitable learning due to the significant and positive relationship to underrepresented students grades in the course.

Fifth, *assessment* was positively related to satisfaction for underrepresented students. Again, the assessment measure is based on quality measures of assessment which include managing students' expectations and providing clarity for how students will be assessed, including participation, quizzes, and exams, the alignment of assessments and activities with the course objectives and outcomes, and incorporation of an assessment approach that provides students frequent opportunities through varied forms to receive feedback on their learning. To ensure equity in their assessment planning, instructors should ensure that their expectations are clear and that they are using a student-centered, active learning approach to assessment as previously indicated in research on college assessment (see Huba & Freed, 2000).

There were other notable findings regarding learner support and instructor interactions with students. Learner support was inversely related to students' perceptions of learning for all students but not in particular for underrepresented students. Further research is needed to better understand why learner support inversely affected students' perceptions of learning and was not significant for underrepresented populations. Moreover, results indicated that student interactions with the instructor was inversely was related to academic performance for all students and similarly for underrepresented students. One could hypothesize that students who require more assistance or are struggling academically except greater communication and interactivity from their instructor. The greater their perception of instructor interactivity, the greater their perception of learning, but the lower their reported grade. Additional research is needed. The standardized beta was higher for instructor interactions for underrepresented students, which could indicate that underrepresented students rely more on those interactions than materials that provide them support.

Notably, there were significant difference between how students with disabilities perceive content in comparison to their counterparts. These differences deem further research, in particular when it comes to assuring that online education provides equal access to underprivileged students. Students with disabilities had lower perceptions of content design and delivery than their counterparts. Alternatively, low-income or Pell grant eligible students had significantly greater reports of content design and delivery, their instructor's interactivity, and interactions with their peers than their counterparts. No research has been conducted on low-income students and interactivity in their online courses, but additional research needs to be conducted to understand these differences.

In examining the instructional characteristics instrument as a whole, findings indicate the whole may be greater than the sum of its parts; predictions regarding perceived learning, satisfaction, and academic performance can be made for all students and for underrepresented students based on their overall scores on the measure, although the amount of variance accounted for by academic performance or grade was quite small. The instrument is reliable and valid. Therefore, the instrument in its entirety has greater predictability than part of the instrument measuring individual aspects of the instructional characteristics.

Some important limitations of our study should be considered. Our surveys yielded low response rates, which may incur selection bias. Students who completed the survey may be systematically different than those who did not on their perceptions of instructional characteristics and outcome measures. Furthermore, although grades are often used as an academic performance measure, there were few significant findings regarding the connection between instructional characteristics and grades in this study. Also, the course completion versus noncompletion stats did not yield a large enough sample to examine. As Moore and Kearsley (2011) noted, online courses tend to have a higher amount of success, meaning that they have higher grades and completion rates. In descriptive analysis, this was evident. There may be future considerations if this skewness is in violation of some statistical tests. Historically, student success is documented by course completion and grade, yet other outcomes rather than summative grades should be considered in future studies.

Understanding the significant relationship of individual constructs as well as the instrument in its entirety has crucial implications for practice. It is important to understand the relationships of the individual aspects of instructional characteristics due to the limitations of time and resources in designing online courses. The findings provide areas of prioritization for instructors in their design efforts, yet to truly impact student outcomes, all attributes should be considered in course design. Guiding future practice and research, the instrumentation has proven reliable and to have predictive validity. The instrumentation can be used in future studies but also can be used by practitioners to guide instructional and course design efforts to ensure quality.

References

Allen, I. E., & Seaman, J. (2016). *Online report card: Tracking online education in the United States*. Babson Survey Research Group.

Allen, M., Bourhis, J., Burrell, N., & Mabry, E. (2002). Comparing student satisfaction with distance education to traditional classrooms in higher education: A meta-analysis. *The American Journal of Distance Education*, *16*(2), 83–97.

Allen, M., Mabry, E., Mattrey, M., Bourhis, J., Titsworth, S., & Burrell, N. (2004). Evaluating the effectiveness of distance learning: A comparison using meta-analysis. *Journal of Communication*, *54*(3), 402–420.

Allen, M., Titsworth, S., & Hunt, S. K. (2009). *Quantitative research in communication*. Thousand Oaks, CA: Sage Publications.

Barkley, E. F., & Major, C. H. (2015). *Learning assessment techniques: A handbook for college faculty*. San Francisco: John Wiley & Sons.

Beare, P. L. (1989). Media: The comparative effectiveness of videotape, audiotape, and telelecture in delivering continuing teacher education. *American Journal of Distance Education, 3*(2), 57–66.

Bowerman, B. L., & O'Connell, R. T. (1999). Survey planning and questionnaire design. *The information system consultants handbook: Systems analysis and design.* London: CRC Press.

Cavanaugh, J. K., & Jacquemin, S. J. (2015). A large sample comparison of grade based student learning outcomes in online vs. face-to-face courses. *Online Learning*, *19*(2), 1–8.

Chickering, A. W., & Gamson, Z. F. (1987). Seven principles for good practice in undergraduate education. *American Association of Higher Education Bulletin*, *37*.

Crawley, A. (2012). *Supporting online students: A practical guide to planning, implementing, and evaluating services.* San Francisco: John Wiley & Sons.

Davis, T. (2015). *Visual design for online learning*. San Francisco: John Wiley & Sons.

Dziuban, C. D., Picciano, A. G., Graham, C. R., & Moskal, P. D. (2015). *Conducting research in online and blended learning environments: New pedagogical frontiers.* New York: Routledge.

Egan, M. W., Welch, M., Page, B., & Sebastian, J. (1992). Learners' perceptions of instructional delivery systems: Conventional and television. *American Journal of Distance Education, 6*(2), 47–55.

Fetherston, T. (2001). Pedagogical challenges for the World Wide Web. *Educational Technology Review, 9*(1). Retrieved from http://dl.aace.org/11556

Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). London: Sage Publications.

Hiltz, S. R. (1988, January). Collaborative learning in a virtual classroom: Highlights of findings. In *Proceedings of the 1988 ACM Conference on Computer-Supported Cooperative Work* (pp. 282–290). ACM.

Hiltz, S. R. (1994). *The virtual classroom: Learning without limits via computer networks.* Norwood, NJ: Intellect Books.

Hiltz, S. R., & Goldman, R. (Eds.). (2004). *Learning together online: Research on asynchronous learning networks.* Mahwah, NJ: Routledge.

Hiltz, S. R., & Meinke, R. (1989). Teaching sociology in a virtual classroom. *Teaching Sociology*, 431–446.

Huba, M., & Freed, J. (2000). *Learner-centered assessment on college campuses: Shifting the focus from teaching to learning*. Needham Heights: Allyn and Bacon.

Hung, D., Tan, S. C., & Koh, T. S. (2006). From traditional to constructivist epistemologies: A proposed theoretical framework based on activity theory for learning communities. *Journal of Interactive Learning Research*, *17*(1), 37.

Jaggars, S. S., & Bailey, T. (2010). *Effectiveness of fully online courses for college students: Response to a Department of Education meta-analysis.* Community College Research Center, Columbia University.

Johnson, H. P., & Mejia, M. C. (2014). Online learning and student outcomes in California's community colleges. Public Policy Institute.

Joosten, T. (2012). *Social media for educators.* San Francisco: Wiley.

Joosten, T. (2015). *Thinking systemically: A study of course communication and social processes in face-to-face and online courses* (Doctoral dissertation). The University of Wisconsin-Milwaukee.

Joosten, T. M., Barth, D., Harness, L., & Weber, N. L. (2014). The impact of instructional development and training for blended teaching on course effectiveness. *Blended Learning: Research Perspectives*, *2*, 173–189.

Joosten, T., & Reddy, D. (2015, October 1). *Distance education and technological advancements research toolkit.* National Research Center for Distance Education and Technological Advancements (DETA). Retrieved from http://uwm.edu/deta/toolkits/

Kaleta, R., Skibba, K., & Joosten, T. (2007). Discovering, designing, and delivering hybrid courses. In A. G. Picciano & C. Dzubian (Eds.), *Blended learning: Research perspectives* (pp. 111–143). Needham, MA: Sloan Consortium.

Ko, S., & Rossen, S. (2010). *Teaching online: A practical guide.* New York: Routledge.

Lehman, R. M., & Conceição, S. C. O. (2010). *Creating a sense of presence in online teaching: How to 'be there' for distance learners*. San Francisco: Jossey-Bass.

Lehman, R. M., & Conceição, S. C. O. (2014). *Motivating and retaining online students: Research-based strategies that work.* San Francisco: Jossey-Bass.

Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2009). *Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies*. Washington, DC: U.S. Department of Education.

Moore, M. G. (1989). Editorial: Three types of interaction. *American Journal of Distance Education*, *3*(2), 1–7.

Moore, J. C. (2009). A synthesis of Sloan-C effective practices. *Journal of Asynchronous Learning Networks*, *13*(4), 73–82.

Moore, M. G., & Kearsley, G. (2011). *Distance education: A systems view of online learning*. Wadsworth, CA: Cengage Learning.

Palloff, R. M., & Pratt, K. (2003). *The virtual student: A profile and guide to working with online learners*. San Francisco: John Wiley & Sons.

Palloff, R. M., & Pratt, K. (2008). *Assessing the online learner: Resources and strategies for faculty*. San Francisco: John Wiley & Sons.

Picciano, A. G. (2002). Beyond student perceptions: Issues of interaction, presence, and performance in an online course. *Journal of Asynchronous Learning Networks*, *6*(1), 21–40.

Ralston-Berg, P. (2014). Surveying student perspectives of quality: Value of QM rubric items. *Internet Learning*, *3*(1), 11.

Sener, J. (2006). Quality Matters: Inter-institutional quality improvement for online courses. *Journal of Asynchronous Learning Networks*, *10*(1), 69–80.

Shattuck, K. (2007). Quality Matters: Collaborative program planning at a state level. *Online Journal of Distance Learning Administration*, *10*(3).

Shea, P., & Bidjerano, T. (2014). Does online learning impede degree completion? A national study of community college students. *Computers & Education*, 75, 103–111.

Vai, M., & Sosulski, K. (2015). *Essentials of online course design: A standards-based guide.* New York: Routledge.