Introduction to the Special Issue: Select Papers Presented at the 2019 OLC Accelerate Conference and the 2020 OLC Innovate Conference

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We are happy to present five articles selected from the many presented at OLC Accelerate, held November 19-22, 2019 in Orlando, Florida, and OLC Innovate, moved from Chicago to a virtual conference June 15-26, 2020. We invite the readers to consider presenting their research to OLC conferences in the future.

The Online Learning Consortium (OLC) sponsors two annual conferences devoted to furthering the OLC mission of creating community and knowledge around quality online, blended, and digital learning while driving innovation. These conferences are known as premiere conferences for faculty, instructional designers, administrators and others who teach or support those who teach in online and blended learning.

The 2019 OLC Accelerate conference marked the 25th anniversary of this international conference. The event was held November 19-22 in Orlando, Florida's Walt Disney World Dolphin and Swan Resort with 1,623 onsite and over 1,000 virtual attendees from 13 countries, 49 states, Washington, D.C. and Puerto Rico.

Little did we know that 2020 would bring new adventures and challenges! OLC Innovate, originally scheduled for March 31-April 3, 2020 was postponed and reimagined after COVID-19 forced its Chicago venue to close. With a quick pivot and fantastic planning by the OLC team, the conference went virtual June 15-26 with 370 presenters and contributors and 5,500+ attendees from nearly 500 organizations/institutions, representing 35 countries, all 50 states, Washington D.C. and Puerto Rico.

Each year we highlight articles from a selected few presentations from these conferences for publication in *Online Learning.* The five selections here represent a variety of topics from varied institutions of higher education.

In "Relationships Between Carl Rogers' Person-Centered Education and the Community of Inquiry Framework: A Preliminary Exploration," Karen Swan, Cheng-Chia (Brian) Chen, and Denise Bockmier-Sommers, investigated connections between Rogers' core conditions (empathy, genuineness, and unconditional positive regard) and the Community of Inquiry (CoI) framework of three "presences" supporting learning: teaching presence, social presence, and cognitive presence. Using the Berrett-Lennard Relationship Inventory (BLRI) and Community of Inquiry Survey (CoI) they conducted preliminary survey research using online students at a small, Midwestern university. Results indicated significant connections between level of regard, empathy and CoI presences, especially teaching presence. The authors discuss future research and practical applications of their findings for online teaching.

Tara Lehan, Bethanne Shriner and Michael Shriner looked at the relationship between synchronous, one-on-one academic coaching and students' program completion in "It's Complicated: The Relationship Between Participation in Academic Coaching and Program Completion in Online Graduate Students." Building on their prior research that had indicated a correlation between academic coaching and student persistence, they compared a random sample of students who participated in academic coaching to a matched sample of students who did not receive academic coaching in a fully online graduate course. While a relationship was found between some demographic variables and program completion, no significant difference was found between those who received coaching and those who did not. They discuss limitations to their study and possible implications for future research.

In "Procrastination and Delayed Assignment Submissions: Student and Faculty Perceptions of Late Point Policy and Grace," Beverly Santelli, Sarah N Robertson, Elizabeth K. Larson and Samia Humphrey surveyed 597 online students and 53 online faculty at a private, Southwestern university. This exploratory study found alignment between faculty and students on their perceptions of the effectiveness and fairness of an institutional late assignment policy and their perceptions of scenarios in which leniency is appropriate. Faculty and student perceptions differed in the need for strict faculty adherence to a late policy. Limitations and future research possibilities are discussed by the authors as well as implications for teaching.

Neuza Sofia Pedro and Swapna Kumar, in "Institutional Support for Online Teaching in Quality Assurance Frameworks," reviewed 13 online education quality frameworks to identify institutional services each framework included as being essential for quality higher education online teaching. They identified 18 components centered around the topics of: technologies and technical support; online program/course effectiveness or evaluation data; guidelines/standards for online course design; administrative and academic support for online students; professional development for faculty in online course development and teaching; instructional design and technical support; online program management support; online learning research support; and recognition for engagement in online learning. Their research highlights the faculty support components required to ensure quality online learning in higher education and is especially timely in the current focus on online learning.

Finally, in "Using Innovative and Scientifically-Based Debate to Build e-Learning Community," Cheng-Chia (Brian) Chen and Karen Swan present research that is very relevant to higher education's move to online learning due to COVID-19. They detail the experience of adjusting the synchronous debate of an on-campus course to asynchronous group debates in a fully online course on public health arguments and policies. Critical to this experience was the infusion of innovative pedagogical elements to facilitate an effective e-learning community. Surveys

indicated that students were positive regarding the impact of the class debate on their active learning and critical thinking skills as well as their interaction and engagement with each other and the instructor. Furthermore, they were positive about the collaborative writing assignment's impact on their collaboration and learning. Comparisons between the online course and a comparable on-campus course found no significant difference in student perceptions, indicating that the online format did not diminish their perceptions of class experiences.

The editors of this special issue would like to acknowledge the OLC staff and numerous conference volunteers who always do an exceptional job but went above and beyond this year to make OLC Accelerate and OLC Innovate a success. The quick and unexpected pivot to a fully online conference resulted in more international attendees for OLC Innovate. We also are grateful to Sturdy Knight, managing editor, and Peter Shea, editor, of *Online Learning*, for their continuing guidance and help in continuing this focus on OLC Conference.

Finally, to our readers, we hope you find the research in this special focus on OLC conferences interesting and helpful. We invite you to consider submitting your research for presentation to OLC Accelerate in the fall, or OLC Innovate in the spring to share your lessons learned with others in the field. And, consider submitting your original research here to *Online Learning* in the future.

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Relationships Between Carl Rogers' Person-Centered Education and the Community of Inquiry Framework: A Preliminary Exploration

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Abstract
The research reported in this paper explored links between the work of Carl Rogers on person-centered education and the Community of Inquiry (CoI) framework, which posits a model of supports for social collaborative learning. Findings suggest significant links between the Rogerian constructs of level of regard and empathy and the CoI concept of teaching presence. The findings suggest avenues for future research and practical ways for enhancing teaching presence in online courses.

Keywords: Community of Inquiry framework, Carl Rogers, person-centered education, empathy, high regard, teaching presence

Swan, K., Chen, C.C., & Bockmier-Sommers, D.K. (2020). Relationships between Carl Rogers' person-centered education and the community of inquiry framework: A preliminary exploration. *Online Learning, 24*(3), 4-18. https://doi.org/10.24059/olj.v24i3.2279

Relationships Between Carl Rogers' Person-Centered Education and the Community of Inquiry Framework: A Preliminary Exploration

Online programs in the human-service professions are becoming more prevalent, which can be observed by merely conducting a Google search for online counseling and human service programs. In fact, online classes are rapidly becoming necessary to attract greater numbers of students and to provide access to students who might not otherwise be able to attend college in the human service professions. However, students in the human service professions are unique in that they must be trained to develop therapeutic, relationship-building and active listening skills, which are challenging at best to develop in the online format.

Happily, the work of Carl Rogers (1969) crosses the boundaries between psychology and education and can be applied to facilitating online courses in the human services. Rogers (1969) identified three "core conditions" that support facilitative practice in both counseling and education: empathy, genuineness, and unconditional positive regard. He theorized that these three conditions were necessary for the creation of relationships that support and facilitate both therapeutic conversations and educational interactions. It seems likely that the three conditions

might support not only learning in online human services courses but in online courses in general. Interestingly, what is probably the most prevalent model of learning processes in online environments, the Community of Inquiry (CoI) framework, similarly identifies three "presences" that support learning: teaching presence, social presence, and cognitive presence (Garrison, Anderson, & Archer, 2000).

The research reported in this paper investigated connections between Rogers' conditions and the CoI framework's presences In particular, the research investigated correlations among the responses of 242 students taking online classes at a small, Midwestern university on two surveys: the Barrett-Lennard Relationship Inventory (BLRI, Barrett-Lennard, 2015) which quantifies student perceptions of how their instructors enact Rogers' conditions, and the CoI Survey (Arbaugh et al., 2008), which measures student perceptions of the three presences in online classes.

In the sections that follow, Rogers' person-centered approach to education and the BLRI created to measure it are described, as are the CoI framework and the CoI Survey. The methods used to explore relationships between student perceptions of these two approaches are summarized and their results presented and discussed. Finally, the limitations of this research, the conclusions that can be drawn from it, and its practical implications are reviewed.

Carl Rogers' Person-Centered Learning

Carl Rogers was a clinical and educational psychologist who is best known for his person-centered or non-directive therapy (Smith, 2004). An admirer of the work of John Dewey, Rogers likewise believed in the importance of opening up to and theorizing from experience. Linking such concepts to the insights born of his clinical experience, Rogers maintained that the client usually knows better how to proceed than the therapist and argued that three conditions were necessary to unlock the client's insight: empathy, genuineness, and unconditional positive regard. According to Tausch and Huls (2014), *empathy* is defined as "…the emotional and cognitive ability to feel the problems or distress of another person combined with the desire to help or to relieve his/her distress" (p. 136). *Genuineness* is consistent with being authentic and transparent. *Unconditional positive regard* refers to accepting others regardless of circumstances (Rogers, 1969). Indeed, even today, recent research on therapy outcomes has revealed that at least empathy and unconditional positive regard, and possibly congruence are critical components of effective psychotherapy (Kirschenbaum, & Jourdan, 2005).

In the 1960s, Rogers became convinced that the relationship between a teacher and a student could be seen as similar to that between a therapist and a client (Rogers, 1969). He theorized that the three conditions were necessary for the creation of relationships that support and facilitate both therapeutic conversations and educational interactions. He further maintained that learning was facilitated when instructors employed empathy, genuineness, and unconditional positive regard (Rogers, Lyon, & Tausch, 2013). Considerable research supports the efficacy of this approach (Cornelius-White, 2007), and there is some indication that it is useful in technology-enhanced teaching and learning (Motschnig-Pitrik, 2013).

Reese (2013) reported that collaboration, the freedom to create knowledge, and critical thinking skills increased students' engagement and participation in learning activities. With regard to the freedom to create knowledge, face-to-face and online learning environments share this potentiality. In light of higher education's movement toward the online format, the question arises, however, as to whether the three conditions can be used to enhance relationships between instructors and their students when instructors and students are separated in space and time.

Bockmier-Sommers, Chen, and Martsch (2017) found the use of empathy to be significantly related to engagement in online classrooms. Engagement in any classroom is key to learning and having the complex conversations needed for difficult topics, such as racism, trauma, and homophobia.

Indeed, Martin and Bockmier-Sommers (in press) found preliminary support for the use of Rogers' three conditions to facilitate such difficult conversations. The authors contend that professors must view students as co-learners as opposed to viewing themselves as the sole experts, which is consistent with Rogers' theorizing that each individual possesses the abilities and skills they need to become engaged learners.

The Barrett-Lennard Relationship Inventory

The Barrett-Lennard Relationship Inventory (BLRI) was developed by Godfrey Barrett-Lennard in 1962 as a means for assessing Rogers' conditions for successful therapy. Indeed, after many years of testing and revision, the author's research confirms the reliability and validity of the BLRI and that scores on it can predict positive change in clients (Barrett-Lennard, 2015). In the education arena, a 40-item version of the BLRI has been used to assess the strength and quality of the student teacher-relationships. Some studies suggest links between scores on this version of the BLRI and students' affective and academic learning (Griffin, 1977/1978, Mason & Blumberg, 1969, Smeltko, 1982/1983).

The educational version of the BLRI is a 40-item survey instrument which measures student-teacher relationships in terms of student perceptions of the Rogerian conditions in their teachers. In the survey, two of the conditions, empathy and genuineness, essentially correspond with the meanings given by Rogers (1969). *Empathy* is defined as "the extent to which one person is conscious of immediate and felt awareness of another" Barrett-Lennard, 2015, p. 20). *Genuineness* is the degree to which one person is "functionally integrated in the context of their relationships with others" (Barrett-Lennard, 2015, p. 21). The highly genuine individual is completely honest, direct, and sincere in what is conveyed, but does not feel a compulsion to either communicate or withhold their perceptions.

The two other Rogerian conditions measured on the BLRI, level of regard and unconditionality of regard represent a division of the concept of unconditional positive regard into two distinct concepts suggested by previous testing of the inventory. *Level of regard* refers to the affective aspect of one person's response to another including not online liking, appreciation, and affirmation, but also dislike, impatience, and rejection. These latter feelings, of course, negatively impact the relationship. *Unconditionality* is specifically the degree of constancy of regard felt by one person for another, ranging from consistency across situations to responses changing and conditioned by differing situations.

The Community of Inquiry Framework

The Community of Inquiry (CoI) framework (Garrison, Anderson, & Archer, 2000) is a process model of learning in online and blended environments, where the social construction of knowledge is made nontrivial by the separation of course participants in time and space. It assumes that, especially in higher education, worthwhile educational experiences are embedded in communities of inquiry composed of teachers and students and that learning occurs within such communities through the interaction of three core elements: cognitive presence, social presence, and teaching presence (Figure 1).

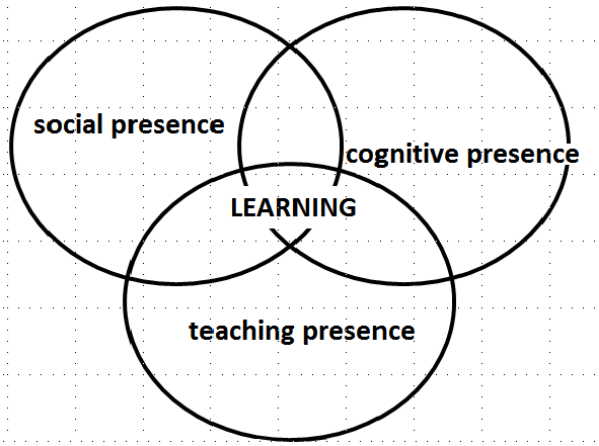

Figure 1. Community of Inquiry model (Garrison, Anderson, & Archer, 2000).

In the CoI framework, *social presence* is defined as the ability of participants to project themselves socially and emotionally in an online class and correspondingly their ability to perceive other participants in that class as "real" (Swan & Shih, 2005). Social presence is conceptualized as embodied by three types of behaviors—*affective expression*, the use of personal expressions of emotions, feelings, beliefs and values to project presence; *group cohesion*, interpersonal communication that builds and sustains a sense of community; and *open communication*, behaviors that encourage interaction and critical reflection by recognizing, complimenting and responding to others. Research has linked social presence to students' satisfaction and perceived and actual learning in online and blended classes (Richardson & Swan, 2003; Picciano, 2002; Swan & Shih, 2005).

Teaching presence includes *course design and organization*, *the facilitation of learning*, and *direct instruction* in online and blended courses (Garrison et al., 2000). Although these are all tasks that are generally undertaken by teachers, in the CoI framework teaching presence is not seen as attached to them but rather conceptualized as distributed across teachers, students, and materials. Researchers have documented strong correlations between learners' perceived and actual interactions with instructors and their perceived learning (Jiang & Ting, 2000; Richardson & Swan, 2003) and between teaching presence and student satisfaction, perceived learning, and the development of a sense of community in online courses (Shea et al., 2005). In fact, the body of evidence attesting to the critical importance of teaching presence for successful online learning continues to grow (Garrison, Cleveland-Innes & Fung., 2010 Vaughan & Garrison, 2006;), with the most recent research suggesting it is the key to developing online communities of inquiry (Kozan, 2016; Shea & Bidjerano, 2009; Zhu et al., 2019).

Cognitive presence is defined as the extent to which learners are able to construct and confirm meaning in a virtual community of inquiry (Garrison, 2016). It is based on the Practical Inquiry Model (Garrison, Anderson, & Archer, 2001) describes four phases in the pragmatic inquiry process. Practical inquiry, according to the model, begins with a *triggering event,* in the form of an issue, problem or dilemma that needs resolution, which elicits a natural shift to *exploration,* the search for relevant information that can provide insight into the challenge at hand. As ideas crystallize, there is a move into the third phase—*integration*—in which connections are made and there is a search for explanations. Finally, there is the selection and testing of the most viable solution and *resolution* around it.

The CoI Survey

In 2008, researchers working with the CoI framework developed and validated a survey designed to measure student perceptions of social, teaching, and cognitive presence (Arbaugh, et al., 2008). The survey has been used to further explore the CoI framework and the interactive effects of all three presences (Garrison, Cleveland-Innes & Fung, 2010; Shea & Bidjerano, 2009) with some meaningful results. Boston and colleagues (2010) used the survey to explore relationships between the presences and student retention and found an important relationship between retention and social presence. Archibald (2010) found that teaching and social presence explained approximately 69% of the variance in cognitive presence, and that teaching and social presence continued to make significant contributions to the prediction of cognitive presence after controlling for self-directed learning readiness, prior online learning experience, and prior collaborative learning experience.

The CoI survey has also been used to inform the design and implementation of online courses. Ke (2010), for example, studied the interactions of teaching, cognitive, and social presence and their relationship to online instructional design, and identified design and teaching elements that were crucial prerequisites for successful online courses. Swan, Day, Bogle and Matthews (2014) used CoI scores to iteratively direct improvements in online graduated courses, resulting in significant increases in student outcomes.

Methods

The purpose of this research was to explore relationships between the conditions Carl Rogers identified as supporting person-centered learning and the CoI presences which many argue support the development of a community of inquiry.

Subjects and Setting

Subjects were recruited from the student population of small Midwest university. They were initially recruited through faculty members in each of the four colleges. A second round of recruitment was pursued through flyers distributed across campus and campus-wide email announcements. Two hundred and forty-eight students met the study requirement of having taken at least one online class. As part of the data analysis process, all variables were initially screened by checking regression assumptions, including linearity, homogeneity of variance and multicollinearity. Six subjects were identified as multivariate outliers through Mahalanobis distances ($p < .001$; Tabachnick & Fidell, 2007) and removed from the dataset, reducing the sample size to 242 subjects.

Of the 242 eligible students who completed the online survey, 67% ($n = 163$) students were on-campus students who had taken at least one online course, and 33% ($n = 79$) were students who took all of their courses online. The majority of participants in this study were females (70%). Subjects participated in the data collection online using their laptops or cell phones.

Data Sources

Two survey instruments were used to collect student perceptions of the Rogerian conditions and the CoI presences.

The *Barrett-Lennard Relationship Inventory* (BLRI; Barrett-Lennard, 2015) was used to measure student perceptions of Rogers' conditions for supporting person-centered learning. The

BLRI contains a total of 40 items with which respondents are asked to indicate their agreement on a six-point bipolar scale ranging from -3 ("NO, I strongly feel that it is not true") to +3 ("YES, I strongly feel that it is true"). It returns scores on four subscales—one each for empathy, level of regard, unconditionality, and genuineness. To make the BLRI scores more similar to the COI scores, 3 points were added to scores on each BLRI item and then scores were averaged for each subscale.

Student perceptions of teaching, social, and cognitive presence were measured using the *Community of Inquiry (CoI) Survey*. The CoI Survey consists of a total of 34 Likert-type items (ranging along a five-point scale from "Strongly Disagree" to "Strongly Agree") that measure student perceptions of teaching, social, and cognitive presences in the online courses they take. The CoI Survey includes three subscales; the teaching presence subscale consists of 13 items; the social presence subscale consists of 9 items, and the cognitive presence consists of 12 items). CoI scores were averaged for each of the three subscales.

Both survey instruments measure student perceptions of teaching and learning processes in online courses. The dependent variables are scores on the three CoI presences and the four measurements in the BLRI model.

Data Analyses

Table 1 gives descriptive statistics for student perceptions of the three presences and the Rogerian conditions explored in this study. The mean total for each item is given in the first column and the standard deviation for that mean is in the second column. However, because the Community of Inquiry presences are measured by differing numbers of items, and the number of items measuring each of the Rogerian constructs is different still, we have divided the means by the number of items in each construct to calculate the average score for each.

Table 1

*Mean Scores and Standard Deviations for Student Perceptions of CoI Presences and Rogerian Constructs (*n *= 242)*

Variable/Construct	mean score	SD
teaching presence	4.02	0.67
social presence	3.76	0.70
cognitive presence	3.99	0.64
level of regard	4.42	1.00
empathy	4.27	0.95
unconditionality	3.50	0.77
genuineness	3.84	0.80

The average student perceptions were the highest for level of regard and empathy, followed by teaching and cognitive presence, genuineness, social presence, and finally unconditionality.

Pearson's correlation coefficients were computed to explore the relationships among three CoI presences and four BLRI constructs. Table 2 reports the relationships among these seven theoretical concepts. The results of the correlational analyses indicated that all seven variables were positively correlated with one another, with variables from the same frameworks most strongly correlated with each other. Results also indicated meaningful correlations between all three presences and both level of regard and empathy, with the two Rogerian constructs accounting for between 19% and 26% of the variance in level of three presence scores. The relationship between teaching presence and empathy was the strongest.

Table 2

*Pearson's Correlations among seven theoretical constructs from the CoI and BLRI surveys (*n = *242)*

Variable/Construct	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Teaching Presence (1)	–						
Social Presence (2)	.591***	–					
Cognitive Presence (3)	.671***	.649***	–				
Level of regard (4)	.482***	.431***	.433***	–			
Empathy (5)	.505***	.455***	.471***	.887***	–		
Unconditionality (6)	.253***	.246***	.224***	.521***	.505***	–	
Genuineness (6)	.332***	.310***	.287***	.740***	.717***	.425***	–

**p <.05, **p < .01, ***p < .001*

Because all the CoI and BLRI variables were correlated with each other, a series of partial correlations were then computed controlling for each of the variables in turn. The purpose of the partial correlation analyses was to further explore the strength of relationships between the CoI presences and the Rogerian constructs. In addition, regression analysis was used to investigate the effects of level or regard, empathy, unconditionality, and genuineness (independent variables) on teaching presence (dependent variable).

Results

Because all the CoI and Rogerian variables were correlated, a series of partial correlations were initiated, controlling for each of the variables in turn. Partial correlations measure the strength of association between two variables with the effects of another variable removed. The purpose of the partial correlation analyses was to further explore the strength of relationships between the CoI presences and the Rogerian constructs without the influence of possible confounding variable to identify the strongest links between CoI and BLRI variables. These results of these analyses are given in Tables 3 through Table 8.

Table 3

*Pearson's Partial Correlations among the study variables controlling for teaching presence (*n = *242)*

Variable/Construct	**1**	**2**	**3**	**4**	**5**	**6**
Social Presence (1)	–					
Cognitive Presence (2)	.421***	–				
Level of regard (3)	.207***	.169**	–			
Empathy (4)	.226***	.207***	.852***	–		
Unconditionality (5)	.123	.076	.471***	.452***	–	
Genuineness (6)	.150*	.093	.702***	.675***	.374***	–

**p < .05, **p < .01, ***p < .001*

Controlling for teaching presence (Table 3) means that we are looking at the relationships among the study variables when we remove the confounding effects of teaching presence. Notice how much weaker the relationship between social and cognitive presence is when teaching presence is controlled for. Similarly, controlling for teaching presence yields considerably weaker relationships between social and cognitive presence and the BLRI variables. Notice that when teaching presence is controlled for, the relationships between social and cognitive presence and unconditionality and genuineness are no longer significant. At the same time, notice that the associations among the BLRI variables remain quite similar. This suggests that teaching presence probably is the most closely related of the CoI presences to the BLRI constructs.

The importance of teaching presence among the CoI/BLRI associations is supported by findings concerning controlling for social presence (Table 4) and cognitive presence (Table 5). Controlling for these two presences reduces the strength of the inter-CoI relationships in degrees similar to what happens when teaching presence is controlled for, but the CoI/BLRI relationships are not so drastically reduced. Indeed, the only relationships which are not significant in these correlations are those between cognitive presence and unconditionality and genuineness when social presence is controlled for.

Table 4

*Pearson's Partial Correlations among the study variables controlling for social presence (*n = *242)*

Variable/Construct	**1**	**2**	**3**	**4**	**5**	**6**
Teaching Presence (1)	–					
Cognitive Presence (2)	.468***					
Level of regard (3)	.312***	.223***				
Empathy (4)	.328***	.259***	.860***			
Unconditionality (5)	.138*	.088	.475***	.456***		
Genuineness (6)	.193**	.119	.707***	.680***	.379***	–

**p <.05, **p <.01, ***p <.001*

Table 5

*Pearson's Partial Correlations among the study variables controlling for cognitive presence (*n = *242)*

Variable/Construct	1	2	3	4	5	6
Teaching Presence (1)	–					
Social Presence (2)	.276***					
Level of regard (3)	.286***	.219***				
Empathy (4)	.289***	.223***	.859***			
Unconditionality (5)	.142*	.136*	.483***	.465***		
Genuineness (6)	.196**	.170**	.714***	.688***	.387***	–

**p < .05, **p < .01, ***p < .001*

Just as correlations among BLRI variables remained quite similar when the COI presences were controlled for, so relationships among the CoI variables remained quite similar when the BLRI variables were controlled for. When the effect of level of regard (Table 6) and empathy (Table 7) are controlled for, however, those inter-CoI relationships are weaker than when unconditionality (Table 8) and genuineness (Table 9) are controlled for, and the former partial correlations result in few significant associations between the BLRI variables and all the study variables. These findings indicate that level of regard and empathy in particular are most closely related to the CoI presences.

Table 6

*Pearson's Partial Correlations among the study variables controlling for level of regard (*n = *242)*

Variable/Construct	1	2	3	4	5	6
1. Teaching Presence (1)	–					
2. Social Presence (2)	.485***					
3. Cognitive Presence (3)	.585***	.568***				
4. Empathy (4)	.192**	.176**	.210***			
5. Unconditionality (5)	.003	.028	-.001	.109		
6. Genuineness (6)	-.042	-.014	-.055	.193**	.069	–

**p < .05, **p < .01, ***p < .001*

Table 7

*Pearson's Partial Correlations among the study variables controlling for empathy (*n = *242)*

Variable/Construct	**1**	**2**	**3**	**4**	**5**	**6**
Teaching Presence (1)	–					
Social Presence (2)	.470***					
Cognitive Presence (3)	.569***	.553***				
Level of regard (4)	.084	.065	.036			
Unconditionality (5)	-.002	.021	-.018	.183**		
Genuineness (6)	-.050	-.026	-.082	.324***	.105	–

**p < .05, **p < .01, ***p < .001*

Table 8

*Pearson's Partial Correlations among the study variables controlling for unconditionality (*n = *242)*

Variable/Construct	**1**	**2**	**3**	**4**	**5**	**6**
Teaching Presence	–					
Social Presence	.564***					
Cognitive Presence	.651***	.628***				
Level of regard	.423***	.366***	.380***			
Empathy	.451***	.396***	.425***	.847***		
Genuineness	.256***	.234***	.218***	.672***	.643***	–

**p < .05, **p < .01, ***p < .001*

Table 9

*Pearson's Partial Correlations among the study variables controlling for genuineness (*n = *242)*

Variable/Construct	**1**	**2**	**3**	**4**	**5**	**6**
Teaching Presence	–					
Social Presence	.544***					
Cognitive Presence	.637***	.614***				
Level of regard	.372***	.315***	.342***			
Empathy	.406***	.352***	.397***	.761***		
Unconditionality	.132*	.133*	.118	.339***	.317***	–

**p < .05, **p < .01, ***p < .001*

To test these initial findings, multiple regression analysis was conducted to assess the potential influence of Rogerian person-centered concepts on teaching presence in the CoI model. Prior to the analysis, linearity, normality, homoscedasticity, and multicollinearity assumptions were checked and all those assumptions were found to meet for analysis. As multicollinearity indicatives tolerance values were above 0.1 (0.185 to 0.718) and variance inflation factors (VIF) were greater than 1 (Field, 2009).

The resulting multiple regression model can be expressed as

$$TP = 0.145\ (LoR) + 0.280\ (Emp) - 0.012\ (UnCon) - 0.089\ (Gen) + 2.566.$$

Where TP = teaching presence, LoR = level of regard, Emp = Empathy, UnCon = unconditionality, and Gen = genuineness.

The prediction model was statistically significant, ($F_{(4,\ 237)} = 21.407$, $p < .001$) and accounted for approximately 27% of the variance in teaching presence (R-squared = .265, adjusted R-squared = .253). Additionally, we found that the estimated power to predict multiple R-squared is 1.000 and the effect size was .361. Moreover, the standardized coefficients for level of regard, empathy, unconditionality, and genuineness were 0.215, 0.398, -0.012, and -0.089, respectively. These coefficients are standardized regression coefficients, which allows the researchers to compare the different degrees of Rogerian constructs' impact on teaching presence. Empathy, as indexed by its standardized beta value of .398, was shown to have the strongest relationship to teaching presence, followed by level of regard. In addition, the regression results suggest that unconditionality and genuineness are not associated with teaching presence. The results of the partial correlation controlling for teaching presence (Table 3), moreover, suggests that these latter two are not related to social or cognitive presence.

Limitations

The results of this research are limited by the sampling methodology employed. First, subjects were all drawn from a small Midwestern university whose students are mostly drawn from the state in which it is located. Two-thirds of the subjects were on-campus students taking at least one online class, and 70% were female, neither of which mirrors characteristics of the university population, let alone university students in general. Moreover, subjects were those who responded to voluntary recruitment and so may have other characteristics not common to the general population. In addition, the research results are limited by the survey instruments themselves used which are self-report. As the CoI and Rogerian concepts being investigated involve individual perception, self-reporting might be the only way to get at them, still the survey items might in some way limit the outcome. In sum, findings may be in some way suspect and may not be generalizable to a larger population.

Conclusions

The research reported herein was preliminary in nature. It was designed to explore possible connections between the Community of Inquiry presences and Rogerian constructs as measured by the CoI survey and the BLRI instrument. Thus, despite limitations, the results are intriguing. Findings indicate significant connections between level of regard and empathy and the CoI presences, teaching presence in particular. Indeed, taken together the two constructs accounted for 27% of the variance of teaching presence in the perceptions of the students in the study.

These findings suggest avenues for future research and practical ways for enhancing teaching presence in online courses. They seem to indicate that online instructors could enhance teaching presence in their courses by working to project empathy and high levels of regard for their students. Future research should explore the effects of addressing instructor empathy and regard for students on student perceptions of teaching presence and on student outcomes. It also might be useful to look at connections between these findings and research on instructor social presence (Lowenthal, 2016; Richardson et al., 2015; Richardson & Lowenthal, 2017). Finally, as we have good evidence linking teaching presence to students' satisfaction and learning (Shea, Li, Swan, & Pickett, 2005), online instructors might focus on empathy in particular to enhance student success.

References

Arbaugh, J. B., Cleveland-Innes, M., Diaz, S., Garrison, D. R., Ice, P., Richardson, J. C., Shea, P., & Swan, K. (2008). Developing a community of inquiry instrument: Testing a measure of the Community of Inquiry framework using a multi-institutional sample. *The Internet and Higher Education, 11*(3–4), 133–136.

Archibald, D. (2010). Fostering the development of cognitive presence: Initial findings using the Community of Inquiry survey instrument. *Internet and Higher Education, 13*(1–2), 73–74.

Barrett-Lennard, G. T. (2015). *The relationship inventory: A complete resource and guide.* John Wiley & Sons.

Bockmier-Sommers, D., Chen, C. C., & Martsch, M. (2017). Student perception of teacher empathy, high regard and genuineness and the impact on student engagement. *e-Mentor, 3*(70), 66–72

Cornelius-White, J. (2007). Learner-centered teacher-student relationships are effective: A meta-analysis. *Review of Educational Research. 77*(1), 113–143.

Field, A. (2009). *Discovering statistics using IBM SPSS statistics* (3rd ed.). Sage.

Garrison, D. R. (2016). *E-Learning in the 21st century: A Community of Inquiry framework for research and practice* (3rd ed.). Routledge.

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*, 87–105.

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence and computer conferencing in distance education. *American Journal of Distance Education, 15*(1), 7–23.

Garrison, D. R., Cleveland-Innes, M., & Fung, T. (2010). Exploring causal relationships among cognitive, social and teaching presence: Student perceptions of the Community of Inquiry framework. *The Internet and Higher Education*, *13*(1–2), 31–36.

Griffin, E. J. (1977/1978). A study of effects of a curriculum-centered college reading course and an affectively oriented curriculum focused course on reading achievement and attitude toward reading [Doctoral dissertation, University of Florida]. *Dissertation Abstracts International, 38-A*, 6429. http://archive.org/stream/effectsofcurricu00miln/effectsofcurricu00miln_djvu.txt

Jiang, M., & Ting, E. (2000). A study of factors influencing students' perceived learning in a web-based course environment. *International Journal of Educational Telecommunications*, *6*(4), 317–338.

Kirschenbaum, H., & Jourdan, A. (2005). The current status of Carl Rogers and the person-centered approach. *Psychotherapy: Theory, Research, Practice, Training, 42*(1), 37–51.

Ke, F. (2010). Examining online teaching, cognitive, and social presence for adult students. *Computers & Education*, *55*(2), 808–820.

Kozan, K. (2016). A comparative structural equation modeling investigation of the relationships among teaching, cognitive and social presence. *Online Learning*, *20*(3), 210–227.

Lowenthal, P. R. (2016). A mixed methods examination of instructor social presence in accelerated online courses. In L. Kyei-Blankson, J. Blankson, E. Ntuli, & C. Agyeman (Eds.), *Handbook of research on strategic management of interaction, presence, and participation in online courses* (pp. 147–159). IGI Global.

Mason, J., & Blumberg, A. (1969). Perceived educational value of the classroom and teacher-pupil interpersonal relationships. *Journal of Secondary Education, 44,* 135–139.

Motschnig-Pitrik, R. (2013). Characteristics and effects of person-centered technology enhanced learning. In J. H. Cornelius-White, R. Motschnig-Pitrik., & M. Lux (Eds)., *Interdisciplinary applications of the person-centered approach* (pp. 125–131). Springer Science & Business Media.

Picciano, A. G. (2002). Beyond student perceptions: Issues of interaction, presence, and performance in an online course. *Online Learning*, *6*(1), 21–40.

Reese, S. A. (2013). Online learning environments in higher education: Connectivism vs. dissociation. *International Journal of Instructional Technology and Distance Learning, 10*(5), 35–44.

Richardson, J. C., Koehler, A. A., Besser, E. D., Caskurlu, S., Lim, J., & Mueller, C. M. (2015). Conceptualizing and investigating instructor presence in online learning environments. *The International Review of Research in Open and Distributed Learning*, *16*(3), 256–297.

Richardson, J. C., & Lowenthal, P. (2017). Instructor social presence: Learners' needs and a neglected component of the Community of Inquiry framework. In A. L. Whiteside, A. Garrett Dikkers, & K. Swan (Eds.), *Social presence in online learning: Multiple perspectives on practice and research* (pp. 86–98). Stylus.

Richardson, J. C., & Swan, K. (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction. *Journal of Asynchronous Learning Networks*, *7*(1), 68–88.

Rogers, C. R. (1961) *On becoming a person: A therapist's view of psychotherapy.* Houghton Mifflin.

Rogers, C. (1969). *Freedom to learn: A view of what education might become* (1st ed.). Charles Merrill.

Rogers, C., Lyon, H. C., & Tausch, R. (2013) *On becoming an effective teacher—Person-centered teaching, psychology, philosophy, and dialogues with Carl R. Rogers and Harold Lyon*. Routledge.

Shea, P., & Bidjerano, T. (2009). Community of Inquiry as a theoretical framework to foster "epistemic engagement" and "cognitive presence" in online education. *Computers and Education*, *52*(3), 543–553.

Shea, P., Li, C-S., Swan, K., & Pickett, A. (2005). Developing learning community in online asynchronous college courses: The role of teaching presence. *Journal of Asynchronous Learning Networks, 9*(4), 59–82.

Simmons, J., Roberge, L., Kendrick, S. B. Jr., & Richards, B. (1995). The interpersonal relationship in clinical practice. The Barrett-Lennard Relationship Inventory as an assessment instrument. *Evaluation and the Health Professions*, *18*(1), 103–112.

Smetko, J. A. (1982/1983). Student perceived facilitation as a correlate of academic achievement, academic self-concept and self-concept among inner city seventh and eighth graders [Doctoral dissertation, Alberta University]. *Dissertation Abstracts international, 43*, 1902-A. https://archive.org/stream/ERIC_ED358616/ERIC_ED358616_djvu.txt

Smith, M. K. (2004) Carl Rogers and informal education. *The Encyclopedia of Pedagogy and Informal Education*. www.infed.org/thinkers/et-rogers.htm.

Swan, K., Day, S. L., Bogle, L. R., & Matthews, D. B. (2014). A collaborative, design-based approach to improving an online program. *Internet and Higher Education, 21*, 74–81.

Swan, K., & Shih, L-F. (2005). On the nature and development of social presence in online course discussions. *Journal of Asynchronous Learning Networks, 9*(3), 115–136.

Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (2007). *Using multivariate statistics* (5th ed.). Pearson.

Tausch, R., & Hüls, R. (2013). Students, patients, and employees cry out for empathy, In C. R. Rogers., H. C. Lyon, Jr., & R. Tausch (Eds.), *On becoming an effective teacher: Person-centered teaching, psychology, philosophy, and dialogues with Carl R. Rogers*. Routledge.

Vaughan, N., & Garrison, D. R. (2006). How blended learning can support a faculty development community of inquiry. *Journal of Asynchronous Learning Networks*, *10*(4), 139–152.

Zhu, M., Herring, S. C., & Bonk, C. (2019). Exploring presence in online learning through three forms of computer-mediated discourse analysis. *Distance Education*, *40*(2), 205–225.

It's Complicated: The Relationship Between Participation in Academic Coaching and Program Completion in Online Graduate Students

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Abstract
This study extends prior research by investigating the relationship of synchronous, one-on-one academic coaching with program completion, comparing a random sample of students who participated in academic coaching to a matched sample of students who did not receive academic coaching in fully online graduate courses. The findings indicate that a previously observed relationship between academic coaching and persistence in online graduate students does not endure through program completion, although the relationship between several demographic and academic variables and program completion did remain statistically significant. In light of these findings, if the goal is to increase their odds of completion, it seems that students who are already engaging with an academic coach (due to either self-selection or faculty encouragement/requirement) might be encouraged to continue to do so. Moreover, a "booster" coaching session might be helpful. However, there is insufficient evidence to support the practice of requiring participation in academic coaching among students who do not do so on their own.

Keywords: distance education, online graduate students, learning center, academic coaching, graduation, completion, retention, persistence

Lehan, T., Shriner, B., & Shriner, M. (2020). It's complicated: The relationship between participation in academic coaching and program completion in online graduate students. *Online Learning, 24*(3), 19-34. https://doi.org/ 10.24059/olj.v24i3.2142

It's Complicated: The Relationship Between Participation in Academic Coaching and Program Completion in Online Graduate Students

As of 2017, there were 868,708 fully online graduate students attending universities in the United States (Bastrikin, 2020). This number represent 28.9% of the total graduate student population of 1.4 million. However, the completion/retention/graduation rates of fully online graduate programs have traditionally fallen behind their face-to-face counterparts (Muljana & Luo, 2019). Despite the rapid growth of online courses and programs, it remains unclear how to support learning and achievement most effectively in this context (Rakes & Dunn, 2010). Slater and Davies (2020) report that online students value accessible, engaging, and assignment-related content, but

faculty members report that they do not have sufficient time to complete all their job requirements optimally (Berebitsky & Ellis, 2018). Academic coaches might represent an opportunity to promote not only learning, but also engagement, as well as persistence, retention, and completion among students (Bettinger & Baker, 2011; Lehan, Hussey, & Shriner, 2018). Scholarly attention has been paid to attrition rates in online graduate programs, which have been estimated to be as high as 50% (Ivankova & Stick, 2007) or even 70% (Nettles & Millet, 2006). A major reason for this high rate is that online graduate students tend to be working adults with multiple sometimes competing demands on their time (Brown, 2012).

Professionals in learning centers, such as academic coaching and/or tutoring centers, can offer support services that provide students with opportunities to engage with their course curriculum using different media, relearn concepts, and request further explanation (Fullmer, 2012). Even though online institutions may offer specialized support services for students, their brick-and-mortar counterparts are more likely to have traditional learning centers (Felder-Strauss et al., 2015). Whereas academic coaching has experienced continued growth at higher education institutions, likely due to its newer development as a student service, it has not been the focus of much research (Capstick, Harrell-Williams, Cockrum, & West, 2019), with almost no previous research focusing on the outcomes and impacts associated with online learning centers. This paucity of research is concerning during a time when learning assistance is needed most, as more students enroll in online programs, but continue to struggle to a greater extent than their peers in face-to-face settings (Britto & Rush, 2013).

Review of Relevant Literature

Tinto's (1993) model of institutional departure has been referenced in numerous publications (Alhojani, 2016) and frequently used to explain or predict whether a student will drop out (Nicoletti, 2019). Tinto argued that students must participate in formal (extracurricular activities) and informal (peer groups interactions) social systems. In addition, they must integrate into formal (academic performance) and informal (faculty/staff interactions) academic systems to learn and persist. Similarly, researchers have found that one of the most important factors related to students' persistence is their ability to make a meaningful connection with at least one member of the college or university community (e.g., Kuh, 2005). Likewise, Chambliss and Takacs (2014) argued that developing relationships with staff members, such as those fostered through academic coaching, can have a positive impact on student success. However, the outcomes and impacts associated with these relationships have been examined to a limited extent, especially among graduate and online students.

Findings are mixed regarding what learning centers do and how they function to support student learning and achievement (Truschel & Reedy, 2009). For the most part, however, results of research have shown that students who choose to take advantage of support services at learning centers reportedly experience beneficial outcomes (e.g., Osborne, Parlier, & Adams, 2019). For example, Lancer and Eatough (2018) used Interpretive Phenomenologial Analysis with nine undergraduates over an academic year to understand their expeirences of having had six academic coaching sessions each. They suggested that academic coaching offered benefits to time management, stress reduction, and overall academic confidence. Additionally, Oreopoulos, Petronijevic, Logel, and Beattie (2020) analyzed the responses of 3,000 undergraduates who experienced low-cost and elective text-message based coaching sessions and reported feelings of

greater satisfaction and belonging to the university amongst the respondents. Conversely, in a pilot study, Sepulveda, Birnbaum, Finley, and Frye (2020) show no differences between 46 participants who experienced brief academic coaching and 45 participants who did not on measures of retention and GPA.

After reviewing the impact of thousands of student success initiatives from dozens of higher education institutions, Civitas Learning (2019) found that tutoring was associated with increased persistence among first-year students (5.2% lift) and students who have completed four or more terms (1.98% lift), with Black and Hispanic students experiencing greater increases in persistence than their white counterparts. In a fairly robust study, Bettinger and Baker (2011) found that students in a face-to-face context who participated in tutoring had significantly higher persistence rates 6, 12, 18, and 24 months later and higher degree completion rates than those who did not. Capstick, Harrell-Williams, Cockrum, and West (2019) used a quasi-experimental nonequivalent post-test design with 1,434 students and reported that students who electivly engaged in acadmic coaching demonstrated increased GPAs, were more likely to be in good academic standing (had a GPA of at least a 2.0) and were more likely to be retained in the next semester than those students who did not participate in acaademic coaching. Similarly, Lehan et al. (2018) found that online graduate students who worked synchronously with an academic coach at an online learning center were significantly more likely to persist six to nine months later than a sample of students in the same course with the same faculty member at the same time who did not work with an academic coach. Specifically, after holding months since enrollment and GPA at follow-up constant, working with an academic coach even once increased the odds of persistence 2.66 times, suggesting that academic coaching can be a high-impact practice. Several researchers have reported a correlation between the number of visits to the learning center and improved student achievement (Cooper, 2010; Fullmer, 2012; Laskey & Hetzel, 2011; Osborne et al., 2019), although Lehan et al. (2018) did not find support for such a relationship among online graduate students.

Given the divergent findings in the relevant scholarly literature, additional research is warranted to understand to what extent working with an academic coach is associated with longer-term persistence up to and including program completion. Such research can serve as a foundation for future investigations that can inform best practices in cocurricular learning assistance as well as efforts to improve student retention for online and/or graduate students. If higher education institutions provide academic coaching services as a persistence, retention, and/or completion initiative, it is critical that they evaluate under what conditions they are effective and use the findings to make continuous improvements (Robinson, 2015). Therefore, the purpose of this study was to examine the extent to which the previously reported impact of academic coaching on persistence (Lehan et al., 2018) endures through program completion. This study extends upon this previous work by examining the longer-term impacts of academic coaching.

Methods

Setting

This study took place at a for-profit turned not-for-profit (in 2019) completely online university that primarily grants graduate degrees. When the data were originally collected, there were four schools: Education, Business and Technology Management, Psychology, and Marriage and Family Sciences. At this institution, students may set the pace at which they take courses. Also, a one-to-one model is employed, where every class size is 1, with the goal of greater personalization of the teaching and learning experience. In addition, a teaching through engagement model is used to guide instruction. At this institution, accountability for student learning and success is shared among not only faculty members and students who are working together, but also staff members, administrators, and all other institutional actors. At the institution, cocurricular learning opportunities, including personalized academic coaching, are available to all students. It is defined as the process of helping a student to examine academic concerns and perceived barriers to success. Anecdotal and empirical (e.g., Babcock, Lehan, & Hussey, 2019) evidence existed at this institution that students' working with an academic coach one-on-one might result in greater persistence. Therefore, an evaluation was designed to determine the extent to which and under what conditions such a relationship might exist.

To enhance student learning and achievement, certified part-time academic coaches with graduate degrees are available at an internal online learning center. These professionals provide personalized cocurricular academic support in written communication and statistics to students in groups and one-on-one at no additional cost. Tiered levels of support (Tier 1: posted resources available 24/7; Tier 2: live chat; Tier 3: asynchronous one-on-one and synchronous group coaching; Tier 4: one-on-one synchronous academic coaching) are available to meet the unique needs of students from diverse backgrounds. The first two tiers are designed so that students can obtain answers and/or guidance surrounding common basic issues rapidly, whereas the two highest tiers are designed for students who need a higher level and/or different type of assistance. In synchronous one-on-one sessions, although students often present with an assignment on which they are feeling stuck, the focus is on the development of competence in the relevant learning outcome(s). Although there is no limit to the number of group sessions in which a student can participate each week, the maximum number of one-on-one sessions per week is two, except in special circumstances. WCOnline is used for scheduling, documentation, and asynchronous interactions. In synchronous sessions, the coach and student(s) meet via teleconference. The focus of coaching sessions is on the enhancement of student competence in specific areas related to institutional learning outcomes, specifically written communication and quantitative reasoning, as opposed to the completion of coursework or development of broader skills, such as time management. Relating to written communication, academic coaching might focus, for example, on the synthesis of literature or paraphrasing. With regard to quantitative reasoning, academic coaching might focus, for example, on levels of measurement or the steps in a specific statistical test. The coaches also aim to help students to become more self-directed in their learning.

All students who interact with a live academic coach while using the two highest tiers of support either synchronously or asynchronously receive a personalized coaching plan. It includes information about the skill(s) on which they worked, coaching strategies that were used, effectiveness of those strategies with supporting evidence, and steps that the student can take between sessions to continue to learn and achieve. A link to the recording of the session is also included in case students want to revisit it. Once the student and coach believe that the student has

reached competence based on the university's definition according to Bloom's taxonomy, coaching for that skill ends, but can begin on another skill. These data were archived and the university's institutional review board approved the study protocol.

Participants

In April 2016, 160 graduate students who participanted in one-on-one synchronous academic coaching at a completely online university were selected using a randomization procedure from all students who participated in academic coaching at least once from October 1 through December 31, 2015 for inclusion in the academic coaching sample. Specifically, they were ordered by student identification number and every tenth student was selected. Data (including their student ID number, issue that prompted them to seek learning assistance, course, and faculty member) they entered before scheduling a coaching session were exported into an Excel spreadsheet. Information from the scheduling program (WCOnline), including number of academic coaching sessions, were added to the spreadsheet. Next, a matched sample of students who were in the same course with the same faculty member at the same time as each student in the academic coaching sample was created by an individual who was external to the research team who had no knowledge of the study's purpose. Even when students are at the same stage of their dissertation (i.e., in the same course), they did not interact through the course. That individual matched the pairs on gender, race, and age when possible. The goal was to identify a student who was as similar as possible in terms of demographic characteristics to each student in the academic coaching sample, except that the corresponding student in the matched sample did not work with an academic coach. The students' enrollment status (active/inactive) was not considered when selecting students in either sample.

In both the academic coaching and the matched samples, 60 (37.5%) students were in the School of Business and Technology Management, 59 (36.9%) were in the School of Education, 26 (16.3%) were in the School of Psychology, and 15 (9.4%) were in the School of Marriage and Family Sciences. For students in the academic coaching sample, 57 self-reported as White (35.6%), 35 as Black/African-American (21.9%), 15 as Hispanic/Latino (9.4%), 7 as Asian (4.4%), 3 as two or more races/ethnicities (1.9%), 1 as Native American or other Pacific Islander (.6%), and 42 reported no information on race/ethnicity shared (26.3%). In the matched sample, 74 self-reported as White (46.3%), 35 as Black/African-American (21.9%), 8 as two or more races (5%), 6 as Hispanic/Latino (3.8%), 1 as Asian (.6%), 1 as Native American or other Pacific Islander (.6%) and 35 reported no information on race/ethnicity shared (21.9%). Moreover, 123 of the 160 students in each sample were pursuing a doctoral degree. Table 1 provides details about the demographic and academic characteristics of the students in both samples. Among the students in the academic coaching sample, the average number of academic coaching sessions ranged from 1 to 208 ($\mu = 16.9$, $SD = 30.4$). However, as was the case in the previous study examining persistence 6 to 9 months later as the outcome of interest, the mode number of sessions was one. Specifically, 27 of these students (16.8%) visited the academic coaching center one time from October 1, 2015 through March 1, 2019.

Procedure

Following a review of the relevant literature and university data, student demographic and academic information for several variables that potentially influence program completion was obtained. In March 2019, an external team member provided updated enrollment status and other data for students in both the academic coaching and the matched sample to permit examination of

the relationship between working with an academic coach and program completion. The recommended time to completion of graduate programs at the university ranges from 23 months to 56 months. As the average time since enrollment among the students in the samples was approximately 68 months (see Table 1), if they made timely progress, the students had sufficient time to complete their programs after working with an academic coach at the end of 2015, even if it was during their very first course in their program. Nevertheless, a record review was conducted to ensure that each student who did not graduate had sufficient time to complete their program if they remained continuously enrolled.

Table 1

Demographic and Academic Characteristics of Academic Coaching and Matched Samples

	Academic Coaching Sample (*n* = 160)	**Matched Sample (*n* = 160)**	
Program Completion (Percentages)	Yes (51.3%) No (48.8%)	Yes (44.4%) No (55.6%)	χ^2 =1.51 *p* = .22
Months Since Program Enrollment* (Means, Standard Deviations)	67.26 (24.50)	68.58 (24.76)	*t*(318) = .47 *p* = .63
Years Since Last Degree (Means, Standard Deviations)	12.88 (8.40)	11.56 (7.85)	*t*(318) = 1.45 *p* = .15
GPA of Content Courses (Means, Standard Deviations)	3.48 (.45)	3.41 (.70)	*t*(318) = 1.02 *p* = .31
Sex/Gender (Percentages)	Women (73.1%), Men (22.5%), No information on sex/gender shared (4.4%)	Women (66.3%), Men (28.8%), No information on sex/gender shared (5%)	χ^2 =1.83 *p* = .40
Age (Means, Standard Deviations)	46.02 years (SD = 10.28)	44.4 (SD = 10.57)	*t*(318) = 1.38 *p* = .17
Number of Coaching Sessions (Means, Standard Deviations)	17.63 (31.8)	0 (0.0)	*t*(318) = 7.01 *p* = .00**
Veteran Status (Percentages)	Yes (2.5%) No (97.5%	Yes (5.6%) No (94.4%)	χ^2 =2.00 *p* = .16
History of Dismissal (Percentages)	Yes (31.3%) No (68.8%)	Yes (41.3%) No (58.8%)	χ^2 =3.46 *p* = .06

* Months between program enrollment date and data analysis in March 2019

** *significant p* < .05

A prospective approach was employed to limit potential sources of bias. Given that the focus of the main analysis was on investigating differences in student program completion rates based on utilization of academic coaching services, a causal-comparative design was used. The outcome variable, program completion, was coded as a dichotomous variable. Students who completed their program by the time the data were analyzed (March 2019) had a 1 on the outcome variable, whereas those who did not make timely completion or withdrew or were dismissed from their program had a 0.

As sequentially delineated by Field (2017), preliminary analyses were first conducted to determine whether there were significant differences between the academic coaching sample and the matched sample (see Table 1) requiring the need to control for certain variables. Next, the bivariate relationships between each potential predictor variable and the outcome variable of interest (program completion) were examined. Finally, for the main analyses, binary logistic regressions were run with four different models including all the predictor variables that had a significant relationship with program completion in Table 2.

Results

In preliminary analyses (as can be see in Table 1), no statistically significant differences in demographic and academic characteristics were found between the students in the academic coaching sample and those in the matched sample ($\alpha < .05$). As shown in Table 2, several of the potential predictor variables were found to be significantly related to program completion in bivariate analyses, including number of months since program enrollment, number of years since attainment of the last degree, GPA for content courses, history of program dismissal due to not making satisfactory academic progress or other reasons, age, and financial aid status. Whereas the number of academic coaching sessions (a ratio-level variable) was found to be significantly related to program completion in the academic coaching sample ($r_s = .170$, $p = .03$, $n = 160$), when the matched sample was added to the analysis, the relationship between working with an academic coach and program completion was no longer statistically significant. This was true, regardless of whether participation in academic coaching was measured as a categorical (yes/no) ($r_s = .069$, $p = .22$, $n = 320$) or an interval (number of sessions) ($r_s = .054$, $p = .34$, $n = 320$) variable.

Table 3 shows the results of the four different multivariate logistic regressions that were run:

(1) Model 1: The Academic Coaching Sample only and the predictor of "Number of Coaching Sessions";

(2) Model 2: Both the Academic Coaching Sample and the Matched Sample, dropping the "Number of Coaching Sessions" and adding "Academic Coaching (Yes/No)";

(3) Model 3: Both the Academic Coaching Sample and the Matched Sample, dropping "Academic Coaching (Yes/No)" and adding "Number of Coaching Sessions," and;

(4) Model 4: Both the Academic Coaching Sample and the Matched Sample and both "Academic Coaching (Yes/No) and "Number of Coaching Sessions."

Table 2

Bivariate Relationships Between Each Potential Predictor Variable and Program Completion

	Program Completion	Academic Coaching (Yes/No)	Number of Coaching Sessions	Months Since Enrollment	Veteran Status	Years Since Last Degree	GPA for Content Courses	History of Dismissal	Age
Academic Coaching (Yes/No)	.069								
Number of Coaching Sessions	.054	.366*							
Veteran Status	-.007	-.079	-.047						
Months Since Enrollment	.416*	-.027	-.042	-.161					
Years Since Last Degree	.278*	.081	.100	.402*	-.130*				
GPA for Content Courses	.413*	.057	.033	.347*	-.053	.367*			
History of Dismissal	-.579*	-.104	-.133*	-.165*	.009	-.267*	-.498*		
Age	.151*	.076	.092	.239*	-.036	.418*	.181*	.180*	
Financial Aid Status	-.199*	.038	-.037	-.032	-.400*	-.137*	-.224*	-.068	-.155

* Correlation is significant at $p < .01$

Table 3

Results of Multivariate Logistic Regression with Graduation as an Outcome

	[1]**Model 1:** The Academic Coaching Sample only and the predictor of "Number of Coaching Sessions,"	[2]**Model 2:** Both the Academic Coaching Sample and the Matched Sample, dropping the "Number of Coaching Sessions" and adding "Academic Coaching (Yes/No)"	[3]**Model 3:** Both the Academic Coaching Sample and the Matched Sample, dropping "Academic Coaching (Yes/No)" and adding "Number of Coaching Sessions,"	[4]**Model 4:** Both the Academic Coaching Sample and the Matched Sample and both "Academic Coaching (Yes/No) and "Number of Coaching Sessions,"
Constant B(SE)	-10.12 (3.38)*	-5.33 (1.87)**	-5.13 (1.82)**	-5.28 (1.87)**
Number of Coaching Sessions B(SE)	-.00 (.00)		-.00 (.00)	-.00 (.00)
Academic Coaching (Yes/No) B(SE)		.17 (.32)		.21 (.34)
Months Since Enrollment B(SE)	.06 (.01)*	.05 (.00)**	.05 (.00)**	.05 (.01)**
Years Since Last Degree B(SE)	-.02 (.03)	.00 (.02)	.00 (.02)	.00 (.02)
GPA for Content Courses B(SE)	2.13 (.86)*	.95 (.49)*	.92 (.48)	.94 (.49)
History of Program Dismissal B(SE)	-3.82 (.85)**	-3.20 (.48)**	-3.25 (.48)**	-3.23 (.48)**
Age B(SE)	.01 (.03)	-.00 (.02)	-.00 (.02)	-.00 (.02)
Financial Aid Status B(SE)	-1.03 (.62)	-.80 (.41)*	-.80 (.41)*	-.81 (.42)*

*significant $p < .05$; ** significant $p < .01$

[1] R^2 = ..43(Cox & Snell), ..57 (Nagelkerke). Model $\chi^2(7) = 105.47$, $p < .001$).

[2] R^2 = .45 (Cox & Snell), .60 (Nagelkerke). Model $\chi^2(7) = 189.81$, $p < .001$).

[3] R^2 = .48 (Cox & Snell), .59 (Nagelkerke). Model $\chi^2(7) = 189.56$, $p < .001$).

[4] R^2 = .45 (Cox & Snell), .60 (Nagelkerke). Model $\chi^2(8) = 189.97$, $p < .001$).

Each of these models include all the variables that had a statistically significant relationship with program completion included in Table 2 (months since enrollment, years since earning the last degree, GPA for content courses, history of program dismissal, age, and financial aid status). The relationship between program completion and both months since enrollment and history of program dismissal status remained significant across all four models, whereas the relationship with GPA for content courses was only significant in the first two models. Financial aid status was significant in models two, three, and four. The relationship with years since last degree, number of coaching sessions, whether or not the participants ever attended a coaching session, and age were not significant in any of the models. The models correctly predicted whether a student graduated or not 83.1% of the time for models 1, 2, and 4 and 81.9% of the time for model 3.

Discussion

Consistent with Tinto's (1993) model of institutional departure, numerous scholars (e.g., Chambliss & Takacs, 2014; Kuh, 2005) have argued that students' persistence and success are related to their ability to make a meaningful connection with at least one member of the college or university community. Therefore, it seems that engaging with a learning assistance professional in academic coaching should have a positive impact on students' program completion. There is evidence to suggest that academic coaching can have beneficial outcomes and impacts (e.g., Lehan et al., 2018; Bettinger & Baker, 2011; Osborne et al., 2019). However, much of the previous research involved undergraduate students at traditional brick-and-mortar institutions, neglecting graduate and online students. Further, the existing body of literature is plagued by methodological limitations, as evidenced by previous researchers' not including a matched sample, holding constant other influential variables, or examining outcomes and impacts in the longer term in their analyses. To add to the relevant literature, the purpose of this study was to determine if the association between participation in synchronous one-on-one academic coaching and persistence among online graduate students (as reported in Lehan et al., 2018) at one completely online university endured in the longer-term through program completion in the same two groups of students (i.e., those who engaged in academic coaching and a matched sample of their peers in the same course with the same faculty member at the same time who did not). Whereas the findings of Lehan et al. (2018) do seem to support the notion that students' integrating with formal and informal academic systems (in this case, with an academic coach in co-curricular learning support) is associated with their persistence, the findings of this study suggest that this relationship might not endure over time and/or in the face of other factors.

In the preliminary analyses of this study, no statistically significant differences in demographic or academic characteristics were found between students who chose to participate in academic coaching and those who did not. Commonly described in the literature is the notion that students often view cocurricular learning assistance, such as academic coaching, as being associated with experiencing difficulties in courses; therefore, they sometimes are hesitant to seek support (Babcock et al., 2019). Additionally, older, first-in-family students (similar to the participants in this study), often lack the time, confidence, and belief that they need additional support, despite the apparent need for academic skills and technology support (Stone & O'Shea, 2019). However, learning assistance is not only for students who are at-risk (Arendale, 2010), as it seems the students in the academic coaching sample in this study understood. Future researchers might examine under what conditions students chose to engage in academic coaching to promote

understanding of the extent to which those conditions influence the relationship between academic coaching and outcomes, including program completion.

Osborne et al. (2019) reported that academic coaching had a positive impact on undergraduate students' perceived academic outcomes, with those attending more regular sessions reporting a greater academic impact. Specifically, the perceived impact was higher for students who engaged in academic coaching five or more times than for students that had done so one to two times, with moderate to high practical importance for a relatively few number of interactions. Other researchers (e.g., Fullmer, 2012; Laskey & Hetzel, 2011) also found a correlation between the number of learning center visits and improved undergraduate student performance. In the previous study of the relationship involving the same two samples of online graduate students examined in this study, participation in synchronous academic coaching was found to increase the odds of persistence six to nine months later 2.66 times (Lehan et al., 2018). In this follow-up study of objective outcomes of online graduate students who participated in academic coaching, attending more sessions (or even one sessison) was not associated with greater odds of program completion. In academic coaching sample, although the average number of academic coaching sessions was approximately 17, nearly one-fifth of them visited the learning center only one time. That is, many of them never returned to academic coaching after their first experience. It is unclear why they made this decision, although the importance of students' willingness to access online learning assistance (Brown, Hughes, Keppell, Hard, & Smith, 2015) and finding them to be helpful (Price, Richardson, & Jelfs, 2007) has been noted. Slater and Davies (2020) contend that online graduate students value resources that are accessible, engaging, content/assignment specific, and approximate a more trational campus experience. In addition, Dawson (2016) found that online graduate students' sense of community was positively related to satisfaction, engagement, and retention. Given that researchers have reported evidence of a relationship between participation in academic coaching (which should attempt to offer the resources that are most valued) and shorter-term student outcomes, future researchers might examine under what conditions students do and do not continue to use this service. Moreover, no research was found in which the researchers attempted to explain this relationship. That is, it remains unclear if it can be explained through the relationship with an academic coach and/or the instructional strategies that are used to assist students in their learning. Future researchers might investigate such potential explanations.

Nevertheless, in this study, the relationship between participation in synchronous one-on-one academic coaching and program completion was not statistically significant. In general, this finding is consistent with previous results showing the limited responsiveness of students to nudging, low-cost interventions designed to change behavior predictably (e.g., Oreopoulous & Pertronijevic, 2019). Although Osborne et al. (2019) reported that students at their institution who participated in academic support programs tended to have higher retention rates and GPAs in the future compared to those who did not, they seemingly did not conduct analyses to determine whether the differences were statistically significant and/or practically important. Overall, given that few previous researchers have included a matched sample of students in long-term examinations of the impacts of academic coaching, it is difficult to know if previously- reported relationships would follow a similar trend as was found in this study. It is possible that one or more "booster" sessions are needed to maintain the impact of academic coaching on student persistence in the longer term. Moreover, it might be that different types of academic coaching (e.g., one focusing on how to be a successful student versus one focusing on how to develop competence in learning outcomes) have distinct impacts for different students.

In this study, after holding years since last degree, age, GPA for content courses, and financial aid status constant, months since enrollment and history of program dismissal were predictive of program completion. These findings are consistent with those of previous research on factors associated with persistence in online programs (e.g., Hart, 2012). Although it is not necessarily remarkable that students with a history of program dismissal might have lower odds of completing their program, it is more surprising that greater time since program enrollment was found to be associated with higher odds of completion. It would seem that students' requesting leaves of absence and extensions as well as having to retake courses due to their not meeting expectations would put them more at risk of noncompletion. It is possible that the examination period simply was not long enough to capture these trends. Further, it is possible that students who take more time in their educational trajectory are more deliberate, perseverant, and even resilient than other students.

In sum, it seems that the relationship between participation in synchronous one-on-one academic coaching and student achievement might be more complicated that initially thought. It appears that it can improve persistence of online graduate students in the shorter term (i.e., six to nine months later). However, this relationship seemingly does not endure over years. If this service is provided at an institution to increase students' odds of completion, it seems that those who are already engaging with an academic coach (due to either self-selection or faculty encouragement/requirement) might be encouraged through informal and informal interactions to continue to do so. Moreover, it is possible that one or more "booster" coaching sessions might be helpful. Nevertheless, based on these findings, there is insufficient evidence to support the practice of requiring participation in academic coaching among students who do not do so on their own.

Limitations

Limitations are inherent to any empirical investigation. As such, the findings reported here should be considered with a number of caveats. First, the population from which the samples were drawn consisted entirely of online graduate students. In addition, on average, the students in this study were in the 40s and it had been approximately 12 years since they were last students. As such, the ability to generalize the findings to other populations, including students in traditional programs, is limited. Second, as a quantitative, causal-comparative study in which participants could not be assigned randomly to a group in an ethical manner, causation could not be established. Other factors, including the participants' age and time since last degree, might explain the findings. This special population might require more and/or a different type of support than students in traditional programs. Third, although every attempt was made to identify a student as close to each student demographically in the matched sample, it was not always possible. Therefore, there were demographic differences (although not statistically different) between pairs in some cases, for example, in gender and/or age. It is possible that these differences influenced the findings. Fourth, as with any investigation, it is possible that one or more correlations are spurious. For example, the influence of some variables that may be related to a student's willingness and/or ability to both seek academic support and ultimately graduate were not controlled for. Fifth, the outcome variable was dichotomized without regard for whether the students made timely completion or were withdrawn or dismissed at any point. Finally, although the coaches follow a protocol, any variations in coaching style were not analyzed. Relatedly, aspects of the relationship between student and coach were not analyzed.

Despite these limitations, the study has a number of strengths that make a contribution to the extant literature. First, variables were selected based upon a critical review of relevant research

and theory. Second, a prospective design was employed, which limits potential sources of selection bias. Third, the use of a matched sample and preliminary analyses offers compelling support for the final model within the main analysis. Additionally, randomization was used to create both the academic coaching center and matched samples.

Conclusion

This study contributed to the literature by examining online graduate students, who are understudied, and including a matched sample of students in the same course with the same faculty member at the same time as the students who participated in academic coaching. The results of analyses of the academic coaching sample only converged with previous findings that participation in a greater number of sessions was associated with greater odds of persistence (in this case, through completion). However, when the matched sample also was included in the analysis, this relationship was no longer statistically significant. Therefore, it appears as though the association between academic coaching and longer-term student outcomes is more complex than originally thought. Future researchers might examine under what conditions students choose to participate in and continue academic coaching as well as what factors mediate and/or moderate the relationship between participation in academic coaching and shorter- and longer-term student outcomes.

Acknowledgments

We would like to thank Erika Mendoza for her assistance in the identification of students to create the matched sample and provision of updated data for students in both samples. Additionally, this work was supported by an award from Northcentral University. This support does not necessarily imply endorsement by the university of the research conclusions.

Disclosure Statement

The authors declare no financial interest or benefit arising from the direct applications of this research.

References

Aljohani, O. (2016). A comprehensive review of the major studies and theoretical models of student retention in higher education. *Higher Education Studies, 6*(2), 18. https://doi.org/10.5539/hes.v6n2p1

Arendale, D. R. (2010). Access at the crossroads—Learning assistance in higher education. *ASHE Higher Education Report*, *35*(6), 1-145.

Babcock, A., Lehan, T., & Hussey, H. D. (2019). Mind the Gaps: An Online Learning Center's Needs Assessment. *Learning Assistance Review (TLAR)*, *24*(1).

Bastrikin, A. (2020). *Online Education Statistics*. https://educationdata.org/online-education-statistics/

Berebitsky, D., & Ellis, M. K. (2018). Influences on personal and professional stress on higher education faculty. *Journal of the Professoriate*, *9*(2), 88–110.

Bettinger, E. P., & Baker, R. (2014). The effects of student coaching: An evaluation of a randomized experiment in student mentoring. *Educational Evaluation and Policy Analysis, 36*(1), 3–19.

Britto, M., & Rush, S. (2013). Developing and implementing comprehensive student support services for online students. *Journal of Asynchronous Learning Networks*, *17*(1), 29–42.

Brown, P. (2012). *Degree attainment for adult learners*. American Council on Education.

Brown, M., Hughes, H., Keppell, M., Hard, N., & Smith, L. (2015). Stories from students in their first semester of distance learning. *International Review of Research in Open and Distributed Learning, 16*(4), 1–17.

Capstick, M. K., Harrell-Williams, L. M., Cockrum, C. D. & West, S. L. (2019). Exploring the effectiveness of academic coaching for academically at-risk college students. *Innovative Higher Education, 44*, 219–231.

Chambliss, D. F., & Takacs, C. G. (2014). *How college works*. Harvard University Press.

Civitas Learning (2019). What really works: A review of student success initiatives. https://media.civitaslearning.com/wp-content/uploads/sites/3/2020/02/Civitas_Learning_What_Really_Works_Report.pdf

Cooper, E. (2010). Tutoring center effectiveness: The effect of drop-in tutoring. *Journal of College Reading and Learning, 40*(2), 21–34.

Dawson, T. L. (2016). *An analysis of the effects of a virtual community on mature learners' feelings of isolation within online programs* [Unpublished dissertation]. Northcentral University.

Felder-Strauss, J., Franklin, P., Machuca, A., Self, S., Offil, T., & Kuhlman, B. (2015). Best practices and creation of an online tutoring center for accounting, finance, and economic disciplines. *International Journal of Education Research, 10*(1), 39–52.

Field, A. (2017). *Discovering statistics using IBM SPSS statistics* (5th ed). Sage Publications.

Fullmer, P. (2012). Assessment of tutoring laboratories in a learning assistance center. *Journal of College Reading and Learning, 42*(2), 67–89.

Hart. C. (2012). Factors associated with student persistence in an online program of study: A review of the literature. *Journal of Interactive Online Learning, 11*(1), 19–42.

Ivankova, N. V., & Stick, S. L. (2007). Students' persistence in a distributed doctoral program in educational leadership in higher education: A mixed methods study. *Research in Higher Education, 48*(1), 93–135.

Kuh, G. D. (2005). Student engagement in the first year of college. In M. L. Upcraft, J. N. Gardner, and B. O. Barefoot (Eds.), *Challenging and supporting the first-year student: A handbook for improving the first year of college* (pp. 86–107). Jossey-Bass.

Lancer, N., & Eatough, V. (2018). One-to-one coaching as a catalyst for personal development. An interpretive analsysis of coaching undergraduates at a UK university. *International Coaching Psychology Review, 13,* 1–25.

Laskey, M. L., & Hetzel, C. J. (2011). Investigating factors related to retention of at-risk college students. *Learning Assistance Review, 16*(1), 31–43.

Lehan, T. J., Hussey, H. D., & Shriner, M. (2018). The influence of academic coaching on persistence in online graduate students. *Mentoring & Tutoring: Partnership in Learning*, 26(3), 289-304.

Muljana, P. S., & Luo, T. (2019). Factors contributing to student retention in online learning and recommended strategies for improvement: A systematic literature review. *Journal of Information Technology Education: Research, 18*, 19–57. doi: 10.28945/4182

Nettles, M. T., & Millett, C. M. (2006). *Three magic letters: Getting to Ph.D.* Johns Hopkins University Press.

Nicoletti, M. d. C. (2019). Revisiting the Tinto's theoretical dropout model. *Higher Education Studies, 9*(2), 52–64.

Oreopoulos, P., & Petronijevic, U. (2019). *The remarkable unresponsiveness of college students to nudging and what we can learn from it* (No. w26059). National Bureau of Economic Research.

Oreopoulos, P., Petronijevic, U., Logel, C., & Beattie, G. (2020). Improving non-academic student outcomes using online and text-message coaching. *Journal of Economic Behavior & Organization, 171,* 342–360.

Osborne, J. D., Parlier, R., & Adams, T. (2019). Assessing impact of academic interventions through student perceptions of academic success. *Learning Assistance Review*, *24*(1), 9–26.

Packham, G., Jones, P., Miller, C., & Thomas, B. (2004). E-learning and retention: Key factors influencing student withdrawal. *Education+ Training*, *46*(6/7), 335–342.

Price, L., Richardson, J. T., & Jelfs, A. (2007). Face-to-face versus online tutoring support in distance education. *Studies in Higher Education*, *32*(1), 1–20.

Rakes, G. C., & Dunn, K. E. (2010). The impact of online graduate students' motivation and self-regulation on academic procrastination. *Journal of Interactive Online Learning*, *9*(1), 78–93.

Robinson, C. E. (2015). *Academic/success coaching: A description of an emerging field in higher education.* [Doctoral dissertation, University of South Carolina—Columbia].UMI Dissertation Publishing.

Sepulveda, A., Birnbaum, M., Finley, J. B., & Frye, S. (2020) Coaching college students who have expressed an interest in leaving: A pilot study. *Coaching: An International Journal of Theory, Research and Practice*, *13*(1), 8–15. doi: 10.1080/17521882.2019.1574847

Slater, D. R., & Davies, R. (2020). Student preferences for learning resources on a land-based postgraduate online degree program. *Online Learning, 24,* 140–161.

Stone, C., & O'Shea, S. (2019). Older, online and first: Recommendations for retention and success. *Australasian Journal of Educational Technology, 35*, 57–69.

Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition* (2nd ed.). University of Chicago Press.

Truschel, J., & Reedy, D. L. (2009). National survey—What is a learning center in the 21st century? *Learning Assistance Review*, *14*(1), 9–22.

Procrastination and Delayed Assignment Submissions: Student and Faculty Perceptions of Late Point Policy and Grace within an Online Learning Environment

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Abstract
An exploratory study using a questionnaire was conducted among 597 full-time enrolled online students and 53 full-time online faculty teaching at a private university in the Southwest. Results are presented in frequency tables and participant feedback to compare differences and similarities of instructor and student perceptions of reasons for late assignment submission, late point policy, and leniency within an online learning environment. Differences in perception between student and faculty participants are noted. Further inquiry into the impact late assignment submissions, late point policies and instructor leniency have on student success rates, satisfaction, and persistence is warranted.

Keywords: late point policy, late submissions, faculty grace, procrastination, homework extension, assignment submission patterns, perception on leniency, online learning

Santelli, B., Robertson, S.N., Larson, E.K., & Humphrey, S. (2020). Procrastination and delayed assignment submissions: Student and faculty perceptions of late point policy and grace within an online learning environment. *Online Learning, 24*(3), 35-49. 10.24059/olj.v24i3.2302

Procrastination and Delayed Assignment Submissions: Student and Faculty Perceptions of Late Point Policy and Grace within an Online Learning Environment

As of 2018, one-third of college students were taking at least one online class (Ruth, 2018). Online education has experienced dramatic growth in recent decades thanks to advantages such as flexibility, convenience, and access to a classroom worldwide (Bowers & Kumar, 2015). However, the online learning environment can have a significant impact on a student's ability or desire to complete a task on time. There are challenges online students face, in addition to the typical challenges students tend to encounter while in college. The online learning environment can elicit feelings of isolation and disconnectedness (Bowers & Kumar, 2015). Arasaratnam-Smith and Northce (2017) also contend that it can be difficult to create a sense of community for online students. Furthermore, it can be challenging for instructors to maintain proximity and a strong social presence within an online asynchronous environment (Dyer, Aroz, & Larson, 2018). This is

important as a sense of community and an in increase in instructor social presence can help aid in student retention (Sorensen & Donovan, 2017). Late point policies to help encourage students to submit on time have become a topic of discussion in higher education as late assignment submissions can be an early warning sign of student nonpersistence.

Review of Related Literature

Procrastination and Late Assignment Submission

Late assignments submissions are sometimes generalized as procrastination. Procrastination can be defined as the intentional delay of a task (Nordby, Klingsieck, & Svartdal, 2017). The delay can come at any point of the action, whether it is at the beginning of the task or at its completion. Although procrastination is intentional, it may not be consciously labeled by the learner as procrastination. Procrastination, particularly for college students, is a ubiquitous phenomenon. Roughly, 70% of college students identified themselves as procrastinators (You, 2015). While procrastination might be seen as a harmless trait, one of its main results are late assignments.

Falkner and Falkner (2012) found that assignment submission patterns could be an indicator for identifying at-risk students and increased rate of course withdrawals at an institution. Several studies show a correlation between student procrastination and academic performance (Nordby et al., 2017). Procrastination can lead to missed classes, assignments, and result in lower grades. Additionally, the quality and accuracy of work can be reduced due to the pressure associated with completing an assignment on a crunched timeline (Kim & Seo, 2015). In addition, procrastination tendencies are linked to poor goal achievement and lower achievements (Akran, et al., 2019).

Yilmaz (2017) found that students in an online environment procrastinated more on assignment submissions compared to their traditional face-to-face counterparts. This is understandable as life events can affect one's schoolwork. Due to its autonomous nature, the online learning environment places a high demand of self-regulation from students (Klingsieck Fries, Horz, & Hofer, 2012). This is significant as Kara (2015) found that self-regulation is an important trait found in effective learners. Additionally, studies have shown that procrastinators delay or are not as engaged in participation due to a lack of self-regulation (You, 2015). Further, "Procrastinators in e-learning tended to perform worse than non-procrastinators but also that the negative relationship between procrastination and achievement in the e-learning environment was stronger than that in the traditional learning environment" (You, 2015, p. 66). In addition, students who post late into an online class have a significantly higher rate of being unsuccessful overall as the onset of procrastination formed an early habit (McElroy & Lubich, 2013).

Individual Factors for Late Submissions

"Research over the past four decades has amply demonstrated that individual factors significantly contribute to the procrastination problem" (Nordby et al., 2017, p. 493). These individual factors vary from student to student; however, family and work obligations can often cause additional challenges (Kara, Erdogdu, Kokoç & Cagiltay, 2019). Online learners are typically older by 10 to 15 years (25 to 40 years of age) than the traditional, young adult student who is taking face-to-face classes (17 to 25) (Kuo & Belland, 2016). Since many adult learners work full time, choosing to go to school online is perceived as far more convenient than the

alternative of a face-to-face classroom (Kuo & Belland, 2016). Difficulties juggling expectations at work, family responsibilities, personal time, and schoolwork often arise for nontraditional students. Student motivation also may fluctuate during their enrollment and may be impacted by situational factors, such as financial problems, family distress, employment status, etc. (Newhouse & Cerniak, 2016). Some online adult students feel that their instructors are inflexible with deadlines and not supportive for the additional responsibilities that are presented (Dumais, Rizzuto, Cleary, & Dowden, 2013). With this juggling, can come reduced prioritization on assignment deadlines and thus procrastination on assignment completion and submission may feel justified by the student. Lin (2016) argues that females in particular are facing additional barriers as adult learners enrolled in college due to commitments of multiple roles and insufficient social and family support.

Another reason why college students procrastinate may be due to an assignment's characteristics. Students are given many study-related tasks, which represent an important environmental context for student delay in submissions (Nordby et al., 2017). Task aversion (degree of unpleasantness, perceptions of boring or uninteresting a student associates with a task), is a high predictor for student delay in starting, working on, and finishing assignments (Nordby et al., 2017). Additionally, level of task difficulty is associated with procrastination. Interestingly enough, the level of difficulty on both ends of the spectrum (either too challenging or not challenging enough) can lead to procrastination. As Nordby et al. (2017) noted, the more difficult the task, the more students tend to procrastinate; at the same time, the easier a task was, the more likely students were to perceive the task to be boring or uninteresting. In addition, dispositional barriers, such as fear of failure and insecurities can often be linked to factors such as relationships with instructors (Shepard & Nelson, 2012 as cited in Osam, Bergman, & Cumberland, 2017). Furthermore, the guilt associated with avoiding necessary tasks can lead to individual's placing a greater importance on alternate activities, thus strengthening procrastination behaviors (Kaftan & Freund, 2019).

Faculty Considerations

Teacher effectiveness, or lack thereof, can have a significant impact on timely assignment completion (Nordby et al., 2017). Corkin, Shirley, Wolters, and Wiesner (2014) found that procrastination and instructor organization had an inverse relationship. This was in large part because effective instructors provided a classroom climate that made it easier for students to organize and plan their work. Further, instructors who set clear and fair deadlines reduced a student's likelihood to procrastinate as opposed to students whose deadlines are self-imposed (Nordby et al., 2017). In addition to classroom management issues, a lack of teaching skill can affect academic procrastination. In Patrzek, Grunschel, and Fries's (2012) study, school counselors reported that poor coaching and teaching skills provide students with insufficient direction. Couple that with a faculty member who feels "absent" to students in the classroom, and it can further disconnect students from their class and their assignments as instructor presence and lack of social interaction negatively affects student persistence and retention (Bower & Kumar, 2015).

Traditional face-to-face faculty perceptions on leniency for late assignment submissions are varied. Some instructors do not feel it is fair to give some students leniency while their classmates worked hard to submit their assignments on time (Patton, 2000). While Kostal, Kuncel, and Sackett (2016) suggest that grade inflation over the years may be related to the overall pressure of pleasing the student in a shift to a more student-centered approach. Consequently, this potential stress of balancing student scores with high satisfaction surveys could lead to more lenient grading

and potentially more acceptance of late student submissions. Note, the perception of leniency by faculty who teach primarily online courses is a gap in literature.

Some universities allow faculty independence but request that no faculty member is stricter than the university's stated late point policy. Thus, faculty may choose to deduct less per day the assignment is late or grant students permission (grace) to submit assignments late without late point deductions. With this being the case, changes in how faculty implement the late point policy and whether or not they provide "grace" on assignments from one course to the next could confuse students on their own personal assignment completion and submission practices (Patton, 2000). Instructors are regularly confronted with moral or ethical issues that do not have an easy solution (Dukewich, 2016). One such moral dilemma centers on the acceptance of late assignment submissions. This is because every instructor at the collegiate level will have to make decisions that center on whether or not they should accept late assignment submissions, and whether to grade the work any differently from those that were submitted on time (Boisvert, Garcia, Giersch, Strickland, & Whitaker, 2015). To support faculty and students alike, many universities have parameters on what late work can or cannot be accepted, as well as any repercussions for late submissions. However, the acceptance of late assignments at the collegiate level is still somewhat of a controversial topic among faculty.

Late Submission Policy

The purpose of a late submission policy is to provide transparency and remove any ambiguity of an instructor's expectations. However, navigating the late policy can be confusing for students as Boisvert et al., (2015) postulated the number of late submission policies at one university were as numerous as there were instructors. While there are a vast number of late policies, the most common policy is to allow leniency in assignment deadlines, but instructors will apply a small percentage penalty on the late submission (Tyler, Preveler, & Cutler, 2017). For example, instructors might have a 10% per day penalty for assignments submitted after their due date.

Additionally, there are policies that can reflect the opposite ends of the spectrum. For example, instructors might adopt draconian policies that do not allow any leniency, thus prohibiting the submission of late work. While this policy might be beneficial for instructors, particularly for those with a large class size, students can perceive it to be overly strict and unfair (Boisvert et al., 2015). On the opposite end of the spectrum, instructors might implement a no penalty policy for late submissions. With a no penalty policy, late submissions are accepted without a penalty or requirement of documentation. Boisvert et al. (2015) acknowledged that a no penalty policy might be effective in upper division courses that have smaller class sizes but caution its use in lower division courses as it can cause numerous assignments submitted after their deadline and extra work for the instructor.

Another way to prevent late assignment submissions is through the implementation of a predetermined, university-wide, late point policy. The policy informs instructors and warns students on how many points are deducted per day an assignment is submitted past the due date. It is uncertain whether this reduces the likelihood of procrastination but may motivate students to submit what they have completed by the deadline. This also provides students with a consistent policy to rely on from one course to the next, no matter the instructor they are assigned. Students who do not miss an assignment deadline may also be more likely to continue with a course. In fact, students who submit assignments early tend to have higher grades (Jones & Blankenship, 2019).

Boisvert et al. (2015) identified five key criteria that should be taken into consideration in order to create an effective late assignment submission policy: the delivery of course materials, consideration of student needs, preparation for the future, grading that reflects mastery, and value of time spent on grading and assignment. The right balance between these key priorities will change from course to course, or even on the type of assignment. For example, Tyler et al. (2017) noted that computer science assignments are prone to unexpected complications such as semantic errors that require a long time to resolve.

While there is much research available on self-regulation and procrastination of online students, there is not as much information available on late point policies that instructors use for this population of college level students and the varying levels of perception on flexibility regarding this concern. What do online students think about a university late point policy and changes in instructor implementation of said policy? And in what ways do late policies influence self-regulation in online courses?

Methods

Research Questions and Study Design

This quantitative, exploratory study set out to answer the following research questions:

1. What are online student and online faculty perceptions of when leniency should be considered by faculty?
2. What are online student and online faculty perceptions of a university-wide late assignment policy?
3. What are online student and online faculty perceptions how strictly faculty adhere to the university-wide policy?

A three-part questionnaire was developed through SurveyMonkey to collect both student and faculty participant data. Part one collected informed consent and had participants differentiate whether they were students or faculty, part two focused on questions framed to gain student perceptions, and part three focused on questions framed to gain faculty perceptions. Based on participant responses in part one, they were either directed out of the study (as in they did not provide informed consent), or they were then automatically directed to either the student or faculty section of the questionnaire. This tool was designed to address the aforementioned research questions. With this in mind, most questions between the faculty and student sections of the survey were aligned with one another. For example, question 10 of the faculty section and question 8 of the student section both read: "It is important to allow instructors to designate their own late point policy as long as it is not stricter than the 10% per day University policy." Some questions however varied in efforts to learn more about the participant and/or their perspectives. Faculty variation example: "How many years have you been teaching online for the university? (Round up to the nearest whole number)." Student variation example: "I would be more likely to submit assignments on time if GCU's late assignment policy was strictly enforced in every course." The three-part questionnaire is available to researchers for review and use upon request.

Eight questions used a five-point Likert scale with one representing strongly agree and five representing strongly disagree. Below each of these questions, a comment box was provided. The questionnaire was created by the researchers and this study was the first time the survey was deployed. Researchers wanted to provide participants with an opportunity to comment on and/or

explain any response they desire. Responses within the comments section were not required. Due to this, they were not analyzed as qualitative data but rather as anecdotal commentary to the quantitative data. Additionally, one question within the survey requested that participants "Identify scenarios in which leniency is appropriate. Check all that apply." This question provided four options with check boxes to the left of each option. Participants were able to check any and all they felt applied to the statement. A copy of the survey is available upon request.

Population and Participant Demographics

The population consisted of both full-time, online faculty who have been employed with a private university in the Southwest for a minimum of six months and students who are enrolled into an online program at the same university. Approximately 187 employees were full-time online faculty within the University during the Fall 2019 semester (University Administration, personal communication, 2019). Approximately, 80,000 students were enrolled into an online program within the Fall 2019 semester (University Administration, personal communication, 2019).

A recruitment email sent by faculty services notified faculty of the opportunity to participate in the study and provided a link to complete informed consent and part three of the questionnaire. Of the 187 full-time, online faculty, 61 volunteered to complete the questionnaire. After cleaning and screening, 53 faculty participants fully completed all questions within part three of the questionnaire and could be utilized within the study. Ages ranged from 25 to 64 years of age with a majority of faculty participants, 45.3% between the ages of 35 to 44. Furthermore, 9.4% were 25 to 34 years of age, 26.4% were between 45 to 54 years of age, and 18.9% were between 55 to 64 years of age. Of the 53 faculty participants, 62.7% were female and 37.7% were male. Faculty participants taught across most colleges with 25 participants in humanities and social sciences, 13 in education, 1 in nursing, 6 in business, 2 in doctoral studies, and 6 in theology. Two colleges, performing arts and science, technology, engineering and math did not have any faculty participants to represent their departments.

Volunteer faculty participants posted a recruitment note for students within the online course discussion forum in the last week of class. The note provided an overview of the study and a link to complete the informed consent and questionnaire. Out of roughly 4,000 online students in the sample, 608 volunteered to participate in the study. After cleaning and screening, 597 student participants completed all questions and could be used within data analysis. The ages of students ranged from 18 to 64, with a majority of online student participants between the ages of 25 to 33 at 40.2% while 20.1% were 18 to 24, 24.6% were 34 to 44, 12.7% were 45 to 54 and 2.4% were 55 to 64.

Reflective of the faculty participant demographics, a majority, 75.4% of student participants were female. Student participants varied in the level of degree program they were enrolled in, though a majority, 89.3% were enrolled in an undergraduate program, 9.4% within a master's level program, and 1.3% in a doctoral program. Of the 597 student participants, 24% reported they were currently in their first course within their program. All eight colleges were represented by student participants with 22.3% in humanities and social sciences, 31.5% within education, 10.2% in nursing, 17.8% in college of business, 0.5% in fine arts, 15.9% in science, technology, engineering and math, 0.8% in doctoral studies, and 1.0% in theology.

Data Collection and Analysis Methods

Site and IRB approval for no more than minimal risks were granted prior to data collection. An acknowledgement was provided in part one of the questionnaire to inform participants of the study's intent to maintain participant anonymity. No identifying information was collected at any point within the study. Informed consent was completed by a "click to confirm" button at the bottom of part and page one of the questionnaire. Data collection for both faculty and student samples lasted one month during the Fall 2019 semester. Analysis was completed through the export of SurveyMonkey questionnaire responses into SPSS. After cleaning and screening, frequency tables for responses of each question within the questionnaire were compiled as initial results. Since there was a vast difference in the quantity of faculty versus students who completed the survey in full (53 faculty and 597 students), frequency histograms are provided as figures below and frequency percentages for each set of criteria (strongly agree, agree, neither agree nor disagree, disagree, strongly disagree) were reported within the written results to assist in comparing the two groups.

Results and Discussion

Four histograms, Figures 1–4, were created from selected frequency tables to provide the most comprehensive takeaways from the data collected for student and faculty perceptions regarding late point penalties and leniency. These histograms also address the study's targeted research questions.

A notable difference was found when comparing student perceptions of instructor grace with the late policy and instructor perceptions of leniency with the late policy. Of the 597 students surveyed, 31.2% agreed that their teachers strictly adhere to a late point deduction of 10% per day with no exceptions, while 52% of instructors strongly disagreed with adhering to a late point deduction of 10% per day with no exceptions. Students may be under the impression that an instructor will uphold the late point policy while instructors themselves plan to show grace. It is important to note here, that of the 597 student participants surveyed, 49 made a specific disclaimer within the open response section below the questions that they have never submitted an assignment late. Though 49 chose to make a disclaimer about not submitting an assignment late in the past, there may be more student participants who have yet to be late on an assignment submission. Some student perceptions then were based on what they believed would be the case, not necessarily what they had experienced to be the case. Figure 1 below displays a histogram of participant responses to the statement: "Faculty strictly adhere to 10% deduction per day with no exceptions."

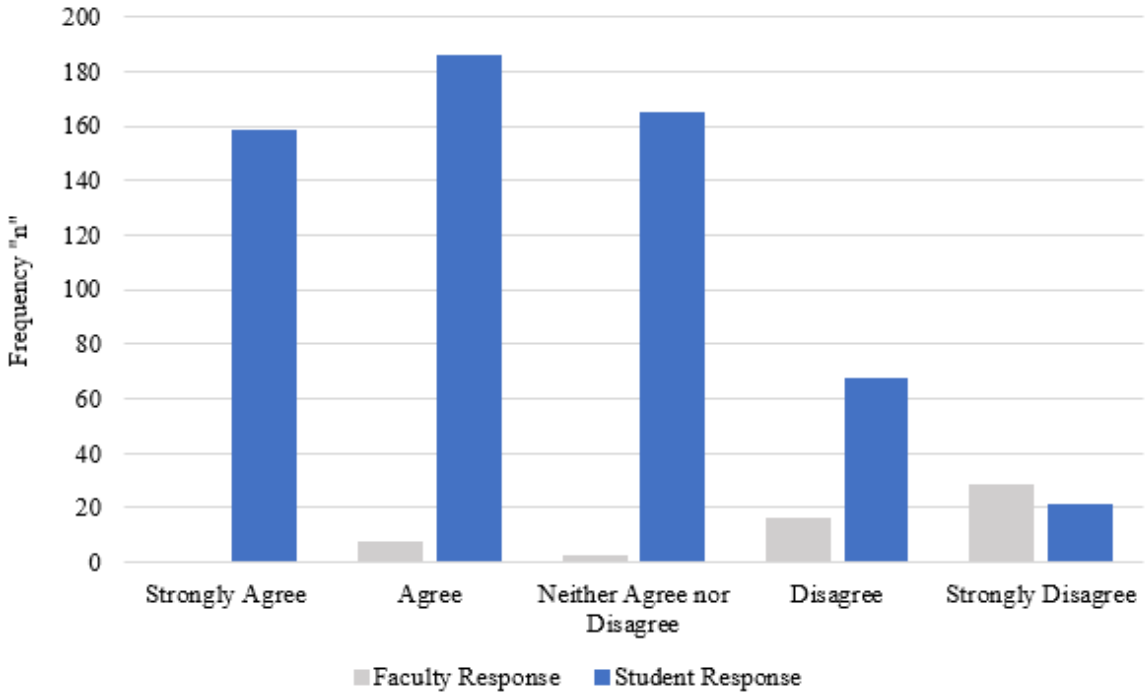

Figure 1. Faculty strictly adhere to 10% deduction per day with no exceptions.

Student and faculty participant perceptions were more closely aligned when it came to whether a deduction of 10% per day was an effective late policy for an institution to have in place, with 64.1% of faculty strongly agreeing or agreeing and 69.9% of students strongly agreeing or agreeing. It is important to note that these comparisons are not based on equal sample sizes. Figure 2 below displays the frequencies of participant responses to the statement: "A deduction of 10% per day is an effective late policy for an institution to have in place." Some open response reasons were provided by participants such as "This teaches the students of the consequence of missing a deadline," from one faculty participant. "Especially for a seven-week course," came from another and, "I agree that it is good to have in place; however, I believe it is better that it is to be used at the instructor's discretion," came from a third. Student participants strongly agreed with follow up open responses such as: "There is plenty of time to get assignments in if you are using time management wisely." "I believe this to be highly motivating in the completing of assignments on time." "This gives students a chance to submit a late assignment with a deduction instead of receiving a failing grade."

As mentioned previously, some online adult students feel their instructors are not flexible with deadlines and are not taking onto consideration the additional responsibilities of said students (Deumais et al., 2013). Interestingly, though a smaller percentage, more student participants, 9.7% than faculty participants, 3.8% disagreed in viewing the 10% per day late deduction policy as effective with open-ended follow up responses such as: "Punishment is not effective late policy to have in place, instead, the drive to receive points as a student is enough driving force to complete assignment." "Circumstances should be taken into consideration." "There should be a late penalty, I don't agree with 10%. Most people who choose online school did so because of a job, family or other obligations. Sometimes it is difficult to meet the Wed., Fri., Sun. deadline but 10% is too big of a hit and you find yourself pushing that 11:59 PM deadline at times." Only one faculty participant who disagreed provided an open-ended response stating, "Depending on the situation."

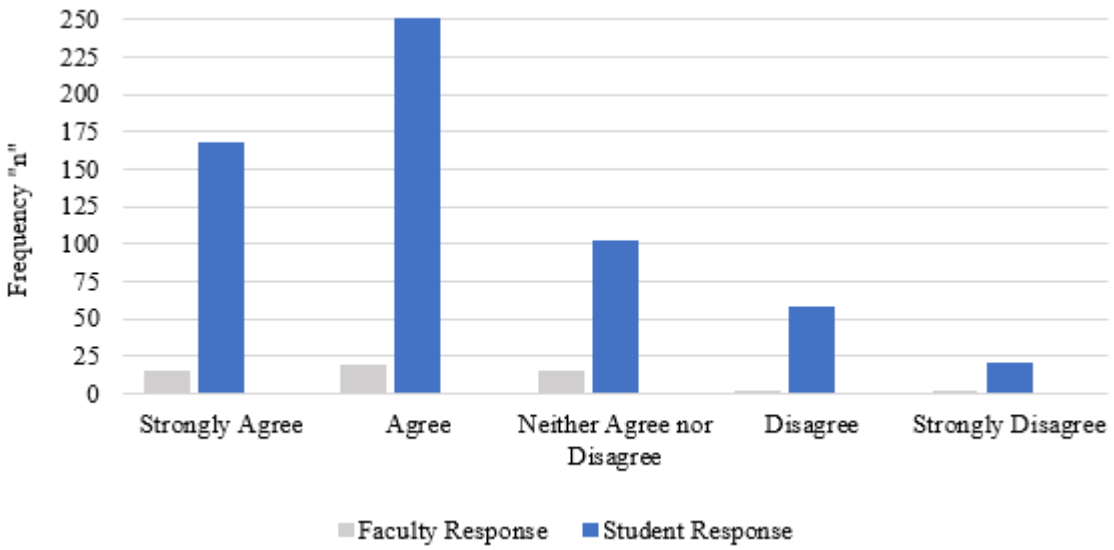

Figure 2. A deduction of 10% per day is an effective late policy for an institution to have in place.

Another area where student and faculty participant perceptions were in somewhat alignment was when asked if the 10% per day late point deduction was too lenient. Figure 3 below displays a histogram of participant responses to the statement: A deduction of 10% per day is too lenient and should be stricter. Of the 53 instructors surveyed, 45% disagreed while 47% of the 597 student participants disagreed. The Likert category with the biggest difference in frequency of responses was between faculty who strongly disagreed at 43% versus the 31% of students who strongly disagreed. Figure 3 below provides a histogram of the frequency rates for responses and is how percentages above were generated. Some student open responses can help to explain why there may have been more students who agreed and/or were neutral than the faculty: "I never feel free to be late at all, and I feel like the allowance tempts me to procrastinate." "Depends how often it is happening." "Only if it is for first time offenders of late policy and it should increase with the increase of times the student is consistently late." It may be an important reminder here that 49 student participants reported within open responses that they had never submitted an assignment late.

In comparing student and faculty perceptions of situations in which instructor leniency with the late policy is appropriate, faculty participants had less "tolerance" for submission of the wrong document in comparison to student participant perspectives when it came to providing late submission leniency. However, this could be attributed with experience. While all instructor participants may have had this happen, students who participated may not have ever submitted late for this reason. See Figure 4 below for frequency histogram of both student participant and faculty participant responses.

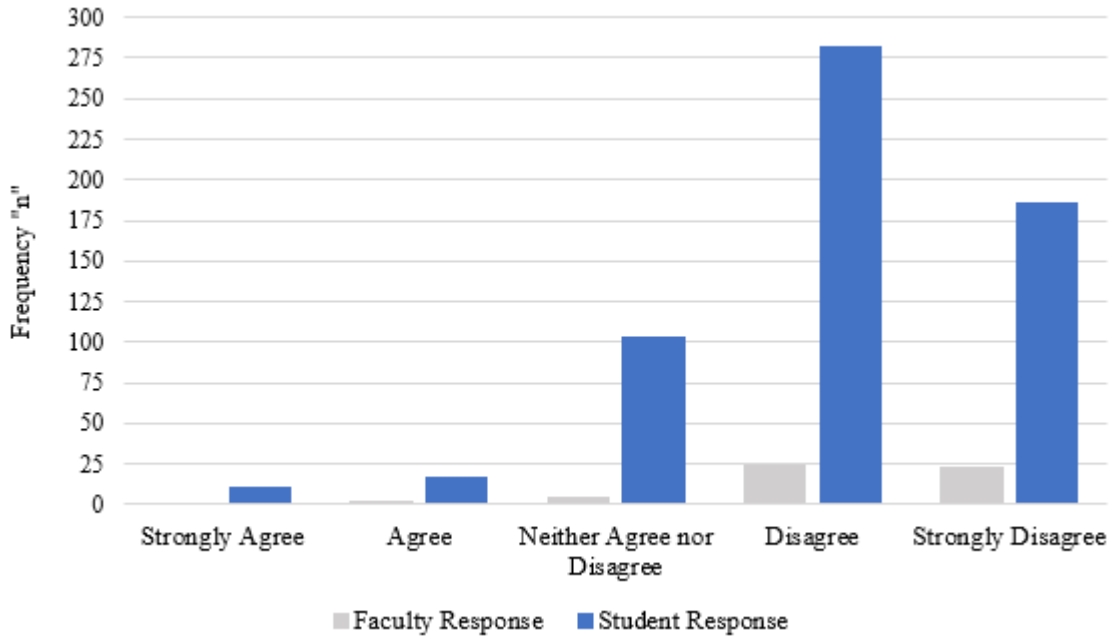

Figure 3. A deduction of 10% per day is too lenient and should be stricter.

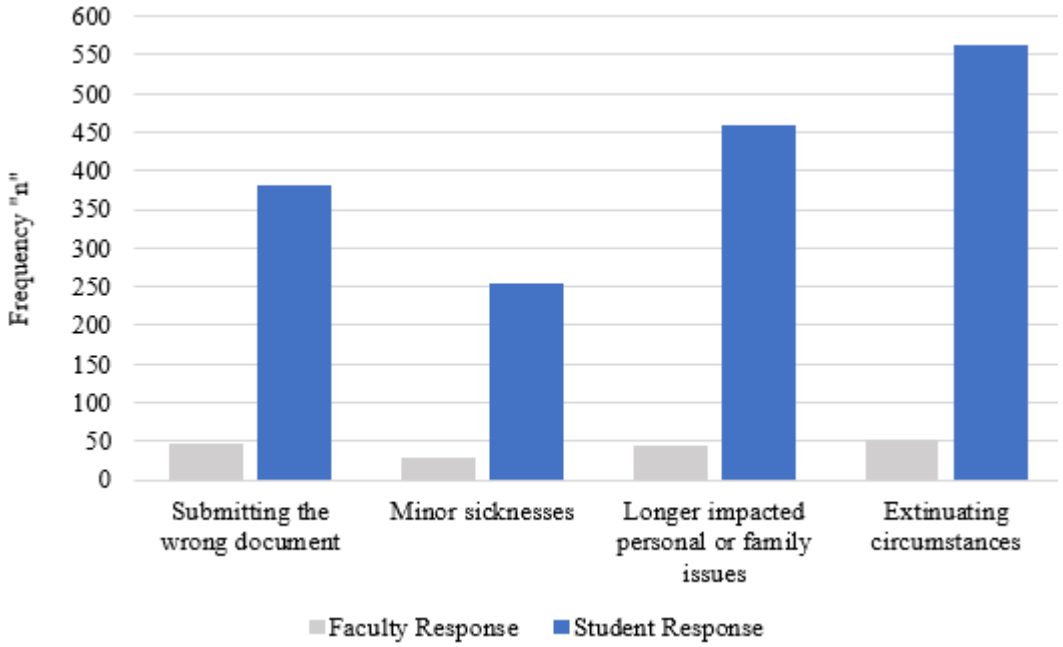

Figure 4. Identify scenarios in which leniency is appropriate.

Conclusion

This exploratory study has shed some light on both faculty and student perceptions and interpretations of instructor and institutional late policies, specific to a distance learning environment in which students are more prone to procrastinate (Yilmaz, 2017). There were areas of agreement as well as areas where student and faculty perceptions did not align. It is interesting to note that there were more similarities than differences between faculty and student perceptions of leniency. For the most part, the two groups of participants were aligned in agreement on the effectiveness and fairness of an institutional late policy of 10 percent per day and scenarios in which leniency is appropriate. There was a divergence in perceptions between faculty members and students in the need for strict adherence to a late policy that provides point deductions per day. This difference in perception may be attributed to a variety of factors, including teaching philosophy, student expectations, or if student participants have previously requested leniency on a late policy.

Adopting a late policy that includes a late penalty may serve as a dual purpose: providing motivation for students to turn in assignments on time, as well as holding them accountable (Nordby et al., 2017). Depending on the institution, faculty may or may not have flexibility on the late point policy for their class. Based on the wide array of faculty perceptions on how much of a deduction should occur for late submissions, it is important for faculty members to designate their own late point policy. This flexibility is important as long as it is not perceived to be severe, which for this study was more than a 10 percent point deduction per day.

Though one question asked student participants to identify the reasons for their past late submissions, there was no question within the questionnaire that directly asked student participants if they have ever submitted any assignment late. This is a limitation to the study. In mulling over the results, it was noted that 49 student participants had at some point within open responses of the survey noted that they had never submitted an assignment late. Not all participants utilized the open response sections, thus there may be more student participants who had not experienced/worked through a late submission during their online program. It could be that more student participants are within this category as volunteer participants may be more involved in their classes and have a greater connection to the content. It could be then that student participants are not generalizable to the entire student population. For example, would results differ if data was sorted to only include responses from students who had submitted an assignment late? This could be an opportunity for additional research. It may be of interest in future studies to also ask faculty participants a similar question as to whether they had ever submitted an assignment late while they were students. Responses may provide clues as to how they frame their perception as well and could possibly begin to explain some of the discrepancies between student and faculty perceptions in how strictly they adhere to the late policy and in instances where leniency may be acceptable.

The survey used in this study was available for all 187 full time faculty. While 53 faculty did volunteer to participate, it is important to note that not all colleges represented equally if at all. In fact, there were no faculty participants representing the colleges of science, technology, engineering, and math or the fine arts. The majority of the faculty participants were from the college of humanities and social sciences. Further research that includes more faculty participation across all areas of study in the survey is recommended in order to assess any differences in faculty and late submission practices between the varying programs of study. The same recommendation can be applied to recruiting additional fine arts and STEM, and more student participants.

While there are limitations, this study provides in-depth insight into online faculty and student perceptions on current known late policies in higher education. Replication of this study should be straightforward. One change needed in the questionnaires is to include responses "I do not know" or "I have never had a late assignment" at the end of each question for student participants, instead of "neither agree nor disagree." This change will help provide students who might not have had to ask for leniency a more accurate option to answer each question.

Future research studies on faculty and student perceptions of late policy leniency should include questions that are designed to identify the ideal late point policy, if students have felt the need to request leniency on the late policy in the past, and if so, how many times this roughly occurred per course. Further inquiry into how students feel the late point policy and/or faculty grace impacts them and whether they see the late point policy as a technique to combat against procrastination would be of interest and could be accomplished through a case study. Additional research could also work to compare differences in late point policy perceptions of full-time faculty who only teach online courses for one institution and those who have an online adjunct role at one or even across multiple schools.

References

Akram, A., Fu, C., Li, Y., Javed, M. Y., Lin, R., Jiang, Y., & Tang, Y. (2019). Predicting students' academic procrastination in blended learning course using homework submission data. *IEEE Access, Access, IEEE*, *7*, 102487–102498. https://doi.org/10.1109/access.2019.2930867

Arasaratnam-Smith, L. A., & Northcote, M. (2017). Community in online higher education: Challenges and opportunities. *Electronic Journal of e-Learning*, *15*(2), 188–198. http://www.ejel.org/volume15/issue2/p188

Bowers, J., & Kumar, P. (2015). Students' perceptions of teaching and social presence: A comparative analysis of face-to-face and online learning environments. *International Journal of Web-Based Learning and Teaching Technologies (IJWLTT)*, *10*(1), 27–44. https://dblp.org/rec/journals/ijwltt/BowersK15

Boisvert, D., Garcia, W., Giersch, J., Strickland, J., & Whitaker, B. E. (2015). Late work and late adds. *Students' Pathways to Success: A Faculty Guide*, 65–72. https://omp.uncc.edu/library/catalog/book/2

Corkin, D. M., Shirley, L. Y., Wolters, C. A., & Wiesner, M. (2014). The role of the college classroom climate on academic procrastination. *Learning and Individual Differences*, *32*, 294–303. https://www-sciencedirect-com.lopes.idm.oclc.org/science/article/pii/S1041608014000727?via%3Dihub

Dyer, T., Aroz, J., & Larson, E. (2018). Proximity in the online classroom: Engagement, relationships, and personalization. *Journal of Instructional Research*, *7*, 108–118. https://eric.ed.gov/?id=EJ1188336

Dukewich, K. R., & Wood, S. (2016). "Can I have a grade bump?" The contextual variables and ethical ideologies that inform everyday dilemmas in teaching. *Collected Essays on Learning and Teaching*, *9*, 97–110. https://eric.ed.gov/?id=EJ1104491

Dumais, S. A., Rizzuto, T. E., Cleary, J., & Dowden, L. (2013). Stressors and supports for adult online learners: Comparing first-and continuing-generation college students. *American Journal of Distance Education*, *27*(2), 100–110. https://doi.org/10.1080/08923647.2013.783265

Falkner, N. J., & Falkner, K. E. (2012). A fast measure for identifying at-risk students in computer science. In *Proceedings of the ninth annual international conference on International computing education research* (pp. 55–62). ACM. https://dl.acm.org/doi/10.1145/2361276.2361288

Feild, J. (2015). Improving student performance using nudge analytics. In *Proceedings of the 8th International Conference on Educational Data Mining* (pp. 464–467). https://files.eric.ed.gov/fulltext/ED560905.pdf

Jones, I. S., & Blankenship, D. C. (2019). The effect of procrastination on academic performance of online students at a Hispanic serving institution. *Journal of Business Diversity, 19*(2), 10–15. https://articlegateway.com/index.php/JBD/article/view/2053

Kaftan, O. J., & Freund, A. M. (2019). A motivational perspective on academic procrastination: Goal focus affects how students perceive activities while procrastinating. *Motivation Science*, *5*(2), 135–156. https://psycnet-apa-org.lopes.idm.oclc.org/record/2018-32060-001?doi=1

Kara, M., Erdogdu, F., Kokoç, M., & Cagiltay, K. (2019). Challenges faced by adult learners in online distance education: A literature review. *Open Praxis, 11*(1), 5–22. https://eric.ed.gov/?id=EJ1213733

Kim, K. R., & Seo, E. H. (2015). The relationship between procrastination and academic performance: A meta-analysis. *Personality and Individual Differences*, *82*, 26–33. https://www-sciencedirect-com.lopes.idm.oclc.org/science/article/pii/S0191886915001610?via%3Dihub

Klingsieck, K. B., Fries, S., Horz, C., & Hofer, M. (2012). Procrastination in a distance university setting. *Distance Education*, *33*(3), 295–310. https://www.tandfonline.com/doi/full/10.1080/01587919.2012.723165

Kostal, J. W., Kuncel, N. R., & Sackett, P. R. (2016). Grade inflation marches on: Grade increases from the 1990s to 2000s. *Educational Measurement: Issues & Practice*, *35*(1), 11–20. https://onlinelibrary.wiley.com/doi/abs/10.1111/emip.12077

Kuo, Y.-C., & Belland, B. R. (2016). An exploratory study of adult learners' perceptions of online learning: Minority students in continuing education. *Educational Technology Research and Development, 64*(4), 661–680. https://link.springer.com/article/10.1007/s11423-016-9442-9

Lin, X. (2016). Barriers and challenges of female adult students enrolled in higher education: A literature review. *Higher Education Studies*, *6*(2), 119–126. https://files.eric.ed.gov/fulltext/EJ1101356.pdf

Litchfield, J. M., & Matteis, M. (2016). Faculty experiences with technology, millennials versus baby boomers. *Online Journal of Nursing Informatics, 20*(1), 6–1. https://www.researchgate.net/publication/310510564_Faculty_experiences_with_technology_millennials_versus_baby_boomers

McElroy, B. W., & Lubich, B. (2013). Predictors of course outcomes: early indicators of delay in online classrooms. *Distance Education*, *34*(1), 84–96. https://eric.ed.gov/?id=EJ1005247

Nordby, K., Klingsieck, K., & Svartdal, F. (2017). Do procrastination-friendly environments make students delay unnecessarily? *Social Psychology of Education: An International Journal*, *20*(3), 491–512. https://link.springer.com/article/10.1007/s11218-017-9386-x

Newhouse, N. K., & Cerniak, J. (2016). Student success factors in graduate psychology professional programs. *Online Learning*, *20*(1), 70–91. http://dx.doi.org/10.24059/olj.v20i1.585

Osam, E. K., Bergman, M., & Cumberland, D. M. (2017). An integrative literature review on the barriers impacting adult learners' return to college. *Adult Learning*, (2), 54. https://journals.sagepub.com/doi/full/10.1177/1045159516658013

Patton, M. A. (2000). The importance of being flexible with assignment deadlines. *Higher Education in Europe*, *25*(3), 417–423. https://www.tandfonline.com/doi/abs/10.1080/713669270

Patrzek, J., Grunschel, C., & Fries, S. (2012). Academic procrastination: The perspective of university counsellors. *International Journal for the Advancement of Counselling*, *34*(3), 185–201. https://scinapse.io/papers/2074269256

Ruth, S. (2018). Faculty opposition to online learning: Challenges and opportunities. *International Journal of Technology in Teaching & Learning*, *14*(1), 12–24. https://files.eric.ed.gov/fulltext/EJ1211994.pdf

Sorensen, C., & Donovan, J. (2017). An examination of factors that impact the retention of online students at a for-profit university. *Online Learning*, *21*(3), 206–221.

Tyler, J., Peveler, M., & Cutler, B. (2017). A flexible late day policy reduces stress and improves learning. *The 2017 ACM SIGCSE Technical Symposium,* 718. https://doi.org/10.1145/3017680.3022439

Yilmaz, M. B. (2017). The relation between academic procrastination of university students and their assignment and exam performances: The situation in distance and face-to-face learning environments. *Journal of Education and Training Studies*, *5*(9), 146–157. https://www.researchgate.net/publication/319189539_The_Relation_between_Academic_Procrastination_of_University_Students_and_Their_Assignment_and_Exam_Performances_The_Situation_in_Distance_and_Face-to-Face_Learning_Environments

You, J. W. (2015). Examining the effect of academic procrastination on achievement using LMS data in e-learning. *Educational Technology & Society*, *18*(3), 64–74. https://eric.ed.gov/?id=EJ1070043

Institutional Support for Online Teaching in Quality Assurance Frameworks

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Abstract
The widespread growth of online education at higher education institutions necessitates institutional support for the development, implementation, and sustenance of online education. Faculty who teach online are at the forefront of implementation and play a critical role in online student success. In this scoping review, 13 online education quality frameworks were analyzed for the types of support needed by higher education faculty who teach online. The results are discussed in the context of implications for ensuring quality online education at higher education institutions.

Keywords: faculty support, online education, quality assurance, online teaching, e-learning, instructor support, institutional support

Pedro, N.S. & Kumar, S. (2020). Institutional support for online teaching in quality assurance frameworks. *Online Learning, 24*(3), 50-66. https://doi.org/10.24059/olj.v24i3.2309

Institutional Support for Online Teaching in Quality Assurance Frameworks

Online education has experienced tremendous growth in the last two decades, with at least 31.6 percent of students taking online courses in the United States in 2016 (Seaman, Allen, & Seaman, 2018). Over one-fifth of the U.S. higher education institutions (n = 280) surveyed in the 2019 CHLOE report (Garrett, Legon, & Fredericksson, 2019) reported that more than 50% of their courses were offered online, and that between spring 2017 and 2018, the median growth rate of enrollment in fully online courses was 10%. Higher education institutions (HEI) around the world are expanding their online course offerings, accompanied by increased scrutiny into quality and accountability (Shelton, 2011). The transition to online education necessitates changes within institutions and the provision of various types of support for stakeholders (e.g., faculty, students) and processes (e.g., course development) to ensure its success. In this article we focus on the types of institutional support for faculty who teach online at HEIs that are described in online education quality frameworks.

Faculty Support for Online Teaching

Notwithstanding the importance of technology, infrastructure, instructional design, and standards for online course design, the faculty teaching online courses play a crucial role in the success of the courses and in student learning (Kibaru, 2018). They are integral to all aspects of an online course and to student engagement and success, acting as the subject matter expert, course designer, course manager, and facilitator (Martin, Budhrani, Kumar, & Ritzhaupt, 2019; Phirangee, Epp, & Hewitt, 2016). Although faculty roles might vary depending on institutional structures and academic policies, effective systems and supports are needed to ensure that they are able to successfully teach in online environments that are student-centered and interaction focused (Beck & Ferdig, 2008). When an institution transitions to online education, or when programs decide to offer online courses, it is the faculty who are at the forefront of that change, needing to reconceptualize what they teach, how to teach it, how to assess student learning, and how to facilitate that learning in the online environment that requires a paradigm shift (Kibaru, 2018). The time taken to develop an online course and to teach it well has been acknowledged as more than that needed in an on-campus course (Seaman, 2009). The perceived and/or real increase in workload required in online teaching and the lack of recognition and institutional support for faculty teaching online have been identified as two of the most significant barriers in online education (Bolliger & Wasilik, 2009).

There is an abundance of research in the last two decades on the barriers faced by faculty when they teach online and the need for faculty support and professional development (Berge, Muilenberg, & Haneghan, 2002; Kebritchi, Lipschuetz, & Santiague, 2017; Lloyd, Byrne, & McCoy, 2012). Faculty lack technical skills, pedagogical skills for the paradigm shift in the online environment, incentives and resources to compensate for the time invested in developing and teaching an online course, and other supports for academic and administrative processes when transitioning to online teaching (Kebritchi et al., 2017; Lloyd et al., 2012; Seaman, 2009). Support for faculty is therefore extremely important for online education to succeed at an HEI, and especially so for faculty with little or no online teaching experience (Hunt et al., 2014; Martin & Parker, 2014). Faculty development and training have been reported to be a top priority of all types of HEI, followed by resources for instructional design and faculty support, but such training and support vary widely across different types of HEI and contexts (Garrett et al., 2019). Additionally, there are other forms of institutional support that contribute to online instructors' success in online teaching. In reviewing the literature, we found several different studies that called for such support. However, we identified a lack of systemized knowledge pertaining to instructional services that should be provided by HEI to assure high quality online teaching.

Faculty support can take many forms—course development support, time and rewards for engagement in online teaching, professional development for skill development in online teaching, help with academic processes (e.g., plagiarism prevention, fair use of materials), institutional guidance on policies in online education, operational support, peer support, and even student support (Almpanis, 2015; Baran & Correia, 2014; Fetzner, 2003; Lion & Stark, 2010; Seaman, 2009; Wang, Gould, & King, 2010). Online student support with administrative and academic processes, technology access, and in some cases, advising, can greatly reduce the questions and concerns that faculty teaching online courses deal with, and thus their workload. Furthermore, it is important that these different forms of support for faculty are in some way coordinated and are part of the strategic goals and direction at an institution (Hartman et al., 2014; Orr, Williams, & Pennington, 2009). Leadership and institutional positioning as well as institutional support have

been highlighted by both administrators and faculty in the research as essential for online instructor success (Hicks, 2009; Kibaru, 2018; Orr et al., 2009). Such support contributes to faculty satisfaction, which is a key indicator of quality in online learning (Bolliger & Wasilik, 2009) and one of the five pillars of quality online education according to the Online Learning Consortium (https://onlinelearningconsortium.org/about/quality-framework-five-pillars/).

Faculty support has been identified as a key indicator of quality online learning (Martin, Polly, Jokiaho & May, 2017) as well as a critical factor for successful online learning (Daniel & Uvalic-Trumbic, 2013). Individual studies have focused on various forms of instructional design support or faculty development for online teaching, but it is important to comprehensively identify what constitutes faculty support at an HEI aiming for quality online education. The purpose of this study is to identify the institutional support services that help faculty practice quality online teaching that are included in online quality assurance frameworks and systematically detail such support. In a context where an increasing number of HEIs across the world are adopting online education, and HEIs already in the online education space expand their online offerings, information about quality in faculty support of online teaching can be valuable to institutions, administrators, and faculty engaged in online education. This is particularly significant during the COVID-19 pandemic where large numbers of faculty are expected to transition to emergency remote teaching (Hodges et al., 2020) in the short-term and online teaching in the long-term.

Research Question

In this paper, we conducted a scoping review of frameworks, guidelines, and standards related to quality in online education to answer the research question:

What institutional services are identified in online quality assurance frameworks as supporting quality online teaching in higher education?

Methods

A scoping review is an increasingly-used literature review approach to map broader topics that are of a complex or heterogenous nature (Arksey & O'Malley, 2005; Peterson, Pearce, Ferguson & Langford, 2016). It allows for the inclusion of various types of literature that can be theoretical, empirical, and "gray literature" and is particularly relevant for "practice, education, research, and policy" (Peterson et al., 2016, p. 12). Arksey and O'Malley's (2005) framework and methodological enhancements by Levac, Colquhoun, and O'Brien (2010) were used in this step-by-step approach to conduct the scoping review. Two independent reviewers engaged in all steps of the process and met regularly to discuss their results and establish agreement before proceeding to the next phase (Colquhoun et al., 2014).

After identifying the broad research question, an online search was conducted in the search engine Google to identify relevant documents. This scoping review focused on a corpus of international frameworks, standards, and guidelines for the quality assurance of online education in higher education contexts. Searches were not conducted within academic databases because the literature being scoped was of a nature that could have been published outside research journals, or, in fact, would have most likely not been published within academic journals. The search was conducted in English, Portuguese, and Spanish, using the following combinations of keywords to encompass phrases used to describe online education across the world: "e-learning or distance learning or distance education or online education or online learning" + "Quality assurance." Two

filters were applied: under "usage rights" the option "free to access, share or modify" was selected and under "terms appearing" the option "in the text on the page" was selected. The first five pages of results of each online search, a total of 82 sources, were then analyzed.

Exclusion and Inclusion Criteria

The selection process included exclusion criteria and inclusion criteria that were applied to the 82 relevant sources retrieved about quality assurance in online education. Two independent reviewers engaged in the application of the previously agreed exclusion and inclusion criteria for the eligibility process. Exclusion criteria were first applied as follows:

(a) the framework should have a broad scope and not address only a specific aspect of online education (e.g., learning management system quality, online course design);

(b) the framework should not be more than 20 years old (only sources between 1999 and 2019 were included);

(c) the framework should not be a result of an empirical study by an individual researcher, and;

(d) the frameworks should not have been developed for use within specific universities.

The goal was to identify broadly used and accepted frameworks that were not specific to one study or one university, however valuable or empirically significant. A total of 16 documents encompassing frameworks, standards or guidelines were found to be eligible by both reviewers (Table 1).

Table 1

Online Education Quality Assurance Frameworks After Exclusion Criteria

Nr.	Title	Organization	Country/ Region	Year	Retrieved from
1	Canadian Recommended E-learning Guidelines	Canadian Association for Community Education + Office of Learning Technologies of Human Resources Development Canada	Canada	2002	https://www.futured.com/pdf/CanREGs%20Eng.pdf
2	Quality on the Line; Benchmarks for Success in Internet-based Distance Education	Institute for Higher Education Policy	USA	2000	http://www.ihep.org/research/publications/quality-line-benchmarks-success-internet-based-distance-education
3	Quality Scorecard for Online Learning Programs	Online Learning Consortium	USA	2017	https://onlinelearningconsortium.org/consult/qs-navigator/
4	National Standards for Quality Online Programs + Online Teaching	National Standards for Quality Online Learning	USA	2019	https://www.inacol.org/resource/inacol-national-standards-for-quality-online-programs/
5	Quality Assurance Toolkit for Open and Distance Nonformal Education	Commonwealth of Learning	Intergovernmental Organisation	2012	http://oasis.col.org/handle/11599/106
6	Quality Assurance in Open and Distance Learning	Commonwealth of Learning	Intergovernmental Organisation	2019	http://oasis.col.org/handle/11599/103
7	Sequent Handbook for Quality in E-Learning Procedures	European Association of Distance Teaching Universities	EU	2015	https://www.sequent-network.eu/images/Guidelines/Sequent_Handbook_for_Quality_in_e-learning_procedures.pdf
8	Quality Assessment for E-Learning: A Benchmarking Approach—Excellence (3rd Ed.)	European Association of Distance Teaching Universities	EU	2016	https://e-xcellencelabel.eadtu.eu/tools/manual
9	Considerations for Quality Assurance of E-Learning Provision	European Association for Quality Assurance in Higher Education	EU	2018	https://enqa.eu/indirme/papers-and-reports/occasional-papers/Considerations%20for%20QA%20of%20e-learning%20provision.pdf

10	ACODE Benchmarks for Technology Enhanced Learning	Australasian Council on Open, Distance and e-learning	Australia	2014	https://www.acode.edu.au/mod/resource/view.php?id=193
11	E-Learning Capability: Informing and Guiding E-Learning Architectural Change and Development	New Zealand Ministry of Education + Victoria University of Wellington	New Zealand	2009	https://www.educationcounts.govt.nz/publications/e-Learning/58139
12	AVU Quality Assurance Framework for Open, Distance and eLearning Programmes	African Virtual University	Africa	2014	http://www.avu.org/avuweb/wp-content/uploads/2016/05/QA_FRAMEWORK.pdf
13	Distance Higher Education Programmes in a Digital Era: Good Practice Guide	Council on Higher Education South Africa	South Africa	2014	https://www.che.ac.za/media_and_publications/frameworks-criteria/distance-higher-education-programmes-digital-era-good
14	Asian Association of Open Universities Quality Assurance framework	Asian Association of Open Universities	Asia	2010	http://aaou.upou.edu.ph/quality-assurance-framework/
15	Instrumento de Avaliação Institucional Externa-Presencial e a distância	Ministério da Educação e Cultura + Inep + DAES	Brazil	2017	http://inep.gov.br/instrumentos1
16	Principios y estándares para la evaluación de programas educativos en las instituciones de educación superior 2017 - Modalidad a distancia	CIEES - Comités Interinstitucionales para la Evaluación de la Educación Superior	Mexico	2018	https://ciees.edu.mx/wp-content/uploads/2018/07/Principios-y-esta%CC%81ndares-para-la-evaluacio%CC%81n-de-programas-educativos-a-distancia-en-las-instituciones-de-educacio%CC%81n-superior-2017.pdf

These 16 frameworks were then screened in detail using the following inclusion criteria:

(a) The document presents a *framework, standards, guidelines or criteria checklist* for quality assurance in online education, online programs, or e-learning;

(b) The framework should have been developed by an *organization, governmental organization,* or *entity that assumes a national or international regulatory role* in the area of online education, therefore the framework is used for approval, assurance or evaluation of quality in online education, online programs, or e-learning;

(c) The framework is *currently applied or can be applied across countries*, even if developed within a country or region;

(d) The framework focuses addresses the quality assurance of online education, online programs, or e-learning in *higher education*.

The two reviewers independently reviewed the 16 frameworks for each criterion using a binary scale (1 point for each criterion matched and 0 if no match found). Frameworks that were found by both reviewers to fulfill at least three criteria (scored 3 or 4 points) were considered eligible for further analysis. The final list of 13 frameworks are listed in Table 2.

Table 2

Eligible Online Education Quality Assurance Frameworks

Nr.	Title	Criteria				Total Score
		(i)	(ii)	(iii)	(iv)	
1	Canadian Recommended E-Learning Guidelines	1	1	1	1	4
2	Quality on the Line	1	1	1	1	4
3	Quality Scorecard for Online Learning Programs	1	1	1	1	4
4	Quality Assurance in Open and Distance Learning	1	0	1	1	3
5	Sequent Handbook for Quality in E-learning procedures	1	0	1	1	3
6	Quality Assessment for E-learning: a benchmarking approach - Excellence (3rd ed.)	1	0	1	1	3
7	Considerations for quality assurance of e-learning provision	1	1	1	1	4
8	ACODE Benchmarks for Technology Enhanced Learning	1	1	1	1	4
9	AVU Quality Assurance Framework for Open, Distance and eLearning Programmes	1	0	1	1	3
10	Distance Higher Education Programmes in a Digital Era: Good Practice Guide	1	1	0	1	3
11	Asian Association of Open Universities Quality Assurance framework	1	1	1	1	4
12	Instrumento de Avaliação Institucional Externa- Presencial e a distância	1	1	0	1	3
13	Principios y estándares para la evaluación de programas educativos en las instituciones de educación superior 2017 - Modalidad a distancia	1	1	0	1	3

The 13 international quality assurance frameworks were then analyzed with the aim of identifying the types of institutional support that are needed to ensure high quality online teaching and are important for faculty who teach online. The "population of interest" in this scoping review was faculty or instructors who teach online (Cacchione, 2016). The goal was thus to analyze all the information within each framework relevant to support for faculty or instructors who teach online, and that could ensure quality online teaching. While it can be argued that all support services involved in online education holistically contribute to supporting online teaching by faculty, the institutional support services that were listed as relevant for assuring quality in online teaching from a faculty perspective within the 13 frameworks and also those in prior research that were identified in the frameworks were the focus of this analysis. Although much of the data might also be relevant to other aspects of support in online education, the analysis and thus the results presented in this paper pertain specifically to institutional support services for online teaching and faculty. Various terms and designations were used to describe this population in the international frameworks analyzed across geographies. They were described as *faculty members*, *professors*, *academic staff*, *online instructors*, *teaching staff*, *teachers*, *lecturers*, *staff members*, and *tutors*.

Results

The quality frameworks, guidelines, or standards found were representative of all the continents: four in North America, two in Central and South America, three in Europe, two in Africa, and one each in Asia and Australia. The analysis of the institutional support services in the 13 frameworks that are relevant for assuring quality in online teaching from a faculty perspective is listed in Table 3 and described below.

Technologies and Technical Support

All 13 frameworks included technologies crucial to online education, which are described as "learning management systems and their associated systems; library systems; cloud-based tools and services; mobile technologies, hardware (computers, telecommunications and ancillary equipment) and networks, both internal and external" (Framework 8, p. 20). Technical support for faculty and students to successfully access and use the infrastructure, technologies, and networks for online education are important for quality online education at an institution. Additionally, technical support should constantly be updated and aligned to fulfill the needs of faculty and staff at an institution (Framework 8).

Online Program/Course Effectiveness or Evaluation Data

All 13 frameworks included recommendations for the regular collection of data in online programs and courses to evaluate their effectiveness and ensure their quality. For example, Framework 2 states, "The program's educational effectiveness and teaching/learning process is assessed through an evaluation process that uses several methods and applies specific standards" (p. 12). In addition to quality assurance benefits, the availability of such data can be valuable for faculty who teach online and who wish to continuously improve their courses and online teaching practices. In this regard, it is important that faculty have access to such data that is collected at the institution. Additionally, two frameworks mentioned the use of *learning analytics support* for course improvement. The use of learning analytics can be very useful for the improvement of online course design and teaching. However, support should be provided to faculty or professional development can be provided to faculty about how to view, download, and interpret the data.

Table 3

Institutional Support for Quality Online Teaching

Types of support	Frameworks (1–13) from Table 2	Total occurrences	Percentage
Technical support for faculty and students	(1 to 13)	13	100%
Online course or program effectiveness/assessment data collection	(1 to 13)	13	100%
Guidelines/standards for online course design	(1); (2); (3); (4); (5); (6); (7); (8); (9); (10); (11); (13)	12	92%
Administrative and academic support for online students	(1); (2); (3); (4); (5); (6); (7); (8); (9); (10); (12); (13)	12	92%
Development and training for faculty in online course development and teaching	(1); (2); (3); (4); (5); (6); (7); (8); (9); (10); (11)	11	85%
Availability of online tutors or tutoring services	(3); (4); (5); (6); (7); (8); (10); (12); (13)	9	69%
Online library support	(1); (2); (3); (4); (5); (6); (7); (10); (13)	9	69%
Online student advising services	(1); (2); (3); (5); (6); (7); (11); (13)	8	62%
Technical assistance for faculty in course and course materials development	(2); (3); (6); (7); (8); (10); (11)	7	54%
Instructional design support	(1); (2); (3); (5); (7); (10); (13)	7	54%
Support for online students with special needs	(3); (5); (6); (7); (8); (9); (11)	7	54%
Online program management support	(1); (4); (8); (9); (12); (13)	6	46%
Intellectual property/ copyright support	(2); (3); (4); (5); (7)	5	38%
Online student orientation to institution	(1); (2); (3); (8); (10)	5	38%
Online education research support	(4); (5); (9); (10); (11)	5	38%
Faculty recognition and compensation for transition to and engagement in online education	(3); (5); (6); (7); (9)	5	38%
Online student orientation to online learning/study skills	(5); (6); (7)	3	23%
Learning analytics support	(5); (6)	2	15%

Guidelines/Standards for Online Course Design

Twelve of the 13 frameworks recommended that institutions need guidelines or standards for online course design that can either be developed within an institution or adopted from well-known professional organizations. Most of the frameworks also included such guidelines or standards to ensure quality. These are not only useful for faculty who are transitioning to online teaching, but also provide structure and guidance for faculty revising existing online courses.

Administrative and Academic Support for Online Students

Twelve of the 13 frameworks also highlighted the importance of administrative services for online students such as student admissions, registration, and financial guidance. Although these services are categorized under online student support and not under faculty support in the frameworks, prior research has established that online student support of this nature supports faculty in focusing on online teaching. Many faculty members teaching online might not be aware of institutional procedures or resources in these areas and can be overwhelmed if they are the only point of contact for online students. The inclusion of such administrative and academic support presumes the presence of qualified staff with continuously updated expertise in supporting online faculty and students (Framework 9).

Several frameworks also included specific forms of academic support for online students that can be lessen the responsibilities and workload of faculty teaching online:

- *Online tutors or tutoring services* (9 of 13 frameworks) that can work with individual students or student groups and help them feel less isolated. There was variety in the conceptualization of the responsibilities of online tutors in the frameworks, yet they all assumed a supportive role to faculty and students. HEIs have to "include guidelines on how these tutors/e-tutors can best be used" (Framework 10, p. 73) and should ensure continuous professional development of those in such roles.
- *Online library support services* (9 of 13 frameworks) that help students access resources needed for their online courses, thus reducing the need for faculty to help online students with library access and teach them the skills needed to navigate library websites and databases;
- *Online student advising services* (8 of 13 frameworks) for student program questions, academic program planning, student counseling, career planning and employment counseling;
- *Support for online students with special needs* (7 of 13 frameworks), which can be crucial for faculty who might be unsure as to how to support online students with special needs in the online environment;
- *Online student orientation to the institution* (5 of 13 frameworks) that introduces online students to procedures and technologies at the institution, thus increases their familiarity with online education at the institution, and possibly decreasing the initial questions that faculty might face from new students;
- *Online student orientation to online learning/study skills* (3 of 13 frameworks), which helps students understand the importance of time management and self-regulation to online learning success. This responsibility often falls to faculty in the online environment who

have to not only teach content, but also help students learn how to best approach online learning to succeed.

Professional Development for Faculty in Online Course Development and Teaching

Eleven of 13 frameworks highlighted the need for faculty professional development on various topics related to online teaching (e.g., course design, interactions, communication, and assessment), technology (e.g., the learning management system), and policies to ensure quality in online course design and teaching. An institutional environment that not only fosters faculty development of knowledge and skills related to online teaching, but also recognizes and rewards faculty engagement in such learning is needed (Framework 2 & 5). Professional development can take the form of workshops, best practice guides, seminars, symposia, peer mentoring, peer reviews, collaborative course development, and also participation in communities of practice.

Frameworks 8 highlighted the need for professional development that is "not limited by factors of physical location, equity, or technological skills…is offered flexibly, accommodates a range of entry points" and is coordinated across an institution (p. 29). Such flexibility is needed because faculty who teach online are not always full-time and located on-campus, but can be part-time and may not be connected to the institution where they teach. Professional development should not only take into account full-time faculty, but also provide learning and support opportunities that consider the needs of online faculty who may work part-time, feel isolated, and "have no regular face-to-face contact with supervisors and colleagues" (Framework 10, p. 77).

Instructional Design and Technical Support

Seven of 13 frameworks emphasized instructional design support for faculty making the transition from face-to-face to online teaching, that is not only provided before a course runs, but also during its duration. Framework 6 states that "this support should encompass both educational and technical aspects without demanding that academics become ICT or media specialists in their own right" (p. 113). Seven of 13 frameworks also recommended *technical assistance for course development*, which includes support in the areas of course materials development, graphic design, media development, editing, open educational resource use, and Learning Management System or Virtual Learning environment use (Framework 9). *Intellectual property/ copyright support* for faculty who might not be aware of an institution's intellectual property policies or fair use guidelines for online course materials were recommended by 5 of 13 frameworks as important to quality online education. This support should also include resources and training related to these topics, "plagiarism, and other relevant legal and ethical concepts" related to online education (Framework 3, p. 4).

Online Program Management Support

In addition to the administrative and academic support for online students that is essential for quality online education and helps faculty focus on interacting with students about course content, online program management support is also recommended in 9 of 13 frameworks. Support for faculty with the administration of online programs can be helpful because online programs often need additional accreditation, transfer of study credits, or other types of procedures with which faculty might not be familiar.

Online Education Research Support

Five of 13 frameworks highlight the importance of research on online education, or the scholarship of online teaching for quality online education. They recommend that faculty be

encouraged to practice such scholarship related to their online courses, and be provided resources and support in order to do so. For example, Framework 5 suggests that "internal and external publication on pedagogic issues related to e-learning" should be encouraged (p. 26).

Recognition for Engagement in Online Education

There is a learning curve associated with the transition to online teaching and time needed for faculty to develop online courses (Framework 5), that should be acknowledged by an institution. Three of 13 frameworks recommended the provision of various types of compensation, rewards, and recognition for initial and continued online course development or online education engagement. It is important to create an environment of respect for online teaching as a "high-status activity" (Framework 6, p. 125) to motivate faculty to adopt, engage, and excel in online teaching. Additionally, Framework 6 suggests that such recognition "be integrated into mechanisms of promotion and career development" (p. 127), while Framework 9 recommends that "promotion criteria give preference to candidates with experience and expertise" (p. 19) in online education.

Discussion

Limitations

This scoping review focused on the types of support needed by faculty teaching online that are found in frameworks, guidelines, or standards addressing quality in online education. This review was conducted in the public domain and excluded empirical literature and research that might have concluded with quality guidelines or suggestions for faculty support in online education. It also excluded frameworks or guidelines that were focused on only one aspect of online education or that did not focus on higher education, specifically. For example, the Quality Matters Higher Education rubric was not included because it pertained specifically to online course design. The exclusion and inclusion criteria we chose to apply thus limited the resulting frameworks that were analyzed. However, we clearly reported our step-by-step method in great detail so that our study is replicable, and also explicitly explained our focus on the faculty perspective in the analysis strategy so that any potential bias in the reporting can be identified (Arksey & O'Malley, 2009).

Implications

The purpose of this study was to identify the institutional support services in online quality assurance frameworks that support quality online teaching in higher education. In this section we discuss the various types of support that were found in the frameworks

Technologies and technical support that comprise infrastructure and faculty/student access to it in online education were unsurprisingly a form of support cited in all the frameworks reviewed in this research. The collection of data about program or course effectiveness was also mentioned in all the quality assurance frameworks and considered important for faculty teaching online because of the opportunities such data provide for faculty aiming for excellence to reflect, revise, and improve their online courses (Kumar, Martin, Budhrani, & Ritzhaupt, 2019). Institutions, however, have to make this data easily available to faculty, and, if in the form of learning analytics, provide opportunities for faculty to learn how to access and interpret such data to improve learning design (Lockyer, Heathcoate, & Dawson, 2013). Likewise, the provision of administrative and academic support services to online students greatly lessens the need for faculty teaching online

(Wang et al., 2010), who might not have adequate knowledge of online administrative and academic processes (e.g., registration, technical help accessing the library), to additionally support students in these processes essential for their success. Only 23% of the frameworks mentioned formal online student orientations and student orientations to online learning, which is an area that can greatly contribute to quality in online education, student success, and faculty success. Although orientations to online course structure and navigation were specified within online course design guidelines in the frameworks, self-regulation, online study skills, and time management advice for the online environment can greatly help online students (Broadbent & Poon, 2015) and the faculty who otherwise mentor them in these areas. The provision of a formal generic orientation to these areas of online learning can also provide faculty with opportunities to focus on discipline-specific or content-specific online learning skills.

Professional development for faculty in online course development and teaching, as well as standards or guidelines for online course design were included in over 90% of the frameworks, but the provision of instructional design or technical assistance for course development and teaching were only mentioned in 54% of the frameworks reviewed. Faculty learning opportunities are essential to ensure quality in online education, but instructional design and technical support are as important to ensure excellence in online course design, development, and improvement. A "team-based approach to online course design, leveraging the talents of various specialists alongside faculty" has been positively associated with a "more well-rounded online student experience" (Garrett et al., 2019, p. 18). Financial and other resources for such support can be a challenge at certain HEIs, but a transition to online education and quality in online education can be expedited with such support. Given the increasing participation of diverse learners in online education, such instructional design support can also help faculty create course materials for learners with special needs, accessibility concerns, or from other cultures.

Support for faculty questions on fair use, plagiarism, and intellectual property was only mentioned in 38% of the frameworks, but is also greatly needed during online course development and teaching. In terms of professional development, only two of the frameworks explicitly focused on learning opportunities or online professional development for part-time faculty or online faculty who might not be physically present at an HEI. Given the high numbers of adjunct or part-time faculty who teach online, innovative, flexible, and online professional development on topics related to online teaching can help ensure the quality of online education at an institution.

Although the time taken for online course development, increased workload in online teaching, and the lack of recognition given to those teaching online are barriers faced by online faculty that are acknowledged in the literature (Bolliger & Wasilik, 2009), only 38% of the quality assurance frameworks reviewed recommended rewards, compensation, and recognition for online course development and teaching. Notwithstanding other forms of support, if engagement and excellence in online teaching is not lauded, and also not acknowledged in tenure and promotion processes, faculty will not be motivated to excel in online teaching. Increased workload or large class sizes in the online environment also have to be addressed with new policies informed by research in online education that support faculty in their online teaching endeavors. Such rewards and policies are needed to increase faculty satisfaction, a pillar of quality online education (https://onlinelearningconsortium.org/about/quality-framework-five-pillars/). Finally, support for the scholarship of teaching (Boyer, 1990), mentioned in only 38% of the frameworks in this study, can contribute greatly to faculty scholarship about online education, to our knowledge of faculty

experiences with online teaching across disciplines, and to the sharing of online pedagogy and course design in various environments.

The frameworks included in this scoping review were from Canada, the US, Mexico, Brazil, South Africa, Africa, Asia, and the European Union. Frameworks from all the regions included most types of support such as technical support for students and faculty, guidelines for online course design, data collection about the effectiveness of online courses, or administrative and academic support for online students. Some types of support appeared more often within certain regions than others. For example, support for copyright considerations and legal services was mainly included in US and European frameworks, and considerations of students' digital skills as well as the use of learning analytics were emphasized in European frameworks. This could be attributed to the fact that all three European frameworks included in this review were published between 2015 and 2018.

Conclusion

In this study, we reviewed the various types of support that ensure quality in online education, specifically from the perspective of supporting faculty members who teach online. HEIs adopt and implement online education differently depending on their institutional goals, the students and communities they seek to serve, and the resources they have available for online education. Regardless of HEI type and involvement in online education, the goal of this review is to provide a comprehensive picture of how quality faculty support of online teaching can be ensured in higher education. Faculty support for online teaching is a relevant topic in current times, where faculty are faced with a sudden transition to various forms of online or remote teaching due to COVID-19. Further research is needed on the different types of support that are needed in such a sudden transition, where faculty engage in emergency remote teaching, and in the longer term, on faculty support for blended remote teaching where faculty might have to teach students at a distance while in their classrooms. This review focused on support for faculty teaching online who play a key role in online student learning. Institutions might need further coordination and collaboration among support services for faculty teaching both online and on-campus students as boundaries between on-campus and online teaching blur and faculty prepare to teach students in both environments.

Acknowledgements

This research was conducted with support from the Fulbright Scholar Program Advanced Research and University Lecturing Award.

References

Almpanis, T. (2015). Staff development and institutional support for Technology Enhanced Learning in UK Universities. *The Electronic Journal of e-Learning, 13*(4), 366–375.

Arksey, H., & O'Malley, L. (2005). Scoping studies: towards a methodological framework. *International journal of social research methodology*, *8*(1), 19–32.

Baran, E., & Correia, A. P. (2014). A professional development framework for online teaching. *TechTrends*, *58*(4), 95–101.

Beck, D., & Ferdig, R. E. (2008). *Evolving roles of online and face-to-face instructors in a lecture/lab hybrid course* (Vol. 7). http://eric.ed.gov/?id=ED499577

Berge, Z. L., Muilenburg, L. Y., & Haneghan, J. V. (2002). Barriers to distance education and training: Survey results. *The Quarterly Review of Distance Education*, *3*(4), 409–418.

Bolliger, D. U., & Wasilik, O. (2009). Factors influencing faculty satisfaction with online teaching and learning in higher education. *Distance education*, *30*(1), 103–116.

Boyer, E. L. (1990) *Scholarship Reconsidered: Priorities of the Professoriate.* Princeton, NJ: Carnegie Foundation for the Advancement of Teaching.

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.

Cacchione, P. Z. (2016). The evolving methodology of scoping reviews. *Clinical Nursing Research*, *25*(2), 115–119.

Colquhoun, H. L., Levac, D., O'Brien, K. K., Straus, S., Tricco, A. C., Perrier, L., Kastner, M. & Moher, D. (2014). Scoping reviews: time for clarity in definition, methods, and reporting. *Journal of clinical epidemiology*, *67*(12), 1291–1294.

Daniel, J. & Uvalic-Trumbic, S. (Eds.) (2013). *A guide to quality in online learning.* https://www.academicpartnerships.com/Resource/documents/A-Guide-to-Quality-in-Online-Learning.pdf

Fetzner, M. J. (2003). Institutional support for online faculty: Expanding the model. *Elements of quality online education: Practice and direction*, *4*, 229–241.

Garrett, R., Legon, R. & Fredericksen, E. E., (2019). *CHLOE 3 Behind the Numbers: The Changing Landscape of Online Education 2019*. Quality Matters. http://qualitymatters.org/qa-resources/resource-center/articles-resources/CHLOE-3-report-2019

Hicks, M. (2014). Professional development and faculty support. In O. Zawacki-Richter & T. Anderson (Eds.), *Online Distance Education: Towards a Research Agenda* (pp. 267–286). Athabasca University Press, Canada.

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. *Educause Review*, *27*. Retrieved from https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning

Hunt, H. D., Davies, K., Richardson, D., Hammock, G., Akins, M., & Russ, L. (2014). It is (more) about the students: Faculty motivations and concerns regarding teaching online. *Online Journal of Distance Learning Administration*, *17*(2), 62–71.

Kibaru, F. (2018). Supporting faculty to face challenges in design and delivery of quality courses in virtual learning environments. *Turkish Online Journal of Distance Education, 19*(4), 176–197.

Kebritchi, M., Lipschuetz, A., & Santiague, L. (2017). Issues and challenges for teaching successful online courses in higher education: A literature review. *Journal of Educational Technology Systems*, *46*(1), 4–29.

Kumar, S., Martin, F., Budhrani, K., & Ritzhaupt, A. (2019). Award-winning faculty online teaching practices: Elements of award-winning courses. *Online Learning Journal*, *23*(4). https://olj.onlinelearningconsortium.org/index.php/olj/article/view/2077

Levac, D., Colquhoun, H., & O'Brien, K. K. (2010). Scoping studies: advancing the methodology. *Implementation science*, *5*(69). https://link.springer.com/article/10.1186/1748-5908-5-69

Lion, R. W., & Stark, G. (2010). A glance at institutional support for faculty teaching in an online learning environment. *Educause Quarterly*, *33*(3), 23–39.

Lloyd, S. A., Byrne, M. M., & McCoy, T. S. (2012). Faculty-perceived barriers of online education. *MERLOT Journal of online learning and teaching*, *8*(1), 1–12.

Lockyer, L., Heathcote, E., & Dawson, S. (2013). Informing Pedagogical Action Aligning Learning Analytics with Learning Design. *American Behavioral Scientist, 57(*10), 1439–1459.

Martin, F., Budhrani, K., Kumar, S., & Ritzhaupt, A. (2019). Award-winning faculty online teaching practices: Roles and competencies. *Online Learning Journal*, *23*(1), 184–205.

Martin, F. & Parker, M.A. (2014). Use of synchronous virtual classrooms: Why, who and how? *MERLOT Journal of Online Learning and Teaching*, *10*(2), 192–210.

Martin, F., Polly, D., Jokiaho, A., & May, B. (2017). Global standards for enhancing quality in online learning. *The Quarterly Review of Distance Education, 18*(2), 1–10.

Orr, R., Williams, M. R., & Pennington, K. (2009). Institutional efforts to support faculty in online teaching. *Innovative Higher Education*, *34*(4), 257–268.

Peterson, J., Pearce, P. F., Ferguson, L. A., & Langford, C. A. (2017). Understanding scoping reviews: Definition, purpose, and process. *Journal of the American Association of Nurse Practitioners*, *29*(1), 12–16.

Phirangee, K., Epp, C. D., & Hewitt, J. (2016). Exploring the relationships between facilitation methods, students' sense of community, and their online behaviors. *Online Learning*, *20*(2), 134–154.

Seaman, J. (2009). Online Learning as a Strategic Asset. Volume II: The Paradox of Faculty Voices-Views and Experiences with Online Learning. Results of a National Faculty Survey, Part of the Online Education Benchmarking Study Conducted by the APLU-Sloan National Commission on Online Learning. *Association of Public and Land-Grant Universities*.

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

Shelton, K. (2011). A rfeview of paradigms for evaluating the quality of online education programs. *Online Journal of Distance Learning Administration, 14*(1). https://www.westga.edu/~distance/ojdla/spring141/shelton141.html

Wang, H., Gould, L. V., & King, D. (2009). Positioning faculty support as a strategy in assuring quality online education. *Innovate: Journal of Online Education*, *5*(6).

Using Innovative and Scientifically-Based Debate to Build e-Learning Community

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Abstract
The research described in this article explored the efficacy of a novel teaching strategy to recreate classroom debates online. Using a structured approach and collaborative group work, the researchers developed an approach that students found very useful in six different dimensions: enhancement of active learning, critical thinking, interaction and engagement among students and between the instructor and students, the usefulness of Google Docs for student collaboration, Google Docs usefulness to enhance learning, and willingness to use Google Docs for future collaborative projects. The total subjects (n = 52) consisted of two groups of undergraduate and graduate students from health-related online courses. The first group contained 25 students who were admitted to 100% online academic programs. The second group consisted of 27 students who were admitted to on-campus academic programs with limited on-line course taking experiences. The research also explored possible differences in perceptions stemming from students' familiarity with online learning by comparing the perceptions of students enrolled in only online classes with those of students enrolled in primarily on-ground classes. No significant differences in any of the variables were found, indicating the efficacy of the approach for all students.

Keywords: online debate, e-learning community, active learning, critical thinking, online teaching, online learning

Chen, C.C. & Swan, K. (2020). Using innovative and scientifically-based debate to build e-learning community. *Online Learning, 24*(3), 67-80. https://doi.org/10.24059/olj.v24i3.2345

Using Innovative and Scientifically-Based Debate to Build e-Learning Community

With the whole world under the threat of the novel coronavirus (COVID-19), vast numbers of schools and institutions of higher education have been experiencing a sudden need to initiate or enhance online teaching and learning. Online education is a growing field that has the potential to enhance learning outcomes by offering more teaching and learning flexibility. More than 30% of students took at least one online course in Fall 2016 (Jiang, Ballenger, & Holt, 2019; Seaman, Allen, & Seaman, 2018). Moreover, an overwhelming majority of students (69%) were taking at least one online course at public institutions (Seaman et al., 2018). With the stay-at-home orders

issued in attempts to deal with the COVID-19 pandemic, it is more important than ever to enhance online education pedagogies.

Indeed, a persistent challenge of online teaching is to successfully adjust on-campus teaching strategies for online course delivery methods. The research literature provides evidence that online courses can be as effective as face-to-face courses when the delivery methods are well-designed to accommodate students' needs (Driscoll et al., 2012; Hadidi & Sung, 2000; Keengwe, Onchwari, & Agamba, 2014; Shea & Swan, 2020). With proper development and the implementation of engaging online learning activities, students can interact with their instructors and classmates using a variety of online technologies such as Zoom video conferences, Short Message Service (SMS), and Google Docs (Moore, 2016; Zhou, Simpson, & Domizi, 2012). Such studies have shown that simply asking students to address the instructors' questions may have limited learning effectiveness (Wolfe & Uribe, 2020). To resolve this issue, the establishment of well-crafted student interactive activities that leads to a sound e-learning community can make a large difference in learning from ordinary online discussions. Educators have to use online teaching techniques appropriately with good designs to meet and surpass the effectiveness of face-to-face classes.

The advantages of the online learning format may include higher flexibility of course schedules, a student-centered approach with, to a greater or lesser extent, self-paced learning, and the capability to fulfill the needs of students with a wide range of learning styles. Online discussion, moreover, allows more time for reflection and values the voices of all students. On the other hand, online discussion does not allow for the immediate negotiation of meaning possible in face-to-face discussions. Other challenges may involve more limited means for communication, and the limitations of technology affordances (Ascough, 2002; Lall & Singh, 2020). To resolve these drawbacks, the establishment of structured interaction is strongly needed.

Educational debate activities have long been used as an active learning tool for students and as a format to encourage collaborative learning (Elliot, 1993; Peasah & Marshall, 2017; Roy, 2012; Zare & Othman, 2013). Both active learning and collaborative activities have been shown to increase student performance (Freeman et al., 2014). Debates can be especially effective in courses where certain issues or topics do not have right or wrong answers. Effective debates can increase students' critical thinking and communication skills, encourage collaboration, and enhance engagement among students as well as between students and instructors (Bradshaw, 2017; Darby, 2007; Mitchell, 2019).

Traditionally, educational debates are held in face-to-face classes with one person in affirming a position and another person arguing against it. Face-to-face debates can also be expanded to group debates with several students in the affirmative and negative groups. For some disciplines such as sociology, public health, nursing, and pharmacology, students and professionals in their fields may need to argue their positions concerning controversial social phenomena or issues that might not have a commonly accepted conclusion (e.g., Is obesity a disease?). In these settings, students often use verbal communications to debate their positions.

If we move this traditional format directly to a remote setting with a synchronous approach, it will create notable challenges and barriers to operating the debate activity smoothly. For example, a high-speed internet connection is often required for all students to ensure constant online connectivity without lagging, delay, or disconnection. In addition, it is challenging to provide an ideal debating environment for online students due to the lack of face-to-face class meetings.

Therefore, an innovative design of asynchronous online group debates could be a valuable and practical vehicle to enhance interactions among online students and instructors, and so contribute to achieving excellence in student learning outcomes.

Furthermore, how would an innovative online group debate connect to the establishment of an e-learning community? It has to be designed in line with the three dimensions of an ideal e-learning community (Tu & Corry, 2002). The first dimension involves instructions with interactivity, community engagement, collaboration, and moderation. The second dimension is social interaction to develop the social context, socio-cultural, and socio-cognitive environment. The third dimension is the technology with the capability to trigger opportunities for knowledge construction. Our online group debates were designed to address these three dimensions and aim at building a sound e-learning community.

In the present study, the researchers used a variety of innovations that transform benefits from traditional one-time synchronous debate to asynchronous 'online group debates' in a 16-week online course. This online scientifically-based group debate project counted 20% of the total grade. There was another collaborative project (i.e., group video presentation) around the end of the semester, which constituted another 20% of the total grade. Other student learning assessments included individual assignments (40%) and a final exam (20%) with questions such as true/false and multiple-choice questions. The specific learning objectives for the online group debates were to be able to: (1) identify and discuss the determinants of obesity; (2) discuss the medical and psychosocial context of obesity; (3) critique and analyze interventions for obesity prevention and control using scientific evidence.

The online group debate topics were adapted from the required course textbook (Rossen & Rossen, 2012) – "*Obesity 101*," and the research article written by Cheng-Chia (Brian) Chen: *"Longitudinal State-Level effects on change in body mass index among middle-aged and older adults in the USA."* This research discussed the determinants of obesity by analyses of large nationally representative data (Chen, Seo, & Lin, 2018). The three group debate topics were selected because they are debatable and controversial public health issues without clear-cut answers. The selected topics were:

- Is obesity a disease?
- Should physical education be mandatory?
- Should pouring rights contracts (i.e., availability of soft drink in schools) be supported by school administrators?

The grading criteria for the group debate's final product are as follows (each criterion – 15 points):

1. Respect for Other Team Members (Were all statements and responses respectful and appropriate?)
2. Information (Was information presented in this debate clear, accurate, and thorough?)
3. Rebuttal (Were all counter-arguments accurate, relevant, and strong?)
4. Use of Facts/Statistics/Literature (Was every major point well supported with several reliable and relevant facts, statistics, and/or peer-reviewed literature?)

5. Organization (Were all arguments clearly tied to an idea [premise] and organized in a tight and logical fashion?)
6. Understanding of Debating Topic (Did all team members clearly understand the topic in depth and present their information professionally and convincingly?)

Each online group debate involved two teams of 3 to 4 students. All group members were expected to participate in research, development, and presentation of their group's debate position. During week 1, the instructor asked students to post a short biography and a picture of themselves on the Blackboard Learning Management System (LMS). During the first four weeks, students were assigned to their groups. Each group signed up for a controversial debate topic in public health on a first-come, first-served basis, specifying their desired debate topic and position (i.e., affirmative or negative). Each group also had to complete team-building exercises including comprehensive discussions of the group's communication methods, time, and frequencies relative to each week's goals. Team leaders were elected and were required to report teams' progress to the instructor each week. The entire debate details on team-building exercises and timeline of debate related activities are summarized below and in Table 1.

Each debate project contained the following components:

1. *Team Building Activities and Preparation of Collaborative Essay Writing for the Debate*: All students introduced themselves on the Discussion Board on the LMS and they were required to take Google Docs and research skills training lessons. Then, they needed to get familiar with each other and elect a team leader. In addition, students were required to attend the "Group Work Q & A" online workshop held by the instructor via 'Google Meet.' More importantly, they had to complete a very comprehensive "Communication Work Plan" through Google Docs.
2. *Pre-debate Activities*: Students collected relevant resources and developed draft statements using Google Docs. The instructor gave timely comments and worked closely with students for multiple revisions.
    - *Part 1—"Position Statement and Three Supporting Arguments" Essay*: The position statement and support arguments included a discussion of the debate issue, a detailed description of the group's perspective, an overview of the upcoming arguments, and three different support arguments. Students worked in groups to create an evidence-based group position statement and wrote it in Google Docs. Only peer-reviewed journal articles were to be used.
    - *Part 2—"Rebuttal" Essay*: Each group then created and posted a group rebuttal statement responding to the other side's argument and providing further evidence in support of their original case statement. Only peer-reviewed journal articles were to be used.
    - *Part 3—"Response to Rebuttal and Position Summary" Essay*: Students were then required to write a summation of their group's perspective, arguments, response to the rebuttal, as well as closing statements providing scientific evidence and arguments supporting their conclusion. Only peer-reviewed journal articles were to be used.

3. *Final Product*: Each group has to submit three final versions of their debate 'essays' on Blackboard – (a) "Part 1: Position Statement and Three Supporting Argument" essay (about 2,000 words); (b) "Part 2: Rebuttal " essay (about 2,000 words); and (c) "Part 3: Response to Rebuttal and Position Summary" essay (about 1,000 words).
4. *Peer Evaluation and Reflection*: Students were asked to evaluate their participation and contributions to the group, as well as that of their group members.
5. *Audience Opinion Essay:* Each audience member (non-participant in a particular debate) was required to provide comments in an essay format for both debate teams and share their own opinions. Students also voted on the winning team in each debate topic.

Seven innovative designs and delivery approaches were employed in online debate projects as follows:

1. During the first four weeks, students had four weeks to know each other better. Debate teams worked together to choose either positive and negative views (on a first-come, first-choice basis) concerning a specific public health argument or policy. In week 7, their comradery was further facilitated through 'Google Meet' online video meetings with the instructor. They then worked in groups to collaboratively write several essays—position statement, three support arguments, rebuttal, responses to rebuttals, and position summary—to support their assigned perspectives for the debates.
2. The debates lasted for fourteen weeks with the asynchronous approach instead of debating several arguments in just one class.
3. Students had to use learned knowledge in the first seven weeks and apply the concepts to write collaborative essays as a form of online debate activities instead of just using their personal opinions for debates.
4. Students were trained to use Google Docs and library database search for peer-reviewed resources in the first four weeks, and then utilize Google Docs to write and edit their essays with rich communication activities among the team members and prompt guidance from the instructor.
5. Students needed to elect a team leader with responsibilities for assigning the workload evenly and providing weekly work progress reports to the instructor.
6. The team leaders worked closely with the instructor and group members to set up detailed weekly goals, group internal deadlines, and timelines throughout the entire debate preparation and writing process.
7. Students were required to mutually agree to use the same SMS (e.g., text-message, "Group Me," or WhatsApp) to communicate with each other in addition to email communications.

Table 1
Timeline for Debate-Related Activities

			Week													
	Online Group Debate Project Required Task	**Learning Outcome Evaluation Weight (20% of the Course Total Grade)**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Team-Building and Preparation of Collaborative Essay Writing for the Debate	Self-Introduction by all students	30 points	X													
	Complete Google Apps and research skill training. Then, take a timed quiz.	90 points		X												
	Create teams, select team leaders, and get familiar with each team member.	N/A		X	X	X										
	All debate teams sign up for the desired topic.	N/A				X										
	Team leaders report the progress of collaboration to the instructor.	N/A				X	X	X	X	X	X	X	X	X	X	X
	Complete "Communication Work Plan" via Google Docs.	50 points				X	X	X								
	Attend "Group Work Q & A" Online Meeting with the instructor via Google Meet.	N/A							X							
Pre-Debate Activities	Pre-debate Writing Activities – Develop "Part 1: Position Statement and Three Arguments" Essay via Google Docs based on peer-reviewed resources (about 2,000 words).	30 points								X	X					
	Pre-debate Writing Activities – Develop "Part 2: Rebuttal" Essay via Google Docs based on peer-reviewed resources (about 2,000 words).	30 points										X				
	Pre-debate Writing Activities – Develop "Part 3: Response to Rebuttal and Position Summary" Essay via Google Docs based on peer-reviewed resources (about 1,000 words).	30 points											X			
	Pre-debate Writing Activities—Revisions for the final version of Part 1 – 3 based on the instructor's guidance and suggestions.	N/A												X		
Final Product	Post all revised and completed debate-related essays (Part 1 to 3) on Blackboard Discussion Board available to the entire class.	90 points (with Grading Rubric)													X	
Peer Evaluation & Reflection	Each student submits the peer evaluation with the reflection of the collaboration.	45 points														X
	Write "Audience Opinion Essay" & vote the winning team in each debating topics.	N/A														X

One of the most interesting innovations employed in the project was the requirement to use Google Docs as the students' collaboration tool to write up all elements of the online group debate. Google Docs is a free and convenient real-time document authoring and collaboration tool, which has been reported as a potentially effective vehicle for team building and teamwork (Mitchell, 2019; Moore, 2016; Zhou et al, 2012). It can allow up to 50 people to edit a Word document at the same time. During the collaborative writing process, users can see each other's changes instantaneously and all editing histories will be recorded permanently. Students and instructors can take advantage of Google Docs' 'History' function to resume any version of the entire editing history. The contents in Google Docs are automatically saved in real-time and collaborators usually do not have to worry about the loss of their teamwork. Another important creative piece for this setting is that instructors and students are capable to use the relatively new 'Chat' function during the collaborative writing process, which is extremely useful for teachers to give just-in-time feedback and writing suggestions, and for group debate members to exchange opinions and resources (see Figure 1). Moreover, when students are using Google Docs, SMS, emails, and following the debate instructional guidelines/policies, it establishes an engaged learning environment that covers all aforementioned key components of an excellent e-learning community.

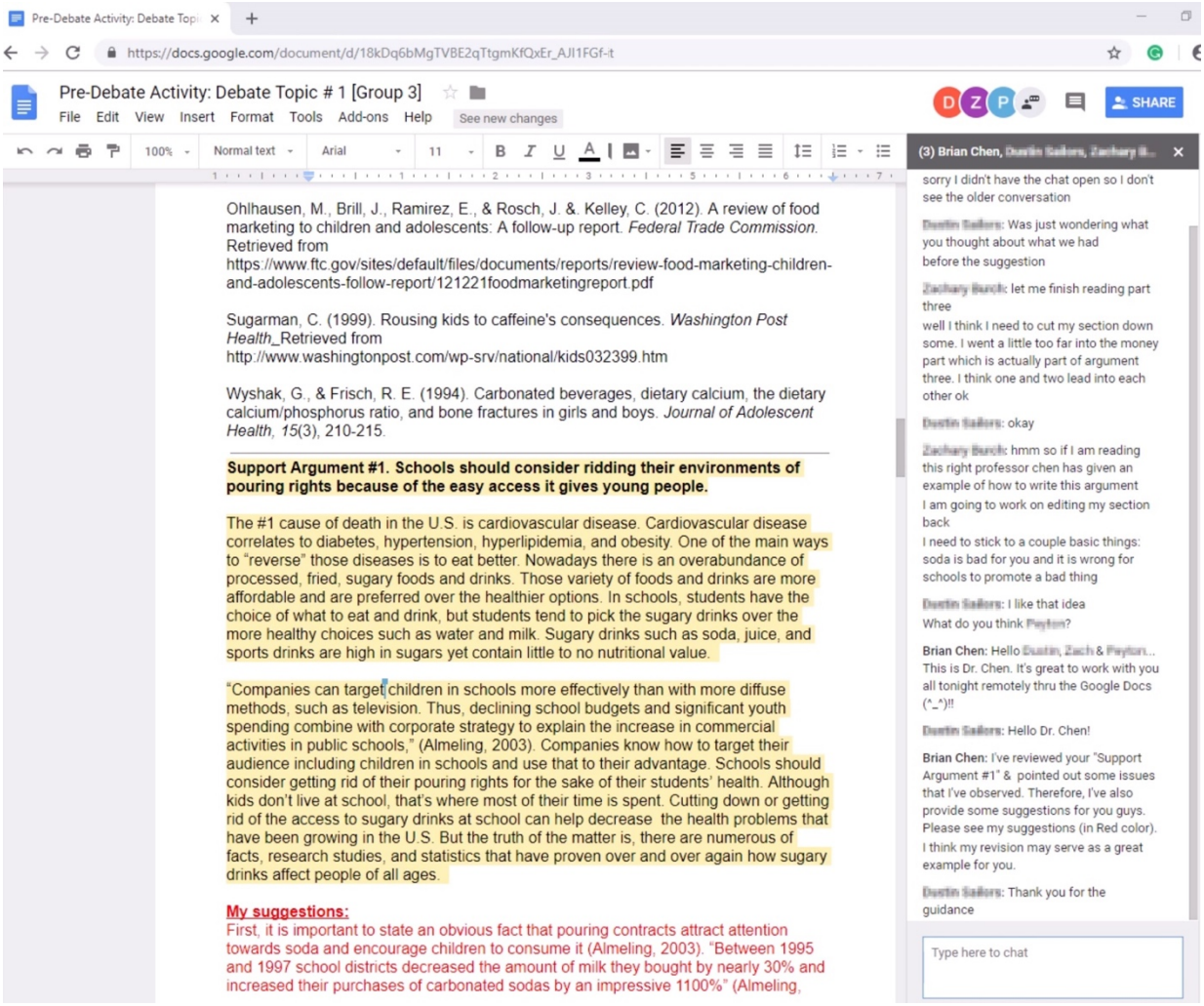

Figure 1. Screenshot of Google Docs Collaborative Writing Process with the Instant Feedback from the Instructor

The first aim of the study was to explore the effectiveness of online group debates in an online health-related course by examining students' perceptions of their effectiveness/usefulness. The second research aim was to investigate whether students' perceived utility of the online debate format differed between students enrolled in a 100% online academic program (Group 1) and students enrolled in an on-campus academic program (Group 2) with very limited exposure to online learning experiences.

Methods

Subjects and Sampling Methods

The present study evaluated students' perceived usefulness/effectiveness of their experiences in online group debates and the required collaborative writing in Google Docs. This research project was approved by the IRB Office. Students were given consent forms before entering the online survey (Zhou et al., 2012) at the end of each semester. The study participants were 52 students who enrolled in an online health elective course at a Midwestern university from 2016 to 2019. To answer the second aim of the study, these 52 students were separated into the two groups. The number of students (sample size = 25) who were admitted to a 100% online academic program (Group 1) was close to the number of students in Group 2 (sample size = 27) who were admitted to an on-campus academic program. Among all subjects, there were 47 undergraduate students (juniors and seniors only) and five graduate students. Around 69% of the students were females and 62 % of them were under 24 years old (see Table 1).

Table 2

Descriptive Statistics (n = 52)

	n	**%**
Gender		
Female	36	69.2
Male	16	30.8
Student Status		
Graduate	5	9.6
Undergraduate (Junior & Senior)	47	90.4
Age		
< 24-year-old	32	61.5
≥ 24-year-old	20	38.4
Students' Admission Status		
100% Online Program (Group 1)	25	48.1
On-Campus Program (Group 2)	27	51.9

Study Variables

Basic demographic information such as gender and age was included in the online survey. Subjects were also asked whether their admission status was primarily online or on-ground. Six other study variables included:

1. student perceptions of the enhancements of active learning,
2. student perceptions of the enhancements to critical thinking,
3. student perceptions of the enhancements of class interaction and engagement from their online group debate experiences,
4. student perceptions of the usefulness of the collaborative writing tool (Google Docs),
5. student perceptions of the usefulness of Google Docs in improving learning outcomes, and
6. students' reported willingness to use Google Docs as a collaboration tool in the future. Five-point Likert scales were used to measure the strength of agreement or disagreement (i.e., 1 = strongly disagree and 5 = strongly agree) with the survey questions.

Data Analysis

Before performing the comparisons of students' perceived utility of the online debate and Google Docs, the parametric assumptions of the study variables (i.e., normality and homogeneity of variance) were tested between the online students and the primarily on-ground students. Since the normality was not satisfied and the homogeneity of variance was met between groups, Welch's *t*-tests were conducted for all six study variables. The purpose of Welch's *t*-tests was to evaluate whether differences existed between students in Group 1 and Group 2. The nonparametric Mann-Whitney-Wilcoxon test was not performed because Type I error may be inflated when it is employed and there has been no optimal procedure to deal with tied ranks (Hahs-Vaughn & Lomax, 2020, pp. 234–235).

Results

Students' perceptions of the enhancement of active learning, critical thinking, as well as interaction and engagement are illustrated in Figure 2. Nearly 87% of students agreed that the online group debate project enhanced their active learning, and more than half (> 50%) of the students strongly agreed with that statement. Approximately 81% of the students agreed that the online group debate had increased their skills in critical thinking (48.1% of students reported that they strongly agreed with this statement). Additionally, around 90% of students agreed that the online group debate improved the interaction and engagement among the students and between the instructor and students.

Figure 3 demonstrates student perceptions of the usefulness of Google Docs for collaboration and learning, and their willingness to deploy Google Docs as a collaborative tool in the future. Approximately 85% of students valued Google Docs as a useful tool for team-based projects. Nearly 77% of students agreed that the use of Google Docs enhanced their learning. Finally, approximately 69% of students reported that they would consider using Google Docs for collaborative tasks in the future.

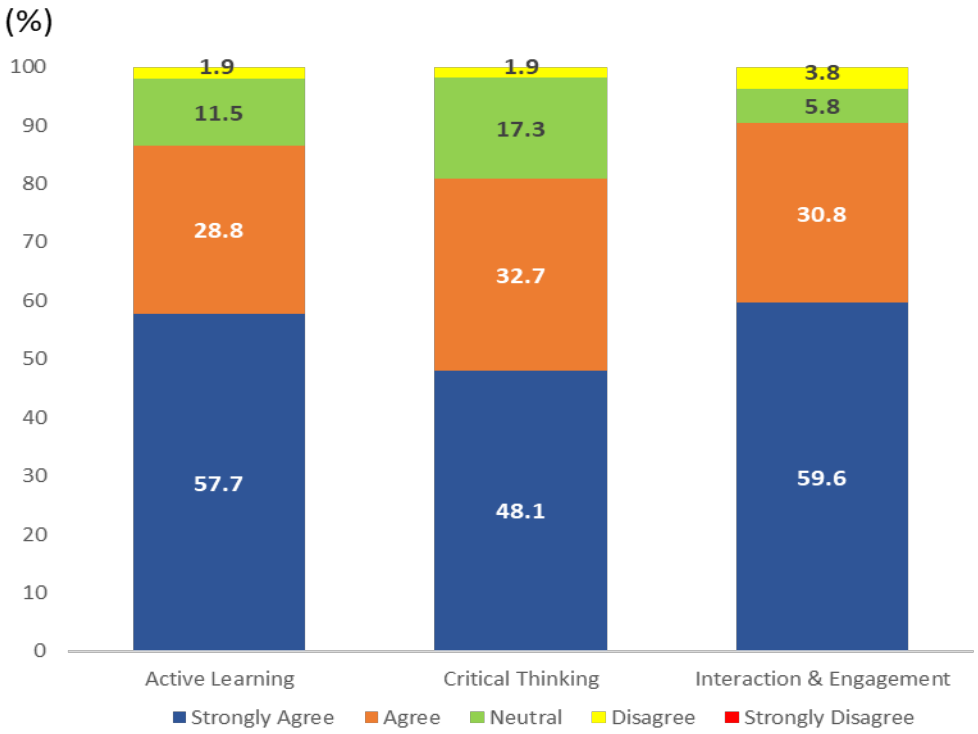

Figure 2. Students' Perceptions of the Enhancements to Active Learning, Critical Thinking, and Engagement from Their Online Group Debate Experiences.

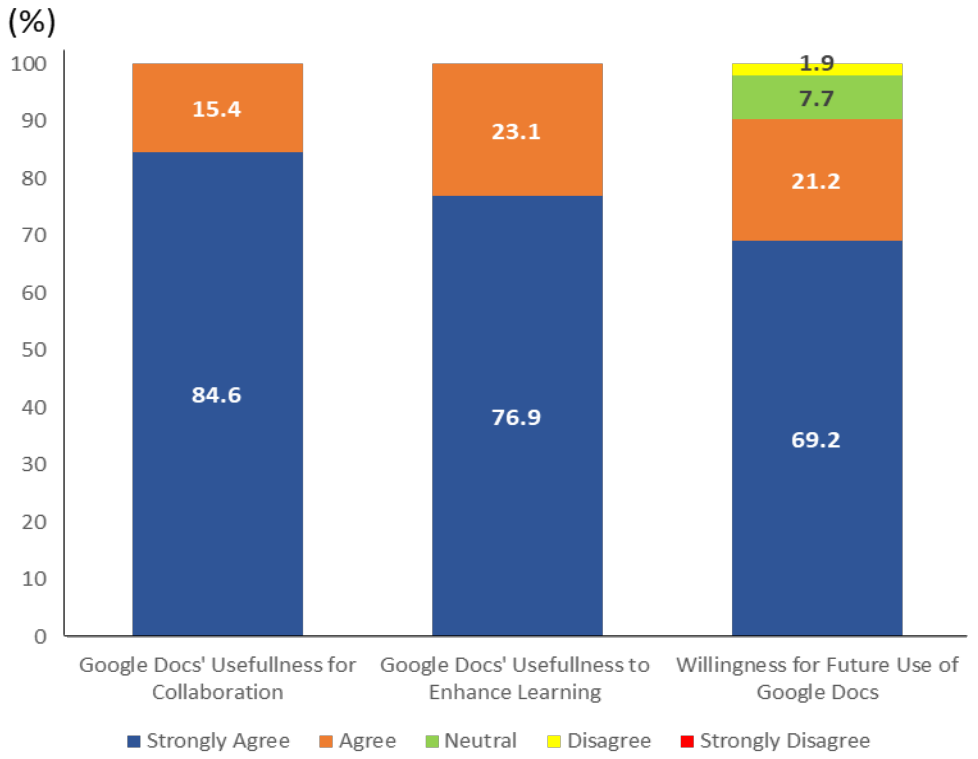

Figure 3. Students' Perceptions towards the Usefulness of Google Docs and Willingness to Use It Again in the Future.

Table 3 presents the mean values for each of the six study variables for students in the online and on-ground groups. Welch's *t*-tests were used to compare the groups on each of these. The results of Welch's *t*-tests were not statistically significant for any of the variables. The test statistics and *p*-values are reported in Table 3.

Table 3

Welch's t-*test that Compared Study Variables between Group 1 and Group 2*

	Students in a 100% Online Program (Group 1)		**Students in an On-Campus Program (Group 2)**			
	M	***SD***	***M***	***SD***	**Welch's Test**	***p*-value**
Active Learning	4.48	0.71	4.37	0.84	0.26	0.61
Critical Thinking	4.32	0.69	4.22	0.93	0.19	0.67
Interaction & Engagement	4.36	0.91	4.56	0.64	0.80	0.38
Google Docs' Usefulness for Collaboration	4.80	0.41	4.89	0.32	0.76	0.39
Google Docs' Usefulness to Enhance Learning	4.72	0.46	4.81	0.40	0.63	0.43
Willingness for Future Use of Google Docs	4.48	0.82	4.67	0.62	0.84	0.36

Discussion

The findings indicate that online debate may be as effective as the debate in the face-to-face classroom. High percentages of students reported very positive perceptions of the group debate's influence on their active learning, critical thinking, and interaction with their classmates and the instructor. These findings are consistent with previous studies in the on-campus setting (Kennedy, 2007; Roy, 2012; Zare et al., 2013), as well as in the online courses (Lin & Crawford, 2007; Richardson & Ice, 2010; Stephens & Roberts, 2017; Stockleben et al., 2017). Moreover, comparisons between online students and students enrolled in primarily on-ground classes reveal that their perceptions of the utility of group debates and Google Docs were statistically similar. This suggests that student perceptions were not affected by their familiarity or lack thereof with the online environment. It is an important contribution to the literature of online learning and instruction design for educational debates.

After graduation, students often will need to make decisions based on scientific evidence and justify a variety of situations with critical thinking. Besides, slick and smooth interaction skills could be very powerful in achieving productive and efficacious collaboration. Thus, online group debates could be a valuable experience to help students develop these skills. The group debating process in the study also involved the collaborative use of Google Docs which may help prepare students for teamwork and collaboration skills. Specifically, collaboration with peers facilitated by the instructor made what might have been a difficult and anxiety-producing exercise instead of positive and rewarding. The findings should encourage educators to change the style of debate in

their classes and apply those innovative approaches to improve students' understanding of practical problem-solving.

The results of this study must be interpreted in light of several limitations. First, the Hawthorne effect may have resulted in somewhat higher ratings for the online debate format. Second, the study investigated students enrolled in a health-related course and may not be generalizable beyond that context. Third, the perceived effectiveness of Google Docs might not reflect the real usability of the collaborative tool. Finally, generalizability might be an issue due to the sample size and type of courses.

One of the directions for further research may be the enhancement of subject recruiting to increase the sample size, which could increase the generalizability. Researchers may want to recruit subjects from different disciplines as well. Online learning scholars may consider using direct measurement data of critical thinking. The purpose is to determine if this skill can be improved with participation in online group debates. Besides, future research may look up more data from more graduate students, who only made up about 10% of subjects in the present study. Finally, it would be worthwhile to measure what students think about their time spent on the debate project (e.g., reasonable, too long, or too short).

In summary, asynchronous online group debates can be utilized to build effective e-learning communities and applied to different disciplines and curriculums. With an almost semester-long and structured debate project, students feel that they belong to an e-learning community that fosters interactive collaborations and engagement with proper monitoring system led by the team leaders and instructor. It also increases students' exposure to online social interactions and affords multiple opportunities for knowledge acquisition through technology. Finally, our innovations overcame several disadvantages of online teaching and created many teamwork opportunities to enrich students' online learning experiences.

References

Ascough, R. S. (2002). Designing for online distance education: Putting pedagogy before technology. *Teaching Theology & Religion*, *5*(1), 17–29.

Bradshaw, M. J. (2017). Debate as a teaching strategy. In M. J. Bradshaw & B. L. Hultquist (Eds.), *Innovative teaching strategies in nursing and related health professions*. Jones & Bartlett Learning.

Chen, C. C., Seo, D. C., & Lin, H. C. (2018). Longitudinal state-level effects on change in body mass index among middle-aged and older adults in the USA. *Health Education Journal, 77*(1), 59–72.

Darby, M. (2007). Debate: A teaching-learning strategy for developing competence in communication and critical thinking. *Journal of Dental Hygiene, 81*(4), 78-1–78-10.

Driscoll, A., Jicha, K., Hunt, A. N., Tichavsky, L., & Thompson, G. (2012). Can online courses deliver in-class results? A comparison of student performance and satisfaction in an online versus a face-to-face introductory sociology course. *Teaching Sociology, 40*(4), 312–331.

Elliot, L. B. (1993). Using debates to teach the psychology of women. *Teaching of Psychology, 20*(1), 35–38.

Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences, 111*(23), 8410–8415.

Hadidi, R., & Sung, C. H. (2000). Pedagogy of online instruction: Can it be as good as face-to-face? *Americas Conference on Information Systems (AMCIS) 2000 Proceedings, 288*, 2061–2065.

Hahs-Vaughn, D. L. & Lomax, R. G. (2020). *An introduction to statistical concepts* (4th ed.). Routledge.

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.

Keengwe, J., Onchwari, G., & Agamba, J. (2014). Promoting effective e-learning practices through the constructivist pedagogy. *Education and Information Technologies*, *19*(4), 887–898.

Kennedy, R. (2007). In-class debates: Fertile ground for active learning and the cultivation of critical thinking and oral communication skills. *International Journal of Teaching & Learning in Higher Education, 19*(2), 183–190.

Lall, S., & Singh, N. (2020). CoVid-19: Unmasking the new face of Education. *International Journal of Research in Pharmaceutical Sciences*, *11*(Suppl. 1), 48–53. https://doi.org/10.26452/ijrps.v11iSPL1.2122

Lin, S. J., & Crawford, S. Y. (2007). An online debate series for first-year pharmacy students. *American Journal of Pharmaceutical Education*, *71*(1, Article 12), 1–8.

Mitchell, E. T. (2019). Using debate in an online asynchronous social policy course. *Online Learning*, *23*(3), 21–33.

Moore, C. (2016). The future of work: What Google shows us about the present and future of online collaboration. *Tech Trends*, *60*(3), 233–244.

Peasah, S. K., & Marshall, L. L. (2017). The use of debates as an active learning tool in a college of pharmacy healthcare delivery course. *Currents in Pharmacy Teaching and Learning*, *9*(3), 433–440.

Richardson, J. C., & Ice, P. (2010). Investigating students level of critical thinking across instructional strategies in online discussion. *The Internet and Higher Education, 13*(1–2), 52–59.

Rossen, L. M., & Rossen, E. A. (2012). *Obesity 101*. Springer.

Roy, D. P. (2012). Promoting active learning of ethical issues in marketing communications using debates. *Marketing Education Review*, *22*(1), 73–76.

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

Shea, P., & Swan, K. (2020). What e-learning leaders should know about learning effectiveness. In G. Miller, & K, Ives (Eds.), *Leading the e-learning transformation of higher education: Leadership strategies for the next generation* (2nd ed., pp. 75–95). Stylus.

Stephens, G. E., & Roberts, K. L. (2017). Facilitating collaboration in online groups. *Journal of Educators Online, 14*(1), 1–16.

Stockleben, B., Thayne, M., Jäminki, S., Haukijärvi, I., Mavengere, N. B., Demirbilek, M., & Ruohonen, M. (2017). Towards a framework for creative online collaboration: A research on challenges and context. *Education and Information Technologies*, *22*(2), 575–597.

Tu, C. H., & Corry, M. (2002). eLearning communities. *Quarterly Review of Distance Education*, *3*(2), 207–218.

Wolfe, K. A., & Uribe, S. N. (2020). What we wish we would have known: Tips for online instructors. *College Teaching*, 1–3. doi: 10.1080/87567555.2020.1711701

Zare, P., & Othman, M. (2013). Classroom debate as a systematic teaching/learning approach. *World Applied Sciences Journal*, *28*(11), 1506–1513.

Zhou, W., Simpson, E., & Domizi, D. P. (2012). Google Docs in an out-of-class collaborative writing activity. *International Journal of Teaching and Learning in Higher Education, 24*(3), 359–375.

Introduction to Section II of *Online Learning* vol. 24, issue 3

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In addition to the special section on papers presented at conferences sponsored by the Online Learning Consortium, this issue of OLJ also contains articles from our regular submission process. These papers appear in three sections broadly related to faculty and student issues as well three papers on blended learning.

The COVID-19 pandemic has changed much in the world, and in higher education dramatically so. Colleges everywhere continue to consider which courses, if any, to offer in classrooms and which to move online or to new distance formats that many refer to as "emergency remote instruction." As we will see, many of the papers contained in Section II, submitted before the pandemic, are based on assumptions about distance and online learning that, at least for now, no longer hold true. This includes assumptions about common temporal modes of delivery (e.g. mostly asynchronous delivery), faculty decisions about whether they will teach online (most faculty are now required to teach online), percentages of students in the US studying at a distance (much higher now than previously), and the current feasibility of blended learning (many courses will not have classroom instruction, even if it is reduced due to blending).

The first article in this section is "Video-based Feedback on Student Work: An Investigation into the Instructor Experience, Workload, and Student Evaluations" by Cheri Ketchum, Daria S. LaFave, Chelsey Yeats, Elaine Phompheng, and James H. Hardy of Ashford University. This paper examines issues related to primarily asynchronous delivery of online learning and the potential for student and faculty isolation and lack of social presence in the absence of real-time interaction and feedback. The paper builds on previous research looking at the benefits of video-based feedback for the development of social presence, increased student-faculty connectedness, faculty workload, and end-of-course instructor ratings. The paper improves on prior research with a larger sample size, more careful control of the measurement of workload, and an examination of the instructors' experiences with video feedback. While the results indicated that video feedback required more time, engendered varied instructor experiences related to social presence, and had limited impact on instructor performance evaluations, the study raises interesting questions for future research.

The next paper in this section is "Faculty Perceptions of Online Teaching at a Mid-Sized Liberal Arts University" by Dana Shreaves, of Pacific Lutheran University, and Yu-Hui Ching, Lida Uribe-Florez, and Jesús Trespalacios of Boise State University. This study looks at faculty acceptance of distance/online learning, specifically focusing on liberal arts faculty when this form of instruction was not as widespread as it is currently. The authors note that traditionally, liberal arts faculty have been particularly concerned with the quality of relationships with their students and thus may be more resistant to adopting online education where the perception is that the

instructor-student relationship may degrade. The authors use mixed methods to analyze perceptions of online teaching and learning and faculty decisions to teach online. Content analysis of faculty perceptions of online teaching identified six shared themes including attractiveness to students, teaching value compatibility, regulation of online learning, technology and infrastructure, faculty resources, and personal influences. An examination of 21 quantitative factors found 17 of these were reported by more than half of respondents to influence their decision to teach online. One wonders how the study itself, and the results might have changed with the wide scale shift to distance education in light of the pandemic. How have faculty responded to the abrupt implementation of distance methods? This paper thus might serve as a foundation for new investigations of faculty experiences, acceptance, and adoption of distance education in our newly transformed context.

The third paper in this section is "Examining Students' Confidence to Learn Online, Self-Regulation Skills and Perceptions of Satisfaction and Usefulness of Online Classes" by Brittany Landrum of the University of Dallas. This article examines how students' confidence regarding their ability to use a learning management system, employ self-regulation strategies, and ratings of their confidence in their ability to learn online predict both their satisfaction with and perceived usefulness of online courses. Multiple regression analyses indicate that students' confidence to learn online was the strongest predictor of satisfaction and usefulness of online classes. The findings suggest students' motivation for taking online classes mediate their evaluations of online learning experiences. This paper also may serve as a launching point for future investigations of student motivations for online study in a time when online education has become much more widespread and mandatory in many cases.

The next paper is "The Impact of Multimedia in Course Design on Students' Performance and Online Learning Experience: A Pilot Study of an Introductory Educational Computing Course" by Torria Davis and Thomas Frederick of California Baptist University. The authors argue that given limited time instructional designers can dedicate to creating multimedia in course design, it is critical to identify the effects of the time investment on student performance and perceptions of overall online learning experiences. This study therefore investigates whether multimedia use in online courses impacts student performance or their perception of online learning after controlling for faculty expertise with course design. The paper presents the results of two studies. In the first study, T-tests were used to analyze if students performed better in courses adhering to Quality Matters (QM) standards or in courses built according to instructor preferences without using QM. The second study involved the course design of four sections of courses, two sections of which were enriched with a variety of multimedia content. Study one analyses indicate that students in the courses that adhere to QM guidelines earned higher end-of-point total scores than those in the non-QM courses. Results of study two indicate that, though participants in the text-based course design scored slightly lower than those in the multimedia course, both of which adhered to Quality Matters standards, the outcome was not statistically significant.

The fifth paper in this section is "Using Crowdsourced Wikis to Teach an Online Undergraduate Course" by John Fisher and Steve Allred of Utah Valley University. This article seeks to address a number of process and outcome questions about using Wikis in online courses. These questions were presented as part of an end of course evaluation to students in an online course in crisis communication. The specific questions included how a class wiki can contribute to learning; whether the class wiki was helpful in learning course content; whether students read the contributions of other students and thereby learn from their work; whether and how students

edit the work of other students, and what incentives motivate students to change, edit, comment and provide feedback to other students using the wiki. The student responses were analyzed using descriptive techniques, allowing the authors to explore the perception and themes about the benefits and challenges of using wikis. The authors conclude that their research confirms much existing research on using wikis in online education. Wikis engage students in the learning process; encourage student collaboration, require students to learn a new skill; but significant preparation and orientation are required for students to benefit from wikis.

The next paper is "Examining Student Reported Interaction and Satisfaction in Higher Education Administration Graduate Seminar-Style Blended Courses" by Derek Thurber of Arizona State University and Lois Trautvetter of Northwestern University. This study investigates how a graduate, seminar-style courses offered in a blended format can promote student satisfaction, motivation, and interaction among students and instructors. Data were collected from 11 courses within a graduate degree program at a private research university from spring 2016 to 2018. The researchers conducted semester-based surveys of students using an instrument developed and validated for evaluating the Community of Inquiry framework. They also conducted interviews with faculty and teaching assistants and used this data to inform future iterations of course design. The results from the student surveys and instructor interviews are reported in detail in the paper. The authors conclude that class size was the biggest factor relating to student interaction. As class size increased quality of interaction with both peers and instructors decreased. This study also found synchronous online discussions had a greater impact than other learning activities. Asynchronous discussion boards were rated as the least helpful tools and were also the only tool rated as unhelpful on average. This finding is in contrast to existing online learning research on the CoI framework. Finally, the authors found that satisfaction and interaction had a slight increase over time as participants became more familiar with the blended format.

Also on the topic of blended learning is "Blended Learning in STEM and Non-STEM Courses: How Do Student Performance and Perceptions Compare?" by Ron Owston, Dennis York, Taru Malhotra, and Jirarat Sitthiworachart of York University. As the title suggests this article addresses two research questions: 1) how does student performance in STEM and non-STEM classes compare when both are taught in the blended mode? and 2) how do student perceptions of blended learning in STEM and non-STEM courses compare when both are taught in the blended mode? Data for the study came from 6 STEM courses and 8 non-STEM courses. Students were given a questionnaire to assess their perceptions of their learning experience in a blended class and 300 questionnaires were collected. Student performance was defined as final course grade. A total of 318 grades were obtained. Analyses indicate that STEM students outperformed the non-STEM students after adjusting for prior academic attainment using GPA as a covariate. However, STEM students did not perceive their blended courses as positively as non-STEM students. These results are consistent with research comparing student performance in blended and traditional course formats suggesting that students perform better under blended conditions.

The final paper, again on the topic of blended learning, is "Optimizing the Technological Design of a Blended Synchronous Learning Environment" by Lauren Angelone of Xavier University and Zachary Warner and Janet Mannheimer Zydney of the University of Cincinnati. This paper discusses a form of blended learning that, while not new, may be new for the many faculty in the US who are teaching "hyflex" courses for the first time as a result of efforts to accommodate social distancing and student preferences for alternate modalities to in-person classes. These are courses in which students may attend either in the classroom or at a distance in a synchronous mode,

frequently with options to move between these modes from week to week. This exploratory study used qualitative methods to iteratively plan, evaluate, and improve the technological deployment of a blended synchronous course to enhance the experience. Qualitative data collection and analysis were used to understand the impact of design decisions on the experiences of the students and the instructor. The results are design recommendations that can be used as guidance for future research and implementation of blended synchronous modes of learning.

We invite you to read and share this issue with colleagues and to consider submitting your original work to Online Learning.

Video-Based Feedback on Student Work: An Investigation into the Instructor Experience, Workload, and Student Evaluations

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Abstract
This exploratory study uses qualitative and quantitative data to analyze instructor experiences in adding video feedback to written notes in online courses. This study asks if instructors will feel more "connected" in video feedback courses, report increased workloads, and see an improvement in their performance evaluations in video feedback courses. The results reveal video feedback requires more time than written feedback (i.e., non-video feedback), generates varied instructor experiences concerning social presence, and has little to no impact on instructor performance evaluations. The study concludes that more research is needed to fully understand the instructor experience when using videos, especially in environments where part-time, adjunct instruction is the norm.

Keywords: instructor, social presence, workload, mixed methods, video feedback

Ketchum, C., LaFave, D.S., Yeats, C., Phompheng, E., & Hardy, J.H. (2020). Video-based feedback on student work: An investigation into the instructor experience, workload, and student evaluations. *Online Learning, 24*(3), 85-105. https://doi.org/10.24059/olj.v24i3.2194

Video-Based Feedback on Student Work: An Investigation into the Instructor Experience, Workload, and Student Evaluations

Compared to traditional courses, online learning environments limit how instructors connect, teach, and respond to their students. Online assignments and lessons are generally asynchronous and restricted to written, verbal communication. For instance, textbook readings, quizzes, discussion boards, and assignments are regularly presented in written form. Feedback, likewise, is offered in writing. Without face-to-face interaction, students and instructors may feel isolated, disconnected, or invisible to each other (on students see Borup et al., 2014; Wade, 2016; on instructors see Dolan, 2011; Dunlap, 2005; Seaton & Schwier, 2014). To address this challenge, instructional researchers are exploring the value of video feedback. Previous research shows that video feedback can foster deep personal connections (Lamey, 2015; Mathisen, 2012; Wade, 2016; West & Turner, 2016), which potentially leads to higher student evaluations of instructors.

Social presence is one way to understand this phenomenon. When social presence occurs online, communicators tend to feel connected through intimacy and immediacy (Crim, 2006). and increased social presence can allow both to feel depth to their interaction (Tu & McIsaac, 2002). Video feedback may be a channel for this, thus making the experience meaningful and valuable to both (Borup et al., 2012; Wade, 2016). Additionally, the rapport established through video feedback (Thompson & Lee, 2012) could lead to higher student evaluations of instructors. However, whether video feedback generates effective social presence and higher student evaluations of instructor performance is in question.

Whereas previous research focused on the impact of video feedback on students' sense of connectedness with their instructors (Borup et al., 2014; Parton et al., 2010; Wade, 2016), few studies have focused on instructor experience. Those that mention instructor experience have relied on a small pool of instructors: Wise et al. (2004) collected information from two instructors, Jusoff and Khodabandelou (2009) interviewed four, Mathisen (2012) interviewed six, and Wade (2016) had five instructors in her project. Other scholars reported on personal experiences as participant observers in providing video feedback (Henderson & Phillips, 2015; Lamey, 2015; Mayhew, 2017; Silva, 2012). It is also unclear if these instructors were full-time or adjunct.

Furthermore, few studies have tackled the impact of video feedback on instructor workload. Studies mentioning workload report a range of outcomes from requiring more grading time (McCarthy, 2015), to less or roughly half the time (Griffiths & Graham, 2009; Henderson & Phillips, 2015; Hyde, 2013; Mathisen, 2012), or the same amount of time as written feedback (Jones et al., 2012). It is important to note that there were no studies that included a systematic and controlled use of time logs for tracking video feedback verses written feedback. Silva (2012) used time logs, but methodology was not transparent about the time spent between reading, commenting, and creating written and video feedback. Wood et al. (2011) gave a time log on audio feedback but did not use written feedback as a comparative. No studies were found that looked at the connection between providing video feedback and student evaluations of instructors specifically.

Analyzing the instructor's perspective seems to be an afterthought versus student sentiment and learning. This project fills the gap by examining the instructor experience of video feedback through positive or negative social presence, its impact on workload, and influence on student evaluations of instructor performance.

Review of Relevant Literature

Social Presence

Short et al. (1976) introduced the idea of social presence by explaining it as a “salience” or “sense of being there” within a communication medium. Social presence has since expanded to include building community (Tu & McIsaac, 2002; Wise et al., 2004), projecting a “real” self (Garrison et al., 2009), emotional connectedness (Akcagoglu & Lee, 2016; Swan & Shih, 2005), and awareness of others in a virtual setting (Tu, 2002). While most research has approached the idea of social connection from the perspective of the student (Hostetter & Busch, 2013; Swan & Shih, 2005; Tao, 2009; West & Turner, 2006), the instructor is the second part of the "social” equation. So, their sense of "connection" matters as well for students to feel an authentic bond and realize the potential learning dividends. Following the work of Garrison et al. (2009) and Swan

and Shih (2005), we define social presence as a mutual "connectedness" instructors and students feel towards each other within an online environment.

However, online courses pose a significant challenge: materials, content, and the process of learning are broadly asynchronous. Crim (2006) posited that online students were likely to be passive observers rather than active engagers due to lack of face-to-face interaction, missing out on social presence. Since students often learn privately and with limited social interaction, they may not feel the "salience" of an instructor or other learners. This can then be a challenge for instructors who wish to both connect and engage with students. To address this lack of connectedness, researchers point to the importance of building social presence through affective bonding and developing meaningful relationships. Krause et al. (2017) suggest the use of multimedia tools provides students with the impression of social presence, adding value to the online learning experience. Clark et al. (2015) found student perceptions of teaching and social presence were significantly higher with the use of videos and that all students interviewed in their study mentioned social presence as a positive component of their online course.

Leaving video feedback might be an enhancement over text-based exchanges, where there are few nonverbal or emotional cues. However, delivering video critiques is generally one-way communication without reciprocal student feedback (Lamey, 2015). Without genuine "interaction," it is difficult to call it entirely "social." Hughes et al. (2007) discovered that a deficiency in the perception of social presence could lead to disappointment and a decrease in affective learning. Attempts at building social presence may lead to negative feelings if both parties do not feel it is a real, reciprocal exchange. As discussed later, it can also lead to frustration for instructors, which might result in "negative social presence." This is something not well documented in previous research. Attention is now turned to the assumed value of feedback, and video feedback specifically, and its links to social presence.

Social Presence and Video Feedback

Traditionally, written feedback corrects student work, provides direction for improvement and helps facilitate a relationship between instructor and student. This improves student satisfaction and feelings of social connection, which is thought to enhance the learning experience (Carless, 2006; Gunawardena & Zittle, 1997; McCarthy, 2015). For Hattie and Timperley (2007), ideal feedback explains how students meet goals, improve, and remarks on progress. High-quality feedback allows instructors to identify growth opportunities and guides learners towards increased knowledge and expertise (Gaytan & McEwen, 2007; Wiggins, 2012), and to develop meaningful and productive instructor-student relationships (Wade, 2016). Additionally, supportive and forward-moving feedback reinforces instructor credibility (Witt & Kerssen-Griep, 2011), demonstrates instructor's care for students and their success (Borup et al., 2014), encourages student self-reflection (Hyde, 2013), and motivates students to become engaged in learning (Griffiths & Graham, 2009). Some scholars argue that all of this can occur in more meaningful ways through video (McCarthy, 2015; Wade, 2016).

Scholars argue that video feedback builds social bonds and is preferred over written feedback (Borup et al., 2014; Lamey, 2015; McCarthy, 2015; Parton et al., 2010; Wade, 2016; West & Turner, 2016). Studies show that students find video feedback more detailed, conversational, and connecting, as they can see their instructor in-person and observe tone, inflection, expressions, eye contact, and personality (Anson et al., 2016; Killingback et al., 2019; Lamey, 2015; Mathisen, 2012; Wade, 2016; West & Turner, 2016). Others found videos allowed

for increased bonding between students and instructors (Mathisen, 2012; Parton et al., 2010). Finally, there was a persistent pattern of students reporting that video feedback was more specific and constructive (Henderson & Phillips, 2015; Mayhew, 2016) and that it would help them improve their performances (West & Turner, 2016). Little research has investigated the impact of videos on student evaluations of instructors or student performance or student evaluations of instructors. Studies have not focused on precise impacts on learning (Jung et al., 2002; Richardson & Swan, 2003; Spears, 2012). Positive links exist between social presence and student *perceptions* of their learning, but most do not analyze actual grades (Hostetter & Busch, 2013; Swan & Shih, 2005; Wise et al., 2004). None of these studies examined the impact of video feedback specifically. Finally, most research addresses student perception of video feedback, quality of feedback, and social presence (Spears, 2012; Wade, 2016), but little of the scholarship looks at faculty connectedness to their students, reactions to being required to provide such feedback, or impact on workload and evaluations of their teaching. Attention is now turned to instructor perspectives, as it is contended that the literature does not sufficiently address their experiences when providing video feedback.

Instructor Perspectives on Video Feedback

As stated, most research does not address instructor perspectives (Borup et al., 2015; Wade, 2016). Research focuses on the positives, including how videos improve instructor tone and build connections with students (Lamey, 2015). Jones et al. (2012) found that video feedback, combined with screencasts, allowed instructors to facilitate fluidity in commenting and highlighting text. Mathisen (2012) reported that instructors found their video feedback to be more efficient and of higher quality. Mayhew (2017) asserted that instructors saw video feedback as a richer medium for building student relationships by bridging interpersonal communication gaps, managing interpretations, reducing distance, and addressing improvements. These positive experiences reported by instructors demonstrate the potential benefits of stronger social presence in video feedback.

There are, however, also concerns about the instructors' reactions to using video feedback. While Wade (2016) found that some instructors reported positivity about making videos, some expressed concerns that they had to "look presentable" to make the videos, perhaps meaning that there was some self-doubt about being assessed on a new criterion: appearance (p. 72). Borup et al. (2014) found that instructors reported frustrations about conveying their emotions on camera unintentionally after years of written feedback. The instructor's morale and emotions are especially important when recording videos (Jones et al., 2012), as resulting negative feelings could be conveyed to students.

Another challenge with video feedback is a lack of consensus on whether it takes more or less time for instructors. Wade (2016) broadly reported it took instructors 30 minutes to two hours to grade each paper and leave videos. McCarthy (2015) reported it took 10 to 15 minutes to give feedback with audio, 20 minutes to give feedback in writing, and 20 to 25 minutes with videos. Silva (2012) compared video and written feedback. For the first paper, using only video feedback averaged 12 minutes whereas reading and writing comments averaged 20 minutes. For the second paper, using only video feedback averaged 20 minutes, while reading and commenting averaged 30 minutes.

Overwhelmingly, there is a lack of precision accounting for and reporting the time spent recording video feedback as compared to the time spent providing it in a written form. Borup et

al. (2014) said, "video appeared to be more time consuming and less convenient than providing text feedback" (p. 245). By contrast, Mathisen (2012) reported video feedback took "one quarter of the time" of written feedback for one instructor and that it was "much easier" for another (p. 107). Similarly, Lamey (2015) and Hyde (2013) vaguely reported that it took instructors "less time" when using only videos than leaving written feedback. After some initial technical issues, Jones et al. (2012) reported that it took tutors a similar amount of time to leave video feedback as written, saying this form of feedback "is no longer or shorter than that for traditional marking" (p. 594). None of these studies explained the time-tracking process or reported on the employment status of their instructors, creating questions about the validity and generalizability of findings.

Instructor skepticism might also arise if students do not take the feedback seriously or show improvement. Instructors in Wade's (2016) study reported concern that video feedback was "time consuming" and that there was no way of knowing if students understood it. Wei & Yanmei (2018) found that when students did not study task-specific written feedback and were not able to achieve better learning outcomes, instructors felt demoralized. Silva (2012) also expressed frustration when a student did not implement her feedback. Furthermore, Henderson and Phillips (2015) noted that "large volumes of feedback may be redundant, with only a proportion of the feedback being received by the student" (p. 62). To summarize, while existing research focused on the benefits and drawbacks of video feedback, little has been written on instructors' potential frustration with being required to do added work while experiencing one-way "social" presence; spending too much time leaving the video feedback; and not seeing positive results from the time invested. This raises the question of whether it is worth requiring instructors to provide video feedback when there is no evidence of what students are gaining from the experience and if it does indeed increase social presence. For part-time adjunct instructors, who make up a high percentage of all faculty positions (Flaherty, 2018), there seem to be few incentives to use their valuable teaching hours on social bonding. This can then lead to instructors experiencing negativity around their attempts at social presence.

Student Evaluations of Teaching (SETs)

While few studies have examined the relationship between quality of feedback and SETs, considerable scholarship has investigated the criteria students use to evaluate instructors. Hornstein (2017) claims students are often "dispassionate evaluators" (p. 3) and Bassett et al. (2017) found a similar pattern of students not putting much effort into their SETs. Liu (2012) also explained that first-year college students (the majority of the student population of this project's study) were found to provide the lowest rankings of instructors. Engagement seems to be a key factor in student assessment though, and personalities can be an influential factor in that and more evident via video. With videos, instructors may be able to communicate more effectively to students and increase their likeability, and one of the purposes of analyzing End of Course Survey (EOCS) data in this study was to test to see if that was the case.

Hornstein (2017) says positive evaluations of instructors on competence, likeability, communication skills and humor are correlated with higher student ratings. Williams and Ceci (1997) found that when instructors showed more enthusiasm through nonverbal cues, they received higher rankings. Additionally, studies have also found a relationship between higher SET scores and being seen as "open" (Kim & MacCann, 2018) or "motivating, helpful, explanatory, and accessible" (Phipps et al., 2006, p. 241). Therefore, it is arguable that videos could help instructors demonstrate passion for the topic through engagement with course content or use of pitch, tone

and volume to be more open and relatable, potentially increasing their likeability which could, in turn, translate into higher student engagement and then higher evaluation scores.

To respond to the gaps in existing literature on the instructor experience and address the concerns raised here, this study aims to examine instructor reactions to being required to provide video feedback, evaluate the impact of video feedback on the instructors' workload, and examine the differences in SETs in courses with and without the use of video feedback.

Methods

This exploratory research study followed a mixed-method strategy conducting short-answer anonymous surveys with instructors, collecting quantitative data for workload, and comparing the EOCS results in courses with and without the use of video feedback. This study was part of a larger project that investigated student performance as illustrated through grades earned and sentiment, as indicated through EOCS results.

At the university where this data was collected, all courses are five weeks long and adjunct instructors (the majority of the workforce) have a 12-hour workweek contract. Students take the course analyzed as part of their degree plan to fulfill the oral and interpersonal communication general education requirement. Participants were informed of the study at the beginning of the course and could opt-out of video feedback by contacting the instructor at any time during the course. Like in all courses at this university, the EOCS was optional and did not affect final grades.

Upon obtaining Institutional Review Board approval, researchers invited online instructors who regularly teach this course to participate in the project. Initially, ten instructors volunteered , but one dropped out. All instructors had between two and seven years of experience teaching this course, and three were co-authors of this paper. Eight of the nine instructors were part-time adjunct faculty and one was permanent full-time. Participating instructors received continuing learning credits as incentives for participation and signed informed consent. All three instructors who were both the participants and the authors were open to leaving videos and did not feel strongly either way. They likely represented the general sentiment of instructors, which was curiosity and a willingness to try a new feedback system mixed with a concern about the amount of time invested. Like the other instructors, they had some thoughts going into the study based on their personal experiences. Ultimately, all feedback was anonymous, with the exception of one instructor-researcher who recognized her own contributions in the data, and all researchers made an effort to go into the project with an open mind.

Data were collected on two sections with video feedback and two sections without video feedback for a total of four courses taught by each of the participating instructors, with a total of 36 courses reviewed. Instructors were asked to log all grading time and record the number of papers marked in each session. Data were also compiled using EOCS results for those same 36 courses.

The standard institutional grading guidelines at this institution include offering a variation of praise, constructive criticism, and suggestions for future improvement for written assignments both in the margins of the paper itself and in the "Summary Feedback" area of the gradebook. Due to the comparative nature of the study, instructors were advised to provide two types of feedback for two assignments in each of the four courses taught—written feedback in the non-video text-only (T) sections, and mixed text and video-feedback in the video (V) sections. For the T courses,

instructors were asked to offer in-text notes within the paper and summative text-based feedback in "Summary Feedback" area of the gradebook that followed the standard institutional grading guidelines. For the V courses, instructors were asked to offer in-text notes within the paper, record 3 to 4 minute feedback videos, and use pre-written templates for "A" through "F" work for the "Summary Feedback" area. Using these templates ensured that no work was added to providing "Summary Feedback" in V courses and that the measured difference was only in summative text-based feedback (T courses) versus creating the videos (V courses).

Two assignments were selected for this study. Instructors provided video feedback on the week 1 paper, which was a two-page paper where students explore assigned topics, and the week 3 paper, which was a five-page draft of the final paper. These two papers were selected with the assumption of having the most impact on the student experience. In week 1, a video could help establish an early bond with each student and provide specific information on the expectations for all written work in the class. In week 3, providing feedback on final paper drafts would help students improve their final papers. By weeks 4 and 5, it would then be possible to assess the impact that investment of feedback had on student sentiment, accounted for in the EOCS results.

Open-Ended Instructor Survey

Online open-ended surveys of the instructors were conducted for their ability to provide a broad overview of instructor sentiment and to allow future research to set up themes to explore through in-depth interviews. Instructors were asked the following eight questions to gauge their reactions to leaving videos:

Q1: What did you think of the video feedback element?

Q2: What did you think of the time allotment?

Q3: Did leaving video feedback change the way you approached feedback? If yes, explain.

Q4: Did using video feedback change your tone? If yes, explain.

Q5: Did using video feedback make you focus on advice for improvement?

Q6: Did you feel more connected with students in your classes where you left video feedback?

Q7: Did you feel you were more supportive in any way when using video?

Q8: What do you see as the pros and cons?

All answers were compiled into a single document and systematically analyzed. First, a number of positive versus negative sentiments was examined through the language expressed. Positive and negative sentiment was obvious by some saying the experience was "wonderful" while others said, "I am not too fond of it." If they were mixed, it was noted. Next, key words were highlighted and those phrases were used to compile a picture of instructor sentiment on each question.

Measuring Workload

Instructors logged time spent through online time-tracking software. Using an Excel spreadsheet, they also recorded the grading week/grading session, start time, end time, total minutes, and number of papers graded. Results accounted for each instructor and class

individually, determining the time spent on each grading session and time spent per paper, in both T and V courses.

EOCS Results

Data regarding EOCS were drawn from summary reports for each section. At the end of each course, all students were asked to complete evaluations voluntarily and provide anonymous feedback about their experiences, including assessing instructors on various categories. These reports provide the number of students responding and the percentage of responses for each score for each EOCS question. These were scored using a 0 to 4, 5-point Likert scale. Using the total number of responses for each survey and the percentage of responses at each level for each question, the responses for each question in each section were then reconstructed. Four of the sixteen provided questions were singled out for their focus on evaluating the quality of assignment feedback and recommending the instructor and the course:

- The instructor's feedback aligns with her/his communicated expectations.
- The instructor provides useful feedback for improving students' quality of work.
- I would recommend this instructor to another student.
- I would recommend this course to another student.

Data were then collected, and *t*-tests were conducted to determine if leaving video feedback impacted EOCS scores.

Results

Qualitative Survey Results—Short Answer Questionnaire Results

All participating instructors were asked to complete an open-ended survey following project completion. Eight out of nine instructors completed a survey. Results are presented below.

Q1: What did you think of the video feedback element?

For general impressions, six out of eight instructors were positive about using video feedback. They indicated videos to be a "wonderful addition," "interesting," "real," and "healthy." Some commented on nonverbal elements, mentioning s an important "visual" dimension which allowed them to create a "warm and friendly" atmosphere enabling them to explain things "in person."

There were two negative comments, but only one participant (not a study researcher) demonstrated complete negativity. In a mixed review, an instructor mentioned the connection was one-sided and resulted in feeling "personally insulted" when the student did not follow advice. The instructor also felt disappointed when student work did not appear to improve. The instructor who disliked the experience expressed dissatisfaction with video feedback due to time and technology challenges.

Q2: What did you think of the time allotment?

In terms of reflecting on time, there was at least one negative comment shared in six out the eight replies. Most mentioned that providing video feedback took too much time, with one instructor responding that it is still worthwhile because it is "better for the student," and another

noting that an adjustment to the grading plan for the week resolved the time issue. One instructor was concerned that a five-minute video could equal a half-hour upload time, and another pointed out that it took away from time s/he could have spent with the student in other areas. Another participant stated that making videos "requires faculty to make notes of student strengths and weaknesses in the assignment in order to provide constructive feedback the student can use to understand strengths and make improvements to future work." This demonstrates there is often preparatory time needed to make videos, and instructors expressed some frustration with feeling their work was not valued or acted upon even after extra time invested.

Q3: Did leaving video feedback change the way you approached feedback? If yes, explain.

Half of the respondents indicated a positive change, two were negative, and two were mixed. For those who felt a change in approach, responses ranged from requisite positivity to improvements in grading practices. One participant expressed feeling "obligated to have a smile on my face, even with potentially negative news…[to] soften the blow of negative feedback." Another valued the more detailed explanation of points as opposed to writing them out. Some mentioned paying more attention, having a "vested interest" in student success, and seeing an improvement in their T feedback.

Other participants did not change their approach to feedback. They stated that their practice is to engage with students throughout all other areas of the course and to be straightforward in both T and VT feedback. One participant explained that they used the “sandwich style” of T feedback (offering praise, constructive criticism, and positive suggestions, per institutional guidelines) and then applied a similar approach to videos, thus employing the same standard of practice via a different medium. In all, no-change participants felt adding video feedback was not different but another way of engaging with students.

Among negative experiences, a common frustration resulted from instructors feeling a lack of student actions toward suggested improvements in the VT courses, bringing to question whether instructors' video feedback was impactful. Two instructors said there was no evidence students were viewing or reacting to the video feedback. One said, “I was spending more time creating substantial feedback, but there wasn't evidence it was being utilized or valued.” Here, two instructors again had a "negative" experience with social presence, as they did not experience the returns on the invested time.

Q4: Did using video feedback change your tone? If yes, explain.

There were mixed reviews, with five of eight instructors stating it did not change their delivery. One instructor worried about sounding "worn out" or "bored" by the end of a video session. This instructor indicated feeling bad about delivering negative news but could not offer an entirely sympathetic connection because it was one-sided. Adding to this, the instructor felt "emotional distress when I had to tell someone they receive a failing grade."

Others said it was easier to be supportive via video through smiling, encouraging, or empowering students, where "a smiling face and kind tone are better received than written feedback, especially if the grade is low." One instructor mentioned that they were able to fully demonstrate personal concern and investment.

Q5: Did using video feedback make you focus on advice for improvement?

Here instructors were more positive, with five of the eight stating that it allowed them to focus on how the students could improve. One of the instructors said they created "mini lessons" to help them overcome their struggles, that they could offer advice rather than just focus on what was wrong and noted that they looked more closely at each assignment.

Two of the instructors were more negative in their responses, saying videos did not make a difference in their advice, as they felt that it would either be taken or not regardless of delivery style. One instructor felt comments were repetitive in both video feedback weeks. The instructor said that for both T and V feedback, students did not follow the advice, reiterating the feeling that students did not appreciate the effort, or the instructor felt no return on the time investment of leaving the videos.

Q6: Did you feel more connected with students in your classes where you left video feedback?

When asked about their feelings of being "connected" to students, three of the eight reported a change, four reported none, and one reported mixed feelings. Out of the four instructors who indicated no connection, one said that any connection felt was short-lived in first few minutes of leaving feedback. Others were frustrated, with one saying they felt unheard by and disconnected from students. Another respondent shared that no one responded to the videos or commented that they helped, so the instructor felt disappointed that students were not engaged. Instructors felt negative about the experience because of a false sense of "connection."

From those who responded with positivity and indicated a feeling of connectedness to their students, they received more texts and emails when they left video feedback, and felt the students appeared to be more connected with the instructor.

Q7: Did you feel you were more supportive in any way when using video?

Instructors were more united in stating that the videos allowed them to be more supportive, with only one of the eight disagreeing Some said they smiled more to be positive and encouraging, that they felt advocacy for the student, that it was "much more personal," and that they could be "up beat [sic] and energetic." However, this same instructor said, "This was the only way I felt I was more supportive since written feedback lacks nonverbals."

Commenting more on the dynamic of leaving VT feedback, one instructor said, "It was like I was talking with them, not typing to them," which lends support to emotional connectedness. Another said, "I had to sometimes force a smile and I think that smile actually forced my brain to be more positive and encouraging. I wanted them to see that they had an advocate who would work for them." So, for some, leaving the videos led to a change in how they felt about the experience or their tone. Reiterating this point, an instructor said, "I think what the video did was provide me an opportunity for them to see me and hear me and know that it is not just words, that I am really invested in them as students." Here, T communication is seen as being less powerful than spoken.

To sum up, these instructors felt the medium altered the experience and led to a change of the tone of the message and potentially message reception.

Q8: What do you see as the pros and cons?

Responses were mixed based on those who enjoyed the experience and those who did not. One respondent remarked "for me, it is all cons" and one said "I do not see any cons." In four

replies there were more pros listed than cons, in three there were more cons than pros listed, and in one there was an even split.

For the positives, instructors mentioned feeling more connected, real, positive, and that they offered actionable advice. One indicated full appreciation for the practice and expressed a desire for video feedback to become a standard part of their future grading process. Another said the videos "forced me to be more positive, with a smile on my face. That smile did translate into being more positive and offering more forward-looking advice."

The most persistent complaint was about the workload increases, with six mentioning time as a challenge. One said the con was "the time it took and the lack of student satisfaction." Among others, video feedback was indicated as physically and emotionally taxing, that it did not lead to change, that it was time wasted, and redundant. Another said, "The time angle can be a problem as it takes longer to video them. I have to video it on my computer then upload it."

Two instructors raised doubts about whether students were watching the videos. One said:

> I am not sure students were watching it, just as I am not sure they read the [standard] feedback. Student [sic] who do well do not need video feedback, and students who do poorly and NEED it do not read it.

Similarly frustrated, another said:

> … it felt like my time in class was wasted giving redundant feedback no one listened to. I became offended about it after doing this a few times and tried less in the class because I felt like they didn't care.

Two other instructors mentioned that they faced persistent technological issues. Because of the added time and frustration with technology, one instructor was frank in expressing uncertainty that they would "want to teach under these conditions."

While some instructors enjoyed the project, others had a bad experience making the videos and struggled seeing any value in it. Calculations of time spent leaving videos is now offered to gain a better understanding of if and how much leaving videos adds to instructor workload.

Workload

One of the critiques offered in the literature review was that there was limited formal tracking of time spent grading in classes with and without video-based feedback. To address this, participants in this study tracked the time they spent providing feedback on two papers in four courses for a total of eight.

There was a great deal of variation in how much time instructors spent grading and giving feedback and a considerable difference in the number of students who submitted papers in each class. Therefore, an accounting of how much total time was spent and time spent per paper is offered to give a more realistic picture of how much time leaving videos adds to instructor workload. It is also important to note that two instructors faced significant technological issues. One instructor was not able to get the learning management system (LMS) video function to work, so they recorded each video and uploaded a link for students. Another instructor abandoned the plan of using the internal video system and offered students video feedback by sending an attached video file for one of the assignments. These challenges led to a significant increase in hours for both participants. Others used the video software embedded within Canvas, the LMS used by the school, without reported technical issues.

Week 1 Papers

As Table 1 indicates, it took significantly more time to provide students with V feedback than T feedback on Week 1 papers. In all 18 courses combined, it took almost 37 more hours to leave V (which included preparation, creation, and upload time) vs. T feedback. When dividing this by the 18 V courses, it added an average of over one hour to each instructor's grading session, or two hours of work for each course (however, even these numbers varied significantly).

Table 1

Week 1 Paper: Time Comparisons between Video (V) and Text-only (T)

	V	Text-only T	Difference
Total hours spent:	94.6 hrs.	57.7 hrs.	36.95 hrs.
Average hours spent per class:	5.26 hrs.	3.21 hrs.	2.05 hrs.

Table 2 offers the average number of minutes instructors spent on each paper and the variation of time spent on the Week 1 papers. For the T feedback, instructors ranged from spending 3.42 to 14 minutes on each paper. For the V feedback, they spent between 9 and 28 minutes. The average went from 8.78 to 14.34 minutes spent per paper (a 63% increase).

Table 2

Week 1: Time Spent Per Paper (*n* = 27) *for Video (V) and Text-only (T)*

	V	T	Difference
Average minutes per paper (*n* = 27):	14.34	8.78	5.55
Range of minutes per paper (*n* = 27):	9.03–28.31	3.42–14.22	5.61–15.29

Given that on average instructors at this institution see about 27 week 1 papers in any given class, Table 2 indicates video feedback would add an average of 149.85 minutes (27 x 5.55) to each V grading session, which is 2.5 hours (again a 63% increase).

Instructors were asked to leave 3- to 4-minute videos. Many instructors left shorter videos (see Table 3). On average, in week 1, instructors left videos that were 2.64 minutes long. Combined video lengths per class ranged from 19.25 to 94 minutes, with an average of 51.63 minutes of video left in week 1.

Table 3

Week 1: Length of Feedback Videos (n = 353)

Total length of videos, combined	Average length of all videos, combined, per class (*n* = 18)	Average length of video
929.40 minutes	51.63 minutes	2.64 minutes

Week 3

The week 3 papers were longer (roughly five pages versus two pages in Week 1) and therefore the grading sessions were typically longer. In the T courses, it took 70.9 hours to leave feedback on papers, averaging 3.94 hours for each grading session. In the V courses, it took 95.35 hours, averaging 5.3 hours for each instructor. Therefore, videos added 24.4 hours to total instructor time and this was an average of an additional 1.36 hours per instructor (a 35% increase). It should be noted that fewer papers are submitted in Week 3, as students drop or stop participating. Because of this, it is essential to consider the time spent per-paper.

Table 4
Week 3: Time Comparisons between Video (V) and Text-only (T)

	V	T	Difference
Total minutes spent (all instructors):	5,721 (95.35 hours)	4,257 (70.9 hours)	1,464 (24.4 hours)
Average minutes spent (per class):	317.83 (5.3 hours)	236.5 (3.94 hours)	81.33 (1.36 hours)

On average, it took 11.84 minutes to grade and give feedback per paper in the T class and 15.98 minutes in the V class (see Table 5). Videos then added 4.14 minutes per paper, which is again a 35% increase. As the table demonstrates, instructor grading time varied significantly.

Roughly 23 students end up submitting the week 3 paper. Under that assumption, it would add about 95 minutes (23 x 4.14) to the instructor workload this week, or 1.58 hours, which is again a 35% increase (see table 5).

Table 5
Week 3: Time Spent Per Paper ($n = 23$) *for Video (V) vs. Text-only (T)*

	V	T	Difference
Average minutes per paper ($n = 23$):	15.98	11.84	4.14
Range of minutes per paper ($n = 23$):	7.66–22.2	4.36–18.42	3.3–3.78

EOCS Results

There were 329 student responses to the surveys for both classes (V = 174 students, and T = 154 students), yielding an n of 328 for each test in this section. The results of an independent samples t-test to compare answers in V and T courses found no significant difference ($p < 0.05$) for any of the questions (see Table 7). The use of video feedback does not appear to result in a change of student perceptions related to the instructor or course.

Table 7
Comparison of Student Feedback Results in Video (V) and Text-only (T) Surveys

	V		T			
Question	***M***	***SD***	***M***	***SD***	***t*(326)**	***p***
The instructor's feedback aligns with her/his communicated expectations.	4.36	1.04	4.48	0.93	-1.06	0.28
The instructor provides useful feedback for improving students' quality of work.	4.44	0.98	4.58	0.75	-1.87	0.06
I would recommend this instructor to another student.	4.13	1.27	4.3	1.15	-1.27	0.20
I would recommend this course to another student.	4.20	1.16	4.29	1.14	0.67	0.50

Discussion

Overall, this study found leaving videos led to mixed reactions from instructors (similar to results from Wade, 2016), increased workload (in line with findings from Borup et al., 2014, and McCarthy, 2015), and did not significantly impact EOCS scores. Within the qualitative data, there were mixed feelings about the experience, with some instructors demonstrating excitement and others disappointment. About half of the instructors enjoyed leaving videos and found value in the idea, while the other half felt they were frustrating or meaningless. When listing the pros and cons, which share the instructors' overall attitude about the experience, four listed more pros than cons, three listed more cons, and one was even. Those who viewed the experience as "warm" or "real" may have felt a personal connection with their students by utilizing video feedback, extending findings of McCarthy (2015), Thompson and Lee (2012), and West and Turner (2015), who found similar results. Those who were disappointed felt a lack of social connection to their students, or a negative social presence, as their efforts at social connection felt lost. This extends the concerns raised by Silva (2012) and Wei and Yanmei (2018), who reported being frustrated that students did not act upon the feedback given to them. One of the assumptions of social presence is the idea of interaction and mutual connectedness (Biocca et al., 2003; Hwang & Park, 2007). In this study, some instructors felt otherwise, indicating a one-way transaction instead of "interaction." Supporting the work of Lamey (2015), instructors noted that the videos were "one-sided," that instructors could not see students' reactions, and they questioned whether the students were even watching them. Some instructors also acknowledged that their recommendations were not "utilized or valued," and described providing feedback on failing papers as "distressing." On the positive side, similar to Henderson and Phillips (2015), instructors acknowledged that video feedback provided a space to foster students' improvement. Instructors expressed that they could provide verbal mini-lessons or offer specific direction with more ease than T feedback, and through this, felt more connected and invested.

Providing video feedback could also be overwhelming and tiring for the instructor. Those instructors who feel frustrated by the video-making/posting process or discouraged by a lack of student reaction may have negative experiences with attempts at social presence. Dissatisfaction

with providing videos could potentially translate into an unfavorable experience with presence, which could be subtly conveyed through the instructor's tone (Hughes et al., 2007). Therefore, it is relevant to recognize that this video-based social presence might not always be positive. Instructors expressed concerns that their recorded verbal messages may come off as harsh or too flippant, and that nonverbal signals can produce unintended impressions, creating barriers or distance that might not exist in T feedback. Finally, concerns that students might not understand the feedback or feel that it was "useful" align with similar findings as Wade (2016).

In line with Borup et al (2014) and McCarthy (2015), results of the quantitative data indicated that leaving videos requires a lot more time, adding to instructor workload, and creating a considerable variation in the time spent providing feedback. This study found an increase of one to two hours of work for instructors per week. Some technology concerns (also raised in Borup et al., 2014; McCarthy, 2015; & Wade, 2016) further complicated the process and created additional frustration and workload issues. For example, being unable to get the LMS video-system to work in a reasonable amount of time led one instructor to working beyond the 12-hour contract and finding alternative delivery methods. It took an average of 10.26 minutes for each paper in the T courses and 15.15 minutes for each in the V courses, even if the videos were only an average of 2.59 minutes long. When considering a requirement to provide video feedback, it might be necessary to assess the time it typically takes to complete grading. Within a 12-hour weekly pay period, video feedback required up to 2 hours per week of additional grading. For those who struggled to provide timely feedback, or had issues with technology, there were significant added time commitments. Therefore, leaving videos can require valuable work time and could lead to instructors cutting time in other important areas (e.g., preparing content or participating in discussions), to compensate for this loss.

Finally, there was no significant relationship between leaving videos and EOCS results, which may extend studies that found no clear link between leaving videos and improved learning outcomes (see Mathisen, 2012; Mayhew, 2016) and the fickleness of student evaluators (see Bassett et al., 2017; Hornstein, 2017). Within the quantitative EOCS results, no connection was found between leaving videos and improved scores on the four survey questions analyzed. This lack of improved EOCS scores could have led to a demoralization for instructors as well. After they put many more hours into the feedback, absence of seeing a significant impact could hurt one's morale and thus cause "negative" feelings about any attempts at social presence. Experiencing increased workload without seeing concrete results in instructor evaluation scores seems to also have been distressing.

Limitations and Future Directions

One of the limitations of this exploratory study is the relatively small number of courses and instructors that were evaluated. A total of nine instructors monitored 36 courses—a small percentage of the number of instructors who teach the course sections. Future research should include a larger number of participating instructors, which will allow for expanded data collection.

The instructor teaching style may have created biased opinions about video feedback. Beginning with an already relatively small pool of potential participants, it is possible that instructors who volunteered had a predetermined bias about the study, thus confining the results and limiting their generalizability. Future studies should employ a random sampling of volunteers and assess a larger number of courses to allow for better representation in the results.

Feedback was a significant element in this study, yet its evaluation was confined to presence or absence only, limiting the results. Researchers focused exclusively on comparing the presence or absence of V and T feedback. Since there was no intent to assess the variations of verbal and nonverbal cues, students' reactions to the feedback, or the quality of that feedback, it was not possible to examine the exact impact V feedback played on students' perceptions of effectiveness. Future research should conduct in-depth interviews and a more systematic data analysis.

Finally, this study did not assess student access to video feedback. Participating instructors raised questions about whether or not students were viewing the videos, so it was not possible to establish if student performance was affected. Understanding how and when students utilize feedback may give insight on how to create useful content that promotes connectedness and learning.

Conclusion

This study examined the personal reactions of instructors to leaving V and T feedback, workload, and the effect on student evaluations in V and T courses. Individual instructor experiences varied. Some experienced positive social presence and embraced the value of video feedback in their courses. Others expressed negative social presence and frustration about their messages being ignored and seeing the extra work as meaningless. Results determined there is a slight to heavy increase in the worktime devoted to providing video feedback, which may lead to negative teaching experiences. This could be especially frustrating to adjuncts, who are being paid for a set number of hours. Contingent workers are already stretched with 89% reporting working for at least two universities, and 27% working for at least three (Douglas-Gabriel, 2019, para. 9). Furthermore, EOCS evaluations showed no persistent improvements. The combination of little change to instructor scores and the additional workload makes it difficult to justify advising the use of video feedback; however, instructors who enjoy using V feedback shouldn't be dissuaded from adding it to their pedagogy. But if the goal is improved student learning through V feedback, instructors need to see some validation of their work in order to motivate both institutions and instructors in adopting this practice.

References

Akcagoglu, M., & Lee, E. (2016). Increasing social presence in online learning through small group discussions. *International Review of Research in Open and Distance Learning, 17*(3). https://doi.org/10.19173/irrodl.v17i3.2293

Anson, C. M., Dannels, D. P., Laboy, J. I., & Carneiro, L. (2016). Students' perceptions of oral screencast responses to their writing: Exploring digitally mediated identities. *Journal of Business and Technical Communication, 30*(3), 378–411. https://doi.org/10.1177/1050651916636424

Bassett, J., Cleveland, A., Acorn, D., Nix, M., & Snyder, T. (2017). Are they paying attention? Students' lack of motivation and attention potentially threaten the utility of course evaluations. *Assessment & Evaluation in Higher Education*, *42*(3), 431–442. https://doi.org/10.1080/02602938.2015.1119801

Biocca, F., Harms, C., & Burgoon, J. K. (2003). Toward a more robust theory and measure of social presence: Review and suggested criteria. *Presence: Teleoperators & Virtual Environments, 12*(5), 456–480. https://doi.org/10.1162/105474603322761270

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. doi: 10.1016/j.iheduc.2011.11.001

Borup, J., West, R. E., &. Thomas, R. (2015). The impact of text versus video communication on instructor feedback in blended courses. *Educational Technology Research and Development 63*(2), 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. *International Review of Research in Open and Distance Learning, 15*(3), 232–256. https://doi.org/10.19173/irrodl.v15i3.1821

Campbell, H. E., Gerdes, K., & Steiner, S. (2005). What's looks got to do with it? Instructor appearance and student evaluations of teaching. *Journal of Policy Analysis and Management*, 611–620. https://doi.org/10.1002/pam.20122

Carless, D. (2006). Differing perceptions in the feedback process. *Studies in Higher Education*, *31*(2), 219–233. https://doi.org/10.1080/03075070600572132

Clark, C., Strudler, N., & Grove, K. (2015). Comparing asynchronous and synchronous video vs. Text based discussion in an online teacher education course. *Online Learning, 19*(3), 48–69.

Crim, S. J. (2006). *An examination of social presence in an online learning environment* [Doctoral dissertation, The University of Louisville]. The University of Louisville's Institutional Repository. https://doi.org/10.18297/etd/291

Culver, S. (2010). Course grades, quality of student engagement, and students' evaluations of instructor. *International Journal of Teaching and Learning in Higher Education, 22*(3), 331–336.

Dolan, V. (2011). The isolation of online adjunct faculty and its impact on their performance. *International Review of Research in Open and Distance Learning, 12*(2), 62–77. doi: 10.19173/irrodl.v12i2.793

Douglas-Gabriel, D. (2019, February 15). "It keeps you nice and disposable": The plight of adjunct professors. *The Washington Post*. https://www.washingtonpost.com/local/education/it-keeps-you-nice-and-disposable-the-plight-of-adjunct-professors/2019/02/14/6cd5cbe4-024d-11e9-b5df-5d3874f1ac36_story.html

Dunlap, J. C. (2005). Workload reduction in online courses: Getting some shuteye. *Performance Improvement*, *44*(5), 18–25. https://doi.org/10.1002/pfi.4140440507

Flaherty, C. (2018, October 12). *A non-tenure track profession?* Inside Higher Ed. https://www.insidehighered.com/news/2018/10/12/about-three-quarters-all-faculty-positions-are-tenure-track-according-new-aaup

Garrison, D. R., Anderson, T., & Archer, W. (2009). 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

Gaytan, J., & McEwen, B. C. (2007). Effective online instructional and assessment strategies. *The American Journal of Distance Education, 21*(3), 117–132. doi: 10.1080/08923640701341653

Griffiths, M. E., & Graham, C. R. (2009). The potential of asynchronous video in online education. *Distance Education, 6*(2), 13–22.

Gonyea, N. E, Osick, M., & Bradley E. G. (2018). An evaluation of the relationship between instructor appearance and college student evaluations of teaching. *Journal of Research in Education, 28*(2), 66–92.

Government Accountability Office. (2017, October 19). Size, characteristics, compensation, and work experiences of adjunct and other non-tenure-track faculty. https://www.gao.gov/products/GAO-18-49

Gunawardena, N., & Zittle, F. J. (1997). Social presence as a predictor of satisfaction within a computer-mediated conferencing environment. *American Journal of Distance Education, 11*(3), 8–26, doi: 10.1080/08923649709526970

Hamermesh, D. S., & Parker, A. (2005). Beauty in the classroom: Instructors' pulchritude and putative pedagogical productivity. *Economics of Education Review*, *24*, 369–376. https://doi.org/10.1016/j.econedurev.2004.07.013

Hattie, J., & Temperley, H. (2007). The power of feedback. *Review of Educational Research*, *77*(1), 81–112. doi.org/10.3102/003465430298487.

Henderson, M., & Phillips, M. (2015). Video-based feedback on student assessment: Scarily personal. *Australasian Journal of Educational Technology, 31*(1), 51–66. https://doi.org/10.14742/ajet.1878

Hornstein, H. (2017). Student evaluations of teaching are an inadequate assessment tool for evaluating faculty performance. *Cogent Education*, *4*, 1–8. http://dx.doi.org/10.1080/2331186X.2017.1304016.

Hostetter, C., & Busch, M. (2013). Community matters: Social presence and learning outcomes. *Journal of the Scholarship of Teaching and Learning, 13*(1), 77–86.

Hughes, M., Ventura, S., & Dando, M. (2007). Assessing social presence in online discussion groups: A replication study. *Innovations in Education and Teaching International*, *44*(1), 17–29. doi: 10.1080/14703290601090366

Hyde, E. (2013). Talking results—trialing an audio-visual feedback method for e-submissions. *Innovative Practice in Higher Education, 1*(3).

Hwang, H. S., & Park S. (2007) Being together: User's subjective experience of social presence in CMC environments. In J. A. Jacko (Ed.), *Human-computer interaction: Interaction design and usability*. Springer. https://doi.org/10.1007/978-3-540-73105-4_93

Ice, P., Curtis, R., Phillips, P., & Wells, J. (2007). Using asynchronous audio feedback to enhance teaching presence and students' sense of community. *Journal of Asynchronous Learning Networks*, *11*(2), 3–25. https://doi.org/10.24059/olj.v11i2.1724

Johnson, M., Narayanan, A., & Sawaya, W. (2013). Effects of course and instructor characteristics on student evaluation of teaching across a college of engineering. *Journal of Engineering Education, 102*(2), 289–318. https://doi.org/10.1002/jee.20013

Jones, N., Georghiades, P., & Gunson, J. (2012). Student feedback via screen capture digital video: stimulating student's modified action. *Higher Education*, *64*(5), 593–607. https://doi.org/10.1007/s10734-012-9514-7

Jung, I., Choi, S., Lim, C., & Leem, J. (2002). Effects of different types of interaction on learning achievement, satisfaction and participation in web-based instruction. *Innovations in Education and Teaching International*, *39*(2), 153–162. https://doi.org/10.1080/14703290252934603

Jusoff, K., & Khodabandelou, R. (2009). Preliminary study on the role of social presence in blended learning environment in higher education. *International Education Studies*, *2*(4) 79–83. https://doi.org/10.5539/ies.v2n4p79

Killingback, C., Ahmed, O., & Williams, J. (2019). 'It was all in your voice'—Tertiary student perceptions of alternative feedback modes (audio, video, podcast, and screencast): A qualitative literature review. *Nurse Education Today*, *72*, 32–39. doi: 10.1016/j.nedt.2018.10.012.

Kim, L. E., & MacCann, C. (2018). Instructor personality matters for student evaluations: Evidence from two subject areas at university. *British Journal of Educational Psychology*, *88*(4), 584–605. https://doi.org/10.1111/bjep.12205

Krause, J., Portolese, L., & Bonner, J. (2017). Student perceptions of the use of multimedia for online course communication. *Online Learning, 21*(3)*,* 36–49. doi:10.24059/olj.v21i3.119

Lamey, A. (2015). Video feedback in philosophy. *Metaphilosophy, 46*(4–5), 691–702. doi: 10.1111/meta.12155

Landrum, R. E., & Dillinger, R. J. (2004). The relationship between student performance and instructor evaluations revisited. *Journal of Classroom Interaction, 39*(2), 5–9.

Liu, O. L. (2012). Student evaluation of instruction: In the new paradigm of distance education. *Research in Higher Education*, *53*(4), 471–486. doi: 10.1007/s11162-011-9236-1

MacNell, L., Driscoll, A., & Hunt, A. (2015). What's in a name: Exposing gender bias in student ratings of teaching. *Innovation in Higher Education, 40,* 291–303. https://doi.org/10.1007/s10755-014-9313-4

Mathisen, P. (2012). Video feedback in higher education - a contribution to improving the quality of written feedback. *Nordic Journal of Digital Literacy, 7*(2), 97–116. https://www.idunn.no/dk/2012/02/video_feedback_in_higher_education_-_a_contribution_to_impr

Mayhew, E. (2017). Playback feedback: The impact of screen-captured video feedback on student satisfaction, learning and attainment. *European Political Science, 16*(2), 179–192. doi:10.1057/eps.2015.102

McCarthy, J. (2015). Evaluating written, audio and video feedback in higher education summative assessment tasks. *Issues in Educational Research, 25*(2), 153–169. https://search.informit.com.au/documentSummary;dn=376762809256535;res=IELHSS

Mengal, F., Sauermann, J., & Zolitz, U. (2019). Gender bias in teaching evaluations. *Journal of the European Economic Association*, *17*(2), 535–556. https://doi.org/10.1093/jeea/jvx057

Mitchell, K., & Martin, J. (2018). *Gender bias in student evaluations*. American Political Science Association. doi: 10.1017/S104906518000001X.

Naftulin, D., Ware, J., & Donnelly, F. (1973). The Doctor Fox lecture: A paradigm of educational seduction. *Journal of Medical Education, 48*, 630–635.

Parton, B. S., Crain-Dorough, M., & Hancock, R. (2010). Using flip camcorders to create video feedback: Is it realistic for professors and beneficial to students? *International Journal of Instructional Technology & Distance Learning.* http://www.itdl.org/Journal/Jan_10/article02.htm

Peacock, S. & Cowan, J. (2019). Promoting a sense of belonging in online learning communities of inquiry in accredited courses. *Online Learning, 23*(2), 67–81. doi: 10.24059/olj.v23i2.1488

Phipps, S. D., Kidd, R. S., & Latif, D. A. (2006). Relationships among student evaluations, instructor effectiveness, and academic performance. *Pharmacy Education*, *6*(4), 237–243. doi: 10.1080/15602210600886175

Richardson, J., & Swan, K. (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction. *Journal of Asynchronous Learning Networks, 7*(1), 68–88. http://hdl.handle.net/2142/18713

Rose, K. K. (2009). Student perceptions of the use of instructor-made videos in online and face-to-face classes. *Journal of Online Learning and Teaching*, *5*(3). https://jolt.merlot.org/vol5no3/rose_0909.htm

Seaton, J. X., & Schwier, R. (2014). An exploratory case study of online instructors: Factors associated with instructor engagement. *International Journal of E-Learning & Distance Education, 29*(1), 1–16. http://ijede.ca/index.php/jde/article/view/870/1536

Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications*. John Wiley.

Silva, M. L. (2012). Camtasia in the classroom: Student attitudes and preferences for video commentary or Microsoft word comments during the revision process. *Computers and Composition, 29*(1), 1–22. https://doi.org/10.1016/j.compcom.2011.12.001

Spears, L. R. (2012). *Social presence, social interaction, collaborative learning, and satisfaction in online and face-to-face courses* [Doctoral dissertation, Iowa State University]. Iowa State University Digital Repository. https://lib.dr.iastate.edu/etd/12976

Swan, K., & Shih, L. F. (2005). On the nature and development of social presence in online course discussions. *Journal of Asynchronous Learning Networks, 9*(3), 115–136.

Tao, Y. (2009). *The relationship between motivation and online social presence in an online class* [Doctoral dissertation, University of Central Florida]. STARS Digital Library, University of Central Florida. https://stars.library.ucf.edu/etd/3871/

Thompson, R. & Lee, M. (2012, February 17). Talking with students through screencasting: Experimentations with video feedback to improve student learning. *The Journal of Interactive Technology & Pedagogy*, *1*. https://jitp.commons.gc.cuny.edu/talking-with-students-through-screencasting-experimentations-with-video-feedback-to-improve-student-learning/

Tu, C. (2002). The impacts of text-based CMC on online social presence. *The Journal of Interactive Online Learning, 1*(2), 1–24. http://openknowledge.nau.edu/id/eprint/2913

Tu, C. H., & McIsaac, M. (2002). The relationship of social presence and interaction in online classes. *The American Journal of Distance Education*, *16*(3), 131–150. https://doi.org/10.1207/s15389286ajde1603_2

Wade, N. N. (2016). *The face of feedback: Exploring the use of asynchronous video to deliver instructor feedback in multidisciplinary online courses* [Doctoral dissertation, Wayne State University]. Wayne State University Digital Commons. https://digitalcommons.wayne.edu/cgi/viewcontent.cgi?article=2490&context=oa_dissertations

Ware, J., & Williams, R. (1975). The Dr. Fox effect: A study of lecturer effectiveness and ratings of instruction. *Journal of Medical Education, 40,* 149–156.

Wei, W., & Yanmei, X. (2018). University teachers' reflections on the reasons behind their changing feedback practice. *Assessment & Evaluation in Higher Education*, *43*(6). doi: 10.1080/02602938.2017.1414146.

West, J., & Turner, W. (2016). Enhancing the assessment experience: Improving student perceptions, engagement and understanding using online video feedback. *Innovations in Education and Teaching International, 53*(4), 400–410. https://doi.org/10.1080/14703297.2014.1003954

Wiggins, G. (2012). Seven keys to effective feedback. *Feedback*, *70*(1), 10–16.

Williams, W. M., & Ceci, S. J. (1997). How'm I doing? Problems with student ratings of instructors and courses. *Change, 29*(5), 12–23. https://doi.org/10.1080/00091389709602331

Wise, A., Chang, J., Duffy, T., & Del Valle, R. (2004). The effects of social presence on student satisfaction, engagement and learning. *Educational Computing Research, 31*(3), 247–271. https://doi.org/10.2190/v0lb-1m37-rnr8-y2u1

Witt, P., & Kerssen-Griep, J. (2011). Instructional feedback I: The interaction of facework and immediacy on students' perceptions of instructor credibility. *Communication Education, 60*(1), 75–94. doi:10.1080/03634523.2010.507820

Wood, K. A., Moskovitz, C., & Valiga, T. M. (2011). Audio feedback for student writing in online nursing courses: Exploring student and instructor reactions. *Journal of Nursing Education, 50*(9), 540–543. https://doi.org/10.3928/01484834-20110616-04

Faculty Perceptions of Online Teaching at a Midsized Liberal Arts University

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Abstract
In this mixed-methods study, faculty perceptions of online teaching at a midsized liberal arts university were examined to better understand faculty acceptance and participation in online teaching at the university. Seventy-nine participants responded to a survey that collected qualitative and quantitative data. Content analysis of faculty perceptions of online teaching was employed and resulted in the identification of six themes. An examination of 21 quantitative factors identified 17 factors reported by more than 50% of respondents to influence their decision to teach or not teach online. Study participants perceived online learning as attractive to students but they wanted any online courses carefully regulated, in part because online learning was seen as contrary to their teaching values. Participants were influenced by personal preferences but also the desire for robust faculty resources, as well as more effective technology and infrastructure. Implications and directions for future research were discussed.

Keywords: online teaching, liberal arts, faculty perceptions, incentives, barriers, mixed methods, survey

Shreaves, D.L., Ching, Y.-H., Uribe-Florez, L., & Trespalacios, J. (2020). Faculty perceptions of online teaching at a midsized liberal arts university. *Online Learning, 24*(3), 106-127. https://doi.org/10.24059/olj.v24i3.2199

Faculty Perceptions of Online Teaching at a Midsized Liberal Arts University

Education is evolving from the influence of technology. This trend is especially evident in the field of online education. While campus enrollments in higher education have declined across the United States, online learning has shown steady or increasing growth (Seaman et al., 2018). However, many faculty members who teach in higher education have resisted the idea of teaching online and view online education with fear or disdain (e.g., Allen & Seaman, 2015; Allen et al., 2012; Mitchell et al., 2015; Vivolo, 2016). Researchers have examined issues affecting faculty participation in online education. Nevertheless, faculty acceptance of online education has

remained unchanged at an acceptance rate of only 30% (Allen & Seaman, 2015). If online education is to succeed in an institution, the faculty must accept and participate in online teaching (Schopierary, 2006).

For institutions looking to offset the revenues lost from declining enrollments, online learning offers an opportunity for new revenue sources. Despite substantial research on the benefits afforded by learning online, institutions of higher education continue to observe faculty resistance to teaching online (Mitchell et al., 2015; Vivolo, 2016). To recruit and retain online instructors, institutions must understand the issues that affect the faculty's willingness to teach online. Little research has been conducted to specifically examine the perceptions of online education among liberal arts faculty, who may resist attempts to change the instructional practices that have traditionally formed the foundation of a liberal arts education. Therefore, the purpose of this study was to examine how faculty perceived online teaching at a midsized liberal arts university in order to understand faculty acceptance and participation in online teaching at the university. This study was guided by the following research questions:

1. How do faculty perceive online teaching and learning at a liberal arts university?
2. What factors are reported to affect faculty's decision to teach or not teach online at a liberal arts university?

Review of Relevant Literature

Liberal Arts Teaching

Researchers on liberal arts education (Deneen, 2014; Thompson, 2015; Wells, 2016) noted the tension between faculty's desire to survive during times of change and the desire to maintain the distinct characteristics that liberal arts education has cultivated for over a hundred years. Clark (1987) described stark differences in the academic life of faculty in research universities, liberal arts colleges, and community colleges. Clark (1997) noted that faculty in middle-level, liberal arts colleges often claimed their relationships with students were highly valued in their careers as academic professionals. Faculty who have chosen to teach at a liberal arts institution may be especially resistant to attempts to change their pedagogical practices (Baker & Baldwin, 2015) and could perceive online teaching as threatening or outright incompatible with their teaching practices. Therefore, it is important to study faculty perceptions of online teaching at liberal arts institutions to better understand the unique perspectives of this demographic.

Factors Influencing Faculty Participation in Online Teaching

When analyzing factors that affect faculty members' perception of online teaching, some researchers broadly grouped these variables into two categories: (1) encouraging factors, also called incentives, bridges, or motivators, and (2) discouraging factors, also called obstacles, barriers, or de-motivators (Bacow et al., 2012; Berge, 1998; Haber & Mills, 2008; Herman, 2013; Maguire, 2005; Shea, 2007).

Factors that Encourage Online Teaching

Five categories of factors that encourage online teaching are: personal challenge and satisfaction, flexibility and convenience, greater student access, unique instructional options, and institutional rewards and recognition. Faculty may be energized by the opportunity to grow personally and professionally through learning new technology and teaching skills (Shea, 2007).

Professional development for online teaching can enhance faculty's face-to-face teaching as well as their confidence, motivation, and attitudes towards online learning (Borup & Evmenova, 2019). The flexibility afforded by asynchronous online teaching and the possibility of reaching a wider audience of learners can be an incentive for faculty to teach online (Allen & Seaman, 2008; Maguire, 2005; Schopieray, 2006; Shea, 2007; Wasilik & Bollinger, 2009). Another key motivator for many faculty is the ability to teach any time or place, which may improve work-life balance or allow more opportunities for research, travel, or family care (the most important motivator that encouraged faculty in their studies to teach online was the ability to teach any time or place that allow faculty to improve their work-life balance or incorporate more opportunities for research, travel, or family care (Hiltz et al., 2007; Shea, 2007). .

Faculty may be motivated by the possibility of using new, technology-enabled strategies for teaching and learning, including the possibility of more adaptive and personalized learning (Dooley & Murphrey, 2000). Some studies suggested that online learning provides faculty with attractive options for increasing peer-to-instructor and peer-to-peer communications (Wasilik & Bollinger, 2009). For instance, in an online, asynchronous forum, all students could be given an equal opportunity to communicate. This may especially benefit introverted students, second-language students, or those who would have missed class conversations due to an absence (Hiltz et al., 2007). Finally, when considering online teaching, faculty may strongly consider whether their institution recognizes and rewards such efforts in the promotion and tenure process, teaching awards, course releases for development time, and/or financial stipends (Betts & Heaston, 2014; Haber & Mills, 2008; Hoyt & Oviatt, 2013; Johnson et al., 2015). For many faculty members, the decision to teach online or not reflects how they perceive the return on investment (Wolcott & Betts, 1999).

Factors that Discourage Online Teaching

Discouraging factors play an especially important role in motivation because barriers perceived to be too burdensome have the potential to negate incentives that might otherwise encourage online teaching (Shea, 2007). Commonly reported themes in the literature included: faculty time and workload, technology issues, student engagement, course quality concerns, and fear or resistance to change. Key concerns include faculty members beliefs that teaching online requires more time than teaching face-to-face as well as concerns about the complexity of online teaching technologies (Berge, 2002; Berge et al., 2002; Lloyd et al., 2012; Mitchell et al., 2015; Wasilik & Bollinger, 2009). Birch and Burnett (2009) recommended institutions take into consideration the time it takes academics to develop and maintain e-learning environments in performance reviews and in promotion interviews.

Other concerns included perceptions that the quality of online courses and the quality of student engagement are poor compared to face-to-face environments (Allen & Seaman, 2015; Berge et al., 2002; Wasilik & Bollinger, 2009). In a 2012 study, 66% of surveyed faculty believed learning outcomes for online courses were inferior or somewhat inferior to traditional face-to-face courses and only 25% of faculty felt their institutions had good tools to assess the quality of online courses (Allen et al., 2012). Faculty may also fear a decrease in enjoyment from teaching if they believe that they will not be able to witness their impact students when they are teaching online (Bacow et al., 2012; Mitchell et al., 2015).

Finally, a factor discouraging faculty from teaching online may be an underlying fear or aversion to change. A survey found that 51% of faculty at two-year institutions were more fearful

than excited about the growth of online learning, and 60% of faculty at four-year institutions reported feelings of fear (Allen et al., 2012). Mitchell et al. (2015) identified fear as a key source of faculty resistance to online teaching: they fear technology as too time-consuming, fear failure when learning a new way of teaching, or fear the loss of a comfortable and successful approach to teaching.

In summary, understanding what factors encourage or discourage online teaching is an important step for motivating faculty to teach online. This is especially true for liberal arts institutions who may experience resistance to online teaching from faculty who hold strong beliefs about teaching and value in-person relationships with students.

Theoretical Framework

The Decomposed Theory of Planned Behavior (DTPB) serves as a framework in this study to discuss faculty's planned decisions to teach online through an examination of three relevant psychological constructs. Taylor and Todd (1995) developed DTPB to better understand the determinants of technology usage for the effective deployment of resources in an organization. The DTPB supposes that intentional behavior is influenced by attitudinal beliefs, normative beliefs, and control beliefs.

The attitudinal beliefs component of the DTPB model describes perceptions of an innovative practice and examines the degree to which an individual supports the behavior under study (Taylor & Todd, 1995). Attitudinal beliefs are examined through the dimensions of compatibility, perceived ease of use, and perceived usefulness. "Compatibility" describes how an innovative practice aligns with an individual's existing values, needs, and experiences. "Perceived ease of use" or "complexity" describes the perceived difficulty to understand, learn, or operate the components of an innovative practice. "Perceived usefulness" or "relative advantage" refers to the degree with which an innovative practice provides important benefits or is better than the current practice (Taylor & Todd, 1995).

Normative beliefs are influenced by three dimensions: peers, superiors, and subordinates. Normative groups within an educational organization are comprised of "peers" (faculty), "superiors" (institutional leaders), and "subordinates" (students) (Taylor & Todd, 1995). Control beliefs are affected by the three dimensions of self-efficacy, available resources, and available technology (Taylor & Todd, 1995). "Self-efficacy" is an internal dimension related to one's perceived ability to be successful at a task. The dimensions of "available resources" such as time and money and "available technology" are considered "facilitating conditions" (Taylor & Todd, 1995). Taylor and Todd note that the absence of facilitating conditions may present a barrier to usage but the presence of facilitating resources may not necessarily encourage usage.

Methods

This study utilized a convergent, parallel, mixed-methods design to gather data on faculty perceptions of online teaching and learning. A cross-sectional survey instrument collected distinct but complementary quantitative and qualitative data for a more complete understanding of the phenomenon (Creswell & Plano Clark, 2011).

Participants and Context

This study was implemented at a liberal arts university located in the Pacific Northwest portion of the United States serving around 3,300 students. Potential participants in this study included all faculty who had not completed the university's program to prepare faculty to teach online. Of the 320 faculty members invited to participate in this survey, 79 faculty submitted surveys for a response rate of 25%. Table 1 shows the number of respondents in each division or school. The divisions of Social Science and Natural Science had the highest representation. Participants ranged from newly hired instructors to faculty with 40 years of experience at the university, as shown in Table 2. The majority of participants were employed full time (91%) as full or associate professors (55.7%).

Table 1

Characteristics of Survey Participants: School/Division

School/Division	Frequency	Respondents
Business	9	11.4%
Humanities	8	10.1%
Educ. & Kinesiology	2	2.5%
Natural Sciences	18	22.8%
Nursing	3	3.8%
Arts & Communication	12	15.2%
Social Sciences	25	31.6%
Library	2	2.5%
TOTAL	79	100%

Table 2

Characteristics of Survey Participants: Years at Institution

Years	Frequency	Respondents
0–3	17	21.5%
4–7	17	21.5%
8–11	14	17.7%
12–15	9	11.4%
16–19	10	12.7%
20+	12	15.2%
TOTAL	79	100%

Survey Instrument

After a review of previous instruments to examine faculty's perceptions of e-learning (Ajjan & Hartshorn, 2008; Dos Santos & Okazaki, 2013), a new survey instrument was developed to answer the specific research questions in this study. Survey questions reflected factors identified in current research studies as well as the dimensions of the Decomposed Theory of Planned Behavior. To establish face validity for the survey instrument, feedback was gathered from (1) experts in the field of educational technology and (2) faculty currently participating in online teaching at the university under study. Survey question prompts and factors were revised multiple times to incorporate the recommendations of reviewers. The fourth and final version of the survey

instrument contained three qualitative prompts and one quantitative question consisting of 21 individual factors. The full version of the instrument is provided in Appendix A and summarized below in Table 3. An online version of the survey was sent to all invited participants and paper copies of the survey were sent to participants who did not respond to the online survey within seven days.

Table 3

Overview of Survey Instrument Questions

Survey Question	Research Question
S1. What role do you think online learning should have in the future of education at the university? What do you see as potential strengths, weaknesses, opportunities, and/or threats for online learning at the university? Please explain.	RQ1. How do faculty perceive online teaching and learning at the university?
S2. How do you view the idea of teaching online courses at the university? Would you consider teaching online? If so, when and why? Please explain.	RQ1. How do faculty perceive online teaching and learning at the university?
S3. What would it take for you to feel comfortable teaching online at the university? What would be the most important factors affecting your willingness to teach online? Please explain.	RQ1. How do faculty perceive online teaching and learning at the university?
S4. Consider each of the factors listed below. Determine whether each factor would encourage, discourage, or not influence your decision (neither encourage nor discourage you) to teach online at the university. Then rate how important each factor would be on your personal decision to teach or not teach online.	RQ2. What factors are reported to affect faculty's decision to teach or not teach online at the university?

Data Analysis

Creswell and Plano Clark (2011) recommend that researchers analyze the qualitative and quantitative strands of a convergent mixed method study separately before merging the results. Therefore, qualitative and quantitative data sets in this study were analyzed and presented separately to answer the research questions and then merged for discussion. A content analysis processes was utilized to describe faculty perceptions of online teaching (Rourke & Anderson, 2004). Exploring underlying themes in participant responses, the researchers discussed beliefs which influence faculty behaviors. The lead researcher initially coded all the qualitative data for discrete concepts, which resulted in over 50 codes. Then the researcher grouped concepts into 15 categories, and consolidated the categories into six final themes. Detailed definitions of themes were created. A random sample of 25% of qualitative responses were coded independently by the first and the second researcher, based on the definitions of the themes.

In order to more effectively merge qualitative and quantitative data, responses were coded at the participant level. Initially, an agreement rate of 85.8% was achieved between two researchers with 100% agreement achieved after discussion. Theme definitions were refined for clarity at this point. Then the lead researcher coded the rest of the 75% of the responses based on refined

definitions of the themes. Descriptive quantitative data analysis was employed to answer Research Question 2, including calculations of frequency and mean scores for 21 factors under evaluation. Descriptive statistics reported characteristics of the sample without making inferences about the sample's larger population (Creswell & Clark, 2011).

Results

Faculty perceptions of online teaching at a liberal arts university

To answer the first research question, data from three open-ended survey questions asked participants:

1. What role do you think online learning should have in the future of education at [the university]? What do you see as potential strengths, weaknesses, opportunities, and/or threats for online learning at [the university]? Please explain.
2. How do you view the idea of teaching online courses at [the university]? Would you consider teaching online? If so, when and why? Please explain.
3. What would it take for you to feel comfortable teaching online at [the university]? What would be the most important factors affecting your willingness to teach online? Please explain.

Six themes surfaced in the qualitative data: (1) teaching values compatibility, (2) attractiveness to students, (3) regulation of online learning, (4) faculty resources, (5) personal influences, and (6) technology and infrastructure. After the identification of these themes, each set of participant responses was coded to identify what, if any, of the six themes were evident. Every participant discussed one or more of the six themes; the percentage of participants who discussed each theme is presented in Table 4 below.

Table 4
Frequency of Qualitative Themes

Qualitative Theme	Frequency (Number of participants)	% Participants
Teaching values compatibility	60	76%
Attractiveness to students	57	72%
Regulation of online learning	45	57%
Faculty resources	44	56%
Personal influences	42	53%
Technology and infrastructure	27	34%

Theme 1: Teaching Values Compatibility

The most common theme that surfaced in participants' responses involved opinions about how "good teaching" should be delivered to students. This theme was evident in 76% of responses, including frequent mention of the importance of face-to-face learning, in-person communication, live interactivity, and the campus community as valued practices that online learning cannot provide. Many faculty participants believed that the university's distinctiveness is based in part on its ability to cultivate in-person relationships with students. One faculty member stated, "The promise we make potential [the university] students is that they will be known and will have a face to face encounter with their professors, will have the opportunity to meet with their professors." Another respondent emphasized the importance of the campus community saying, "A strength of [the university] is that the [university] learning experience includes 'campus life' and in-class personal interactions with students and faculty. Thus, a weakness of online learning would be the lack of the total experience."

Additionally, respondents had mixed feelings on the alignment of online teaching with their personal teaching values and the shared values of the institution. For instance, one faculty member stated, "Online courses assume that what we do in the classroom, face-to-face with students, can be replicated in an electronic format. It undervalues our art of teaching and I see it in direct conflict with our values as an institution." Concerns typically focused on how online learning might adversely affect the preservation of personal and institutional values, distinction, and strengths.

Theme 2: Attractiveness to Students

A prevalent theme in the qualitative data set, noted by 72% of respondents, was affirmation of practical reasons that students may be attracted to online learning. For instance, one participant stated, "Offering online courses over summer and [winter] makes sense because it allows students to earn credit while being away from campus." Some comments emphasized that online courses provide flexible learning options that meet the needs of a wider range of students, especially adult, military, working, or commuter students. One faculty member explained, "I think that online teaching offers the ability to reach non-traditional students and those who struggle to balance on-campus responsibilities and daily-life responsibilities." Additionally, multiple respondents felt that the university could attract or retain students by providing a wider variety of learning options to help them succeed and graduate. One faculty member said, "Online, particularly blended learning has the potential to enrich the experience AND possibly via a bridge course, help students catch up."

Theme 3: Regulation of Online Learning

Theme 3 broadly encompassed comments made by participants that online learning at the university would be acceptable only under certain conditions, and therefore it should be carefully regulated. This concept was present in 57% of responses through in statements that certain disciplines, courses, students, levels of learning, or terms are more appropriate for online learning than others are. One faculty member advocated for disciplinary restrictions stating, "I worry that by switching to teaching classes online we will be shortchanging students... online classes in the future should be offered in moderation, and only in certain disciplines. I do not think that mathematics and science courses should be taught online." This theme also included concerns about the quality and effectiveness of online courses, with many comments suggesting online courses should be regulated and monitored more closely than face-to-face courses. One faculty

member claimed, "I think there needs to be more quality control of online courses. There needs to be more strict review of online and blended courses so that the academic rigor is equal to face-to-face classes." Others were interested in "seeing evidence that students actually learn at least as much as in a regular format."

Theme 4: Faculty Resources

The fourth theme represented 56% of responses and emphasized participants' desire for the university to invest resources into the successful development and teaching of online courses. For instance, one faculty member bluntly stated, "The only possible motivation for teaching an online course would be to have a much greater stipend and/or course release to make up for the huge amount of labor that is put into developing an online course." Some respondents emphasized the importance of training and support. One comment noted, "Faculty development would definitely be necessary, and the opportunity to work with a group of peers who are also experimenting with online teaching, so we would have a built-in support group to consult when issues arise." Interest and support for the university's online training program was high, and several faculty participants expressed enthusiasm for the opportunity to participate.

Theme 5: Personal Influences

The fifth qualitative theme, present in 53% of responses, encompassing discussions of faculty's personal goals, situations, preferences, concerns, experiences, and interests as it affects online teaching. Personal influences included statements of personal dislike or attraction to online teaching, or general fears or concerns about one's personal ability to teach online. Comments within this theme were distinguished from concerns about online teaching's effectiveness, which were classified as a "teaching value compatibility" issues, or concerns about workload, which were classified as a "faculty resource" issues. Some comments categorize in this theme reflected personal preferences that would be difficult to address by institutional policies or planning. For instance, one faculty member humorously stated, "I would never feel comfortable teaching an online course because what I teach is old world—made up by people who take naps in the middle of the day."

Theme 6: Technology and Infrastructure

The final theme found in 34% of responses included a variety of comments on the importance of technology, infrastructure, and technical support. Concerns about technology ranged from vague fears to specific concerns. For instance, one faculty member stated, "There's a lot about the online space that simply isn't comfortable for me. I don't like managing technology, because I find it frustrating." Respondents also wanted the university to ensure adequate technical support was available to instructors and students who would be relying heavily on technology that must function well in order for online learning to be successful. Comments included statements such as, "All I can say is that extensive infrastructure and support are needed to make a success of such undertakings." This theme included concerns about the learning management system, which was the most frequent complaint expressed about technology.

In sum, participants in this study perceived online teaching at the university as attractive for students who may need nontraditional options for learning. In order to be successful, faculty respondents desired facilitative technology and infrastructure as well as faculty resources. However, these things alone may not be enough to motivate faculty participants to teach online. Personal influences and considerations also affected perceptions of online teaching and learning.

Additionally, the teaching values of participants greatly influenced their perceptions of online teaching. Many respondents believed that online learning at the institution needed to be regulated to safeguard course quality and to ensure it was only permitted in specific circumstances. Overall, many faculty participants were skeptical of online learning but willing to consider it under the right circumstances.

Table 5

Frequency of Factors, Sorted by % of Total Influence

Factor	Encouraged	Discouraged	Total % Influenced
Suitability of online teaching and learning for course needs	54%	39%	93%
Instructional support provided by the institution	66%	24%	90%
Student engagement in online courses	31%	59%	90%
Time available for online course development and training	35%	54%	89%
Reflecting on current teaching practices and exploring new ways of teaching	61%	25%	86%
Technology available for teaching and learning online	59%	25%	84%
Time and effort required to teach online	20%	63%	83%
Accommodating a wider variety of students	72%	9%	81%
Online learning's alignment to institutional identity	30%	36%	66%
Personal schedule flexibility for instructors	69%	8%	77%
Technical support for instructors provided by the institution	65%	10%	75%
Additional compensation for online course development and training	67%	7%	74%
Opportunity for improved proficiency with instructional technologies	64%	8%	72%
Current skills with instructional technology	43%	23%	67%
Student retention in online classes	21%	43%	64%
Option to teach online during all academic terms	36%	23%	59%
Influence of students	42%	12%	54%
Past personal experiences with online teaching and/or learning	21%	28%	49%
Prior experience teaching a blended course	25%	10%	35%
Influence of colleagues	16%	13%	29%
Influence of department leadership	23%	6%	29%

Reported Factors that Affect Faculty Members' Decisions to Teach or Not Teach Online

Analysis of the quantitative data in this study focused on how faculty respondents classified 21 unique factors as encouraging, discouraging, or not influential in their decision to teach online. More than 50% of participants reported 17 factors as influential to their decision to teach or not teach online. Table 5 above shows the frequency of factors selected by survey respondents. The top five factors selected included "suitability of online teaching and learning for course needs" that was considered influential by 93% of faculty participants; "instructional support provided by the institution" and "student engagement in online courses" were influential to 90% of respondents; "time available for online course development and training" was influential for 89% of respondents; and, "reflecting on current teaching practices and exploring new ways of teaching" was influential to 86% of respondents.

Discussion

Overall, the results of this mixed-methods study showed strong agreement between the quantitative and qualitative data. To support the convergence of data, the discussion of findings is organized around six key themes from the qualitative data. Each section includes a joint discussion of the quantitative and qualitative data (Creswell & Plano Clark, 2011). This approach was selected because the qualitative themes provided a useful structure for considering both datasets, prior research, and the DTPB from a holistic perspective. The DTPB provided a framework for discussing the results of this study by considering the influence of faculty participants' attitudes, subjective norms, and perceived behavioral control on their willingness to teach online in the future.

Attractiveness to Students

"Attractiveness to students" was a common theme in the qualitative data that demonstrated the influence of students on the faculty members' decisions to teach or not teach online. "Accommodating a wider variety of students" (81% total influence), "student engagement in online courses" (90%), "student retention in online courses" (64%) and the "influence of students" (54%) were all factors identified as influential in the quantitative portion of the survey. This qualitative theme and related quantitative factors can be attributed to two constructs of the DTPB: (1) subjective norms as seen through the dimension "influence of students" and (2) attitude as seen through the dimension "perceived usefulness."

Prior research studies have demonstrated the influence of students on faculty members' decisions making. Studies by Maguire (2005) and Betts and Heaston (2014) both noted the importance of student pressure on faculty members' decisions to participate in distance education. Clark (1997) concluded that faculty members at midlevel American liberal arts institutions particularly value their relationships with students, and this study provides further evidence of the influence of students.

The quantitative factor "accommodating a wider variety of students" and the qualitative theme "attractiveness to students" were interpreted as similar to the DTPB dimension "perceived usefulness" as the anytime, anywhere nature of online education is useful for many learners. Faculty participants in this study acknowledged the potential benefits of online learning for students, and this encouraged participants to consider teaching online. The possibility of increasing access to higher education for a wider audience of learners was a strong incentive evident in this

study and noted in several prior research studies (Allen & Seaman, 2008; Dooley & Murphrey, 2000; Maguire, 2005; Shea, 2007). Participants in this study described benefits to retention, recruitment, and competitiveness, especially for nontraditional students (i.e., adult, military, working, or commuter students).

Teaching Value Compatibility

Despite the attractiveness of online learning for some students, many faculty respondents resisted the idea because they believed it conflicted with their teaching values. This theme was related to the DTPB's attitudinal dimension "compatibility," which describes whether an innovative practice aligns with existing values, needs, and experiences. Approximately 66% of respondents claimed online learning's alignment to institutional values was influential in their decision to teach or not teach online, and institutional values were frequently discussed in written responses. Prior research supports these findings. Mitchell et al. (2015) found that faculty members resist initiatives that appear to threaten their values. Berge (1998) identified cultural barriers (the institutional culture; i.e., the beliefs, values, expectations, and norms of an organization) as the largest category of barriers to online teaching. Zhen et al. (2008) also found that faculty members' teaching philosophies were a significant variable in their discrete decision model for online teaching. Haber and Mills (2008) stated that one of the greatest barriers to online instruction was concerns about the lack of interaction and communication between faculty members and students.

The comments of faculty respondents in this study demonstrated a strong desire to preserve traditional in-person student relationships. To encourage faculty members to participate in online learning, faculty may need reassurance and support to help them understand how to preserve teaching values in the online environment. Professional development efforts can support faculty members through modeling online course design (Borup & Evmenova, 2019) and instructional strategies compatible with their teaching values and teaching approaches (Richardson et al., 2020).

Regulation of Online Learning

Concerns about the compatibility of online teaching with deeply held teaching values may have contributed to the emergence of the third theme, "Regulation of online learning." The "suitability of online teaching and learning for course needs" was reported as influential by 93% of survey respondents. These ideas were interpreted as linked to the DTPB's attitudinal belief structure, particularly the dimensions of perceived usefulness and compatibility. Many faculty respondents expressed concerns that online learning was bad for the institution, their program, students, or themselves. As noted in the literature review, Allen and Seaman (2015) found that just 28% of faculty respondents in surveyed institutions accepted the value and legitimacy of online education.

The findings of this study are consistent with prior research identifying faculty members' concerns about online course quality. Subsequently, many respondents in this study wanted to regulate online learning by placing restrictions on what disciplines, courses, students, levels of learning, or terms would be allowed for online learning. Regulation also involved closely monitoring online courses for quality. Respondents wanted new institutional regulations for online learning to be in place via specific course development and review processes. Betts and Heaston (2014) also identified the quality of online courses as a primary concern of faculty members at their institution.

The results of a recent federal funded study suggested that the indicators of online course quality (i.e., learner support, course design and organization, content design and delivery, interactivity, and assessment) had significant relationships with students' learning, satisfaction, and academic performance in online courses at a higher educational institution (Joosten & Cusatis, 2019). Faculty members' desires to regulate and restrict online learning in order to preserve the quality of education at an institution is an area that could be investigated in more detail in the future. Introducing faculty to the use of online course evaluation instruments to guide course development and review processes (Baldwin & Ching, 2019; Baldwin et al., 2018) and establish a course review process at the institution level may help address faculty members' concerns over online course quality.

Technology and Infrastructure

Another theme identified in the qualitative data of this study highlighted faculty participants' concerns about the technology and infrastructure needed to teach online. "Technology available for teaching and learning" was identified as important to 84% of survey respondents. This theme aligned closely with the DTPB dimension "available technologies", within the control belief structure. Technology is an essential aspect of online teaching. Faculty members' concerns about technology for online teaching are well documented in prior research (Berge et al., 2002; Hiltz et al., 2007; Mitchell et al., 2015; Shea, 2007; Wingo et al., 2017). Maguire's (2005) review of the literature found that a lack of technical support, lack of training, and inadequate infrastructure, hardware, and software were some of the most frequently cited barriers to online teaching. Appropriate technology for teaching is foundational for faculty member participation in online teaching.

Faculty Resources

Faculty members want their institutions to provide effective technology resources and support, but other resources are also important. In qualitative responses, faculty participants requested a variety of resources from the institution, including pedagogical training, time, and compensation. The quantitative data echoed these requests: "instructional support provided by the institution" (90%) "time available for online course development and training" (89%), and "additional compensation" (74%). These factors were classified as similar to the DTPB dimension "available resources" in the construct "control beliefs." As with technology, faculty members must be convinced that their institution will provide them with appropriate resources and training before they will consider investing time and effort into experimenting with online teaching. Since "self-efficacy" is a dimension of "control beliefs," providing online teacher training might help institutions to increase faculty member's confidence in their ability to teach online.

Recent studies have provided guidelines on best practices of online teaching (e.g., facilitation strategies in Martin et al., 2020) and effective professional development approaches for online teaching for higher education faculty (e.g., Borup & Evmenova, 2019; Northcote et al., 2019; Olesova & Campbell, 2019; Richardson et al., 2020). Prior research has documented the importance of various institutional rewards and resources on faculty members' consideration of online teaching (Betts & Heaston, 2014; Herman, 2012; Hoyt & Oviatt, 2013; Maguire, 2005; Wasilik & Bollinger, 2009).

Personal Influences

Personal goals, situations, preferences, concerns, experiences, and interests can influence faculty's perceptions of online teaching. Personal influences have an obvious effect on attitudes, but they are also strongly associated with the self-efficacy dimension of control beliefs in the DTPB. "Current skills with instructional technology" (67%), "past personal experiences with online teaching and learning" (49%), and "prior experience teaching blended courses" (35%) were survey factors associated with self-efficacy. Of these factors, "current skills with technology" was perceived as the most influential to participants in this study. This aspect of self-efficacy suggests that faculty members' perceptions of their current technical skills do affect their willingness to teach online.

"Reflecting on current teaching practices and exploring new ways of teaching" was influential to 86% of faculty participants in this study. This factor relates to motivation and pleasure from learning new skills. In Maguire's (2005) review of the literature, she concluded that intrinsic motivators, such as intellectual challenge and personal motivation to use technology, were stronger than extrinsic motivators for online teaching. There is strong evidence in prior research that faculty members may be motivated by the opportunity for professional, technical, or creative challenges (Hiltz et al., 2007; Lloyd et al., 2012; Maguire, 2005).

Recommendations and Limitations

Future research on this topic could help liberal arts institutions that want to grow their online offerings but need evidence-based strategies for recruiting faculty members to teach online. First, a national study of the perceptions of online teaching among liberal arts faculty across the U.S. would contribute broader insight into the perceptions of this population. A study on liberal arts faculty members' readiness to teach online that focuses on perceptions of ability and confidence would also be a useful extension of research (Martin et al., 2019). Second, the survey instrument used in this study could be altered for closer alignment to the dimensions of the DTPB. In this study, the DTPB was used as a framework for data analysis and discussion of findings. However, future researchers may consider designing a research study or instrument exclusively focused on the dimensions of this framework. An instrument focused specifically on the dimensions of the DTPB would allow for further testing of the theory and greater discussion of the DTPB constructs as determinants of planned behavior related to faculty participation in online teaching.

Subsequent research using the DTPB to study faculty members' participation in online teaching could reexamine whether the dimensions of peer influence and superior influence are perceived as influential in other populations. This study found the influence of peers and superiors were not influential for participants; however, additional testing is needed to determine whether this is an isolated instance or evidence of a larger phenomenon among faculty members at liberal arts institutions.

A limitation of this study is the nature of self-reporting opinions, perceptions, and anticipated behaviors. Self-reported data may not accurately predict or explain actual behaviors, which could affect the validity of a study's results. In addition, the low response rate of the survey (25% in this study) presents another limitation of this study. The potential of non-response bias may invalidate study results. It should be noted that participants in this study did not reflect the exact demographics of the larger faculty population. For instance, the participant sample contained larger numbers of natural sciences and social sciences faculty members than would be represented

in the entire population. Therefore, the perceptions of some faculty groups may be overrepresented while other groups may be underrepresented.

Conclusion

This study examined how faculty members perceived online teaching at a midsized liberal arts university in order to increase faculty acceptance and participation in online teaching at that university. The findings of this research expanded previous research on faculty perceptions of online teaching by studying faculty at a midsized liberal arts university in the Pacific Northwest. A mixed-methods approach to the investigation resulted in strong agreement around six key themes and 17 influential factors. Overall, faculty participants at this liberal arts university appeared encouraged or discouraged from online teaching by factors that were noted in prior research and supported by the theoretical framework of the DTPB.

Faculty participants acknowledged that online learning could increase educational access for students, especially nontraditional student populations. This influential factor was supported in prior research and reflected the influence of students and the perceived usefulness of online learning, two dimensions of the DTPB. Faculty respondents in this study also discussed concerns of whether online learning aligned to personal teaching values and the values of their institution, which reflected the DTPB dimension of compatibility. In addition to concerns about compatibility, faculty participants expressed a need for robust technology, technical and instructional support, development time, training, and other related resources. These findings are similar to prior research and represented in the DTPB through the dimensions of facilitating technology and resources. Faculty respondents in this study also expressed a desire to carefully regulate online learning at the institution through a variety of conditions and restrictions. Faculty members' requests to regulate online learning could indicate a desire to preserve teaching values and ameliorate fears of change, which connected to the DTPB dimensions of compatibility and perceived usefulness.

References

Ajjan, H., & Hartshorn, R. (2008). Investigating faculty decisions to adopt Web 2.0 technologies: Theory and empirical tests. *The Internet and Higher Education, 11*(2), 71–80.

Allen, I. E., & Seaman, J. (2008). *Staying the course: Online education in the United States, 2008*. Sloan-C. https://www.onlinelearningsurvey.com/reports/staying-the-course.pdf

Allen, I. E., & Seaman, J. (2015). *Grade level: Tracking online education in the United States.*

Babson Survey Research Group and Quahog Research Group. http://www.onlinelearningsurvey.com/reports/gradelevel.pdf

Allen, I. E., Seaman, J., Lederman, D., & Jaschik, S. (2012). *Conflicted: Faculty and online education*. Inside Higher Ed, Babson Survey Research Group and Quahog Research Group. https://onlinelearningsurvey.com/reports/conflicted.pdf

Bacow, L. S., Bowen, W. G., Guthrie, K. M., Lack, K. A., & Long, M. P. (2012). *Barriers to adoption of online learning systems in US higher education*. Ithaka S+R.

Baker, V., & Baldwin, R. (2015). A case study of liberal arts colleges in the 21st century: Understanding organizational change and evolution in higher education. *Innovative Higher Education*, *40*(3), 247–261.

Baldwin, S., & Ching, Y.-H. (2019). An online course design checklist: Development and users' perceptions. *Journal of Computing in Higher Education, 31*(1), 156–172. https://doi.org/10.1007/s12528-018-9199-8

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. doi:10.1007/s11528-017-0215-z

Berge, Z. L. (1998). Barriers to online teaching in post-secondary institutions: Can policy changes fix it? *Online Journal of Distance Learning Administration*, *1*(2). https://www.westga.edu/~distance/ojdla/summer12/berge12.pdf

Berge, Z. L. (2002). Obstacles to distance training and education in corporate organizations. *Journal of Workplace Learning*, *14*(5), 182–189.

Berge, Z. L., Muilenburg, L. Y., & Haneghan, J. V. (2002). Barriers to distance education and training: Survey results. *The Quarterly Review of Distance Education, 3*(4), 409–418.

Betts, K., & Heaston, A. (2014). Build it but will they teach? Strategies for increasingfaculty participation & retention in online & blended education. *Online Journal ofDistance Learning Administration, 17*(2). https://www.westga.edu/~distance/ojdla/summer172/betts_heaston172.html

Birch, D., & Burnett, B. (2009). Bringing academics on board: Encouraging institution-wide diffusion of e-learning environments. *Australasian Journal of Educational Technology, 25*(1), 117–134.

Borup, J., & Evmenova, A.S. (2019). The effectiveness of professional development in overcoming obstacles to effective online instruction in a college of education. *Online Learning, 23*(2), 1–20. doi:10.24059/olj.v23i2.1468

Clark, B. (1987). *The academic life: Small worlds, different worlds.* Carnegie Foundation for the Advancement of Teaching.

Clark, B. (1997). Small worlds, different worlds: The uniquenesses and troubles of American academic professions. *Daedalus, 126*(4), 21–42.

Creswell, J. W., & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research*. SAGE Publications.

Deneen, P. (2014). After the interregnum. *Academic Questions*, *27*(4), 368–375.

Dooley, K. E., & Murphrey, T. P. (2000). How the perspectives of administrators, faculty, and support units impact the rate of distance education adoption. *Online Journal of Distance Learning Administration, 3*(4). https://www.westga.edu/~distance/ojdla/winter34/dooley34.html

Dos Santos. L. M. R., & Okazaki, S. (2013). Understanding e-learning adoption among Brazilian universities: An application of the decomposed theory of planned behavior. *Journal of Educational Computing Research, 49(*3), 363–379.

Haber, J., & Mills, M. (2008). Perceptions of barriers concerning effective online teaching and policies: Florida community college faculty. *Community College Journal of Research and Practice*, *32*(4–6), 266–283.

Herman, J. (2013). Faculty incentives for online course design, delivery, and professional development. *Innovative Higher Education*, *38*(5), 397–410.

Hiltz, S. R., Kim, E., & Shea, P. (2007). Faculty motivators and de-motivators for teaching online: Results of focus group interviews at one university. *40th Annual Hawaii international Conference on System Sciences, 2007.* https://pdfs.semanticscholar.org/465c/f6ee0e14baada609f1e4abc2c87b1e3a87f1.pdf

Hoyt, J. E., & Oviatt, D. (2013). Governance, faculty incentives, and course ownership in online education at doctorate-granting universities. *American Journal of Distance Education*, *27*(3), 165–178.

Husmann, D. E., & Miller, M. T. (1999). Faculty incentives to participate in distance education. *Michigan Community College Journal: Research & Practice, 5*(2), 35–42. https://www.learntechlib.org/p/88741/

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.

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

Lloyd, S., Byrne, M., & McCoy, T. (2012). Faculty-perceived barriers of online education. *MERLOT Journal of Online Learning and Teaching, 8*(1). https://jolt.merlot.org/vol8no1/lloyd_0312.pdf

Maguire, L. L. (2005). Literature review–faculty participation in online distance education: Barriers and motivators. *Online Journal of Distance Learning Administration, 8*(1). https://www.westga.edu/~distance/ojdla/spring81/maguire81.htm

Martin, F., Budhrani, K., & Wang, C. (2019). Examining faculty perception of their readiness to teach online. *Online Learning, 23*(3), 97–119. doi: 10.24059/olj.v23i3.1555

Martin, F., Wang, C., & Sadaf, A. (2020). Facilitation matters: Instructor perception of helpfulness of facilitation strategies in online courses. *Online Learning, 24*(1), 28–49. https://doi.org/10.24059/olj.v24i1.1980

Mitchell, L. D., Parlamis, J. D., & Claiborne, S. A. (2015). Overcoming faculty avoidance of online education: From resistance to support to active participation. *Journal of Management Education*, *39*(3), 350–371.

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

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

Richardson, J. W., Hollis, E., Pritchard, M., & Lingat, J. E. M. (2020). Shifting teaching and learning in online learning spaces: An investigation of a faculty online teaching and learning initiative. *Online Learning, 24*(1), 67–91. https://doi.org/10.24059/olj.v24i1.1629

Rourke, L., & Anderson, T. (2004). Validity in quantitative content analysis. *Educational Technology Research and Development, 52*(1), 5–18.

Seaman, J. E., Allen, I. E., & Seaman, J. (2018). *Grade increase: Tracking distance education in the United States*. Babson Survey Research. http://www.onlinelearningsurvey.com/highered.html

Schopieray, S. E. (2006). *Understanding faculty motivation to teach online courses* (Publication 305307371) [Doctoral dissertation, Michigan State University]. ProQuest Dissertations & Theses Global.

Shea, P. (2007). Bridges and barriers to teaching online college courses: A study of experienced online faculty in thirty-six colleges. *Journal of Asynchronous Learning Networks, 11*(2), 73–128.

Taylor, S., & Todd, P. A. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research, 6*(2), 144–176.

Thompson, C. (2015). On the decline and fall of the liberal arts. *Academic Questions*, *28*(4), 417–427.

Vivolo, J. (2016). Understanding and combating resistance to online learning. *Science Progress*, *99*(4), 399–412.

Wasilik, O., & Bollinger, D. (2009). Faculty satisfaction in the online environment: An institutional study. *The Internet and Higher Education, 12*(3), 173–178.

Wells, C. A. (2016). A distinctive vision for the liberal arts: General education and the flourishing of Christian higher education. *Christian Higher Education*, *15*(1/2), 84–94.

Wingo,N. P., Ivankova, N. V., & Moss, J. A. (2017) Faculty perceptions about teaching online: Exploring the literature using the technology acceptance model as an organizing framework. *Online Learning, 21*(1), 15–35. doi: 10.10.24059/olj.v21i1.761

Wolcott, L. L., & Betts, K. S. (1999). What's in it for me? Incentives for faculty participation in distance education. *Journal of Distance Education*, *14*(2), 34–49.

Zhen, Y., Garthwait, A., & Pratt, P. (2008). Factors affecting faculty members' decision to teach or not to teach online in higher education. *Online Journal of Distance Learning Administration, 11*(3). https://www.westga.edu/~distance/ojdla/fall113/zhen113.html

Appendix A
Faculty Survey: Online Teaching Version 4

Please consider the following questions and provide as much detail as possible to help us understand your perceptions and perspectives related to online teaching and learning at the university.

1. What role do you think online learning should have in the future of education at the university? What do you see as potential strengths, weaknesses, opportunities, and/or threats for online learning at the university? Please explain.
2. How do you view the idea of teaching online courses at the university? Would you consider teaching online? If so, when and why? Please explain.
3. What would it take for you to feel comfortable teaching online at the university? What would be the most important factors affecting your willingness to teach online? Please explain.
4. Consider each of the factors listed below. Determine whether each factor would encourage, discourage, or not influence your decision (neither encourage nor discourage you) to teach online at the university. Then rate how important each factor would be on your personal decision to teach or not teach online.

Does this factor would encourage, discourage, or not influence your decision (neither encourage nor discourage you) to teach online at the university? How important each factor would be on your personal decision to teach or not teach online?	Does this factor encourage, discourage, or not influence your decision to teach online? (Encouraging, Discouraging, Not Influential)	How important is this factor in your decision to teach online? (Slightly important, Somewhat important, Fairly important, Very important)
Online learning's alignment to institutional identity *(i.e., consideration for the mission, vision, and values of the university)*		
Suitability of online teaching and learning for course needs *(i.e., a good fit for course content, methods, discipline, etc.)*		
Reflecting on current teaching practices and exploring new ways of teaching *(i.e., evaluating and updating instructional strategies and content)*		
Time available for online course development and training *(i.e., priority for this among other commitments)*		
Option to teach online during all academic terms *(i.e., current practices limit online courses to j-term and summer term)*		

Does this factor would encourage, discourage, or not influence your decision (neither encourage nor discourage you) to teach online at the university? How important each factor would be on your personal decision to teach or not teach online?	Does this factor encourage, discourage, or not influence your decision to teach online? (Encouraging, Discouraging, Not Influential)	How important is this factor in your decision to teach online? (Slightly important, Somewhat important, Fairly important, Very important)
Past personal experiences with online teaching and/or learning		
Prior experience teaching a blended course *(i.e., skills and confidence from teaching a blended course before teaching fully online)*		
Time and effort required to teach online *(i.e., comparability of face-to-face and online teaching commitments*		
Instructional support provided by the institution *(i.e., training, instructional design, peer mentoring)*		
Personal schedule flexibility for instructors *(i.e., the ability to teach anytime or anyplace and accommodate other restrictions on availability)*		

Does this factor would encourage, discourage, or not influence your decision (neither encourage nor discourage you) to teach online at the university? How important each factor would be on your personal decision to teach or not teach online?	Does this factor encourage, discourage, or not influence your decision to teach online? (Encouraging, Discouraging, Not Influential)	How important is this factor in your decision to teach online? (Slightly important, Somewhat important, Fairly important, Very important)
Accommodating a wider variety of students *(i.e., increasing access for students who may not be able to enroll in existing campus-based options)*	(Encouraging, Discouraging, Not Influential)	(Slightly important, Somewhat important, Fairly important, Very important)
Student engagement in online courses *(i.e.,how active students are in the learning experience and the quality of interpersonal interactions)*	(Encouraging, Discouraging, Not Influential)	(Slightly important, Somewhat important, Fairly important, Very important)

Student retention in online classes	(Encouraging, Discouraging, Not Influential)	(Slightly important, Somewhat important, Fairly important, Very important)
Influence of students *(i.e., student demand or preferences for specific instructional formats)*	(Encouraging, Discouraging, Not Influential)	(Slightly important, Somewhat important, Fairly important, Very important)
Influence of colleagues *(i.e peer attitudes regarding teaching online courses)*	(Encouraging, Discouraging, Not Influential)	(Slightly important, Somewhat important, Fairly important, Very important)
Influence of university, division, school, or department leadership *(i.e., encouragement or discouragement to teach online courses)*	(Encouraging, Discouraging, Not Influential)	(Slightly important, Somewhat important, Fairly important, Very important)

Does this factor would encourage, discourage, or not influence your decision (neither encourage nor discourage you) to teach online at the university? How important each factor would be on your personal decision to teach or not teach online?	Does this factor encourage, discourage, or not influence your decision to teach online? (Encouraging, Discouraging, Not Influential)	How important is this factor in your decision to teach online? (Slightly important, Somewhat important, Fairly important, Very important)
Additional compensation for online course development and training		
Current skills with instructional technology *(i.e., your confidence in your ability to learn and use instructional technologies)*		
Opportunity for improved proficiency with instructional technologies *(i.e., learning how to better use Sakai, online video, etc.)*		
Technical support for instructors provided by the institution (*i.e., training, instructional technologies)*		
Technology available for teaching and learning online *(i.e., adequate software, tools, and technology infrastructure for successful teaching and learning online)*		

Thank you for participating in this survey! Your time and thoughts are greatly appreciated! If there is anything else you'd like to share on the topic of online teaching and learning, please do so in the space below.

Examining Students' Confidence to Learn Online, Self-Regulation Skills and Perceptions of Satisfaction and Usefulness of Online Classes

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Abstract

As online class offerings continue to proliferate and more students take at least one online class in college, more research is needed to explore factors that impact students' perceptions of their online classes. Past research has found a positive relationship between students' computer self-efficacy and their satisfaction with online learning, but little research has explored how learning management system and online learning self-efficacy relate to perceptions of satisfaction and perceived usefulness of online classes. In addition to confidence, students must also implement and apply their learning skills in an online environment; thus self-regulation and time management as well as past online learning experience are additional factors that have been shown to be related to satisfaction with and usefulness of online learning. This study explores how students' confidence regarding their ability to use online learning platforms, utilize self-regulation strategies, and their confidence in their ability to learn in online classes predict both their satisfaction with and perceived usefulness of online classes. Multiple regression analyses revealed that students' confidence to learn online was the strongest positive predictor of satisfaction and usefulness of online classes. The results indicate that exploring students' purpose and reasons for taking online classes, beyond a students' skill set and learning strategies, are fruitful directions to pursue when assessing evaluations of online classes.

Keywords: online education, satisfaction, usefulness, self-efficacy, self-regulation

Landrum, B. (2020). Examining students' confidence to learn online, self-regulation skills and perceptions of satisfaction and usefulness of online classes. *Online Learning, 24*(3), 128-146. https://doi.org/10.24059/olj.v24i3.2066

Examining Students' Confidence to Learn Online, Self-Regulation Skills and Perceptions of Satisfaction and Usefulness of Online Classes

As online courses continue to proliferate, with nearly a third of higher education students in 2017 taking at least one online course and over 15% of those students enrolled exclusively in online classes (Lederman, 2018), research assessing students' perceptions of this class delivery modality is important. While some students perceive online and face-to-face classes to be equally effective (Horspool & Lange, 2012) and of similar quality (Waldman, Perreault, Alexander, & Zhao, 2009), not all students find online courses satisfactory or to be their preferred learning modality. Among students who have taken at least one online course, about 25% reported being discontented, dissatisfied, and displeased with their online experience while nearly a third reported that online education was an extremely or somewhat poor choice for education and provided poor learning opportunities (Bristow Shepherd, Humphreys, & Ziebell, 2011). Among business undergraduate students with experience across multiple modalities (face-to-face, online, and hybrid), half of the sample preferred face-to-face classes (Blau, Mittal, Schirmer, & Ozkan, 2017). In an introductory psychology class, with both in-class and online lectures, students were asked to rate which format (in-class, online, or same) was most helpful: 68% preferred the in-class format, 63% enjoyed the in-class material, and 70% felt the in-class helped them learn the most (Jensen, 2011). These negative attitudes towards online learning raise serious implications about online education.

Among these implications are the different outcomes observed between the two class modalities. In a quasi-experimental study, students enrolled in an online psychology course earned similar grades on all assignments, except scoring significantly lower on a group presentation, compared to those enrolled in a face-to-face version of the class. Both groups reported being satisfied with their respective classes, but the rates of withdrawal and failure were more than twice as high in the online class (Garratt-Reed, Roberts, & Heritage, 2016). Similar differences were found for community college students enrolled in online math classes who earned significantly lower grades, were less likely to pass and more likely to withdraw compared to students taking face-to-face classes (Francis, Wormington, & Hulleman, 2019). When examining differences between online students who completed or dropped out of the class, academic locus of control and metacognitive self-regulation were significantly higher among those who completed the online course, but the two groups did not differ on academic self-efficacy, time and environment management, or work/family support (Lee, Choi, & Kim, 2013). Moreover, students who dropped out of online classes reported being less satisfied (Levy, 2007) and participated significantly less, especially early on in the semester, compared to those who persisted and completed the online course (Nistor & Neubauer, 2010).

Differences in outcomes and perceptions of online classes might be tied to differences in the modes of delivery, specifically pedagogical and course related factors, as well as self-selection (Garratt-Reed et al., 2016). When evaluating online classes, students report fewer opportunities to interact with the professor and a lack of connectedness and engagement (Bowers & Kumar, 2015; Dyrbye, Cumyn, Day, & Heflin, 2009). Other barriers that students face when taking online classes are self-discipline and organizational skills (Kokko, Pesonen, Kontu, & Pirttimaa, 2015) as well as technological concerns (Dyrbe et al., 2009), especially when the online learning platform is difficult to navigate and feedback is lacking (Gaytan, 2015; Riley & Schmidt, 2016).

Even if the content and learning outcomes are equivalent (see Garratt-Reed et al., 2016) between the two modalities, how students access and engage with the content online calls for a

different skill set. Indeed, faculty report that self-discipline is a crucial skill for students to persist and succeed in online classes (Gaytan, 2015). Students are more satisfied with online learning if they generally liked online courses, perceived online courses as an appropriate way of learning, or were somewhat familiar with the course background (Beqiri, Chase, & Bishka, 2010). Students' satisfaction with online learning also increased with their level of online experience. The current study focuses on student factors that are tied to learning online. Students who struggle with navigating the online platform, gaining access to the course content and who find that online classes call for a different skill set that does not necessarily translate from traditional face-to-face classes may be less satisfied with their online experience and find online classes to be less useful.

Review of Relevant Literature

Past research exploring factors related to satisfaction with online classes has distinguished between course factors, faculty factors, and student factors (Blackmon & Major, 2012; Cochran, Baker, Benson, & Rhea, 2016; Endres, Chowdhury, Frye, & Hurtubis, 2009). While students' perceptions are tied to an interplay of all these factors, the current study focuses exclusively on student factors, drawing from Zimmerman's model of self-regulated learning (e.g., Zimmerman, 2000; Zimmerman & Martinez-Pons, 1988), a widely cited and comprehensive social-cognitive theory (see Panadero & Alonso-Tapia, 2014). This model focuses on students' active agency and use of learning strategies, which are crucial for success (Panadero & Alonso-Tapia, 2014; Zimmerman, 2008). Zimmerman describes three phases that students undertake when performing a task: forethought, performance, and self-reflection. During forethought, students first evaluate and assess the task in light of their goals and expectations. Students evaluate their interest, purpose and ability to complete the task. During performance, students utilize learning strategies and techniques to help them achieve their goals. During self-reflection, students evaluate their performance and reaction to the task.

Students' initial goals, expectations, and interests in the class comprise the forethought planning phase that has been shown to be influential for successful outcomes (Zimmerman, 2008). After this initial evaluation phase, students' own beliefs about their abilities influence their motivation and use of learning strategies to achieve their goals. According to Zimmerman, Schunk, and DiBenedetto (2017), students' sense of agency is an important characteristic of success. Students' use of self-regulation learning strategies is tied to their perceived ability or confidence to adopt them. Thus, Zimmerman et al. propose a cyclical process between self-efficacy and self-regulation processes. Indeed, for undergraduate students enrolled in a flipped math course, self-efficacy to learn math and students' adoption of help seeking strategies were positively related to performance (Sun, Xie, & Anderman, 2018). Moreover, students assigned to a teaching intervention designed to enhance self-regulation demonstrated higher self-efficacy, time-management, and help-seeking behaviors in comparison to a control group (Lai, Hwang, & Tu, 2018).

Because the sample in the current study comprises students currently enrolled in an online class at one point in time, the current study could not explore students' initial reasons, interests, or purposes for enrolling in an online class nor how these elements of Zimmerman's model progress or change over the course of a semester. Instead, the current study focuses on students' beliefs about their abilities (self-efficacy) and their use of learning strategies (self-regulation) to evaluate how these relate to perceptions of both satisfaction and usefulness. The following sections review

past research on self-efficacy and self-regulation within online learning and lastly considers research on online learning experience.

Self-efficacy

One of the ways researchers have explored students' ability to navigate online classes is by measuring students' self-efficacy. Self-efficacy refers to one's confidence in their ability to accomplish a certain task (Bandura, 1986) and is best defined and measured with specific reference to the domain or task being investigated (Pajares, 1996). When applied to online learning, self-efficacy has mostly focused on the technology aspects and studied in three main ways: *computer self-efficacy*, *internet and information-seeking self-efficacy*, and lastly *e-learning management system (LMS) self-efficacy* (Alqurashi, 2016).

Computer and Internet Self-efficacy. The first two types of self-efficacy, computer and internet, refer to one's confidence to use computers and use the internet to search for information. Research has mostly found a positive relationship between computer self-efficacy and satisfaction with online learning (e.g., Hammouri & Abu-Shanab, 2018; Jung, 2014; Kırmızı, 2015; Lee & Hwang, 2007; Lim, 2001; Wu, Tennyson, & Hsia, 2010; Yimaz, 2017) as well as a positive relationship with perceived ease of use and usefulness of online research databases (Chen, Islam, Gu, Teo, & Peng, 2019; Islam, Leng, & Singh, 2015). However, some research has not found a significant relationship between computer self-efficacy and satisfaction (Jan, 2015) or motivation to learn online (Simmering, Posey, & Piccoli, 2009).

Regarding the internet, research has shown moderate to weak significant positive correlations between internet self-efficacy and satisfaction (Chu, 2010; Kuo & Belland, 2016; Kuo, Walker, Belland, & Schroder, 2013). When included with other predictors in a regression analysis, internet self-efficacy positively predicted student satisfaction (Kuo et al., 2013), but not significantly in other studies (Al-Azawei & Lundqvist, 2015; Kuo, Walker, Schroder, & Belland, 2014). While students scoring high on computer self-efficacy reported greater confidence and relevance of online courses compared to those low on computer self-efficacy, these two groups did not significantly differ on satisfaction with online courses (Chang et al., 2014). Overall, research has shown that one's confidence to use a computer and the internet, in general, are related to satisfaction, but these two variables do not specifically measure a student's ability to use a computer and the internet to take an online class.

LMS Self-efficacy. The last technology aspect of self-efficacy focuses on the online learning platform itself and thus assesses a student's ability to specifically navigate and access the online learning material on a computer. While knowing how to use a computer and the internet are important skills when taking an online class, the class itself is typically delivered on a platform that can either facilitate or hinder access to the course material (Martin, Tutty, & Su, 2010). Research on LMS self-efficacy is scarce (Alqurashi, 2016) and when it is considered, some researchers will combine it with general technology self-efficacy (e.g., Wang, Shannon, & Ross, 2013). When validating a scale to measure LMS self-efficacy, Bradley, Browne, and Kelley (2017) found a moderate positive correlation with internet self-efficacy, suggesting these technology aspects are related but distinct. Despite the importance of the online platform in delivering course content and enabling students to gain access to it using a skill set that goes beyond using a computer and the internet, little research has focused exclusively on this aspect.

When asking students what they value most in an online learning environment, Palmer and Holt (2010) identified the following elements of an online learning system as being the most valued

by students: accessing course information, interacting with online resources, participating in online discussions, and contacting lecturers and tutors. Indeed, if these are most valued by students and perceived as contributing to an enhanced learning experience, students must have confidence in their ability to use these elements of the online platform. In support of this, one's confidence to communicate and learn online was a significant and positive predictor of satisfaction with online learning (Palmer & Holt, 2009). LMS self-efficacy was higher among online students compared to hybrid students, but was only a significant positive predictor of course performance for the latter group (Martin et al., 2010). Being able to use and navigate the online platform seems to be a crucial element of taking an online course and succeeding; more research is needed to explore how confidence using the online platform is related to other perceptions, including satisfaction and usefulness. Therefore, this study will add to this literature by exploring students' confidence to use the online learning platform rather than assessing confidence to use the computer or Internet.

Self-efficacy to Learn Online. While most of the literature on self-efficacy in online education focuses on the technology aspects, there are other dimensions of self-efficacy that are important to consider. Out of five separate components of self-efficacy explored in online classes, a multiple regression revealed that self-efficacy to handle the online platform tools (i.e., LMS self-efficacy) was not a significant predictor of students' satisfaction with online learning (Shen, Cho, Tsai, & Marra, 2013). However, the other four components (self-efficacy to complete an online course, interact both socially and academically with peers, and interact with the instructors) were all positive significant predictors of satisfaction with online learning. A student may feel confident in their ability to use the technology in an online course (use a computer and the internet as well as navigate the online learning platform), but these technology-focused aspects of self-efficacy do not capture students' reasons for taking a class or the purpose of choosing an online class. One reason to take a class is to learn and take something away from the class. Self-efficacy to learn online captures how confident students are about their ability to learn in an online, asynchronous environment in the absence of both peers and the instructor and has been tied to a number of outcomes.

Specifically, self-efficacy to learn online was the strongest predictor of perceived learning (Alqurashi, 2019) and students' self-reported self-efficacy to learn math asynchronously positively predicted math achievement throughout the semester (Hodges, 2008). Moreover, self-efficacy to learn online was a negative predictor of both frustration and boredom in online classes (Artino & McCoach, 2008) and a significant positive predictor of students' satisfaction with their online class experiences (Alqurashi, 2019; Artino, 2008; Y.-M. Lin, Lin, & Laffey, 2008). Online learning self-efficacy was positively and significantly correlated with satisfaction, achievement as well as persistence in online classes (Joo, Lim, & Kim, 2013). Thus, in addition to focusing on self-efficacy to use the online platform, this study will also contribute to this growing body of literature exploring self-efficacy to learn online.

Self-regulation

Students' self-efficacy to use the online learning platform and learn in online classes are both important, but students must also adopt learning strategies to be successful. Self-regulation refers to the ability to use self-managing behaviors and implement learning processes (Zimmerman, 1995a) that, when coupled with motivation, enable students independently to put their self-confidence beliefs into action (Zimmerman, 1995b). These self-regulation behaviors and the confidence to be able to implement them in an online learning environment are related to a number of outcomes. Compared to students who persisted, self-regulation skills were significantly

lower among students who dropped out of online courses (Lee et al., 2013). Furthermore, self-regulation skills were positively correlated with academic outcomes (Broadbent & Poon, 2015), positive attitudes towards online learning and perceived usefulness of collaborative online learning activities (Su, Li, Liang, & Tsai, 2018). In contrast, other studies found student self-regulation did not significantly predict satisfaction in online courses or learning outcomes when included in structural equation models or multiple regressions (Eom & Ashill, 2016; Kuo et al., 2013).

Bradley et al. (2017) found that their newly created LMS self-efficacy scale was strongly positively correlated with self-regulation, suggesting these are closely related and interdependent constructs. According to Lee and Hwang's (2007) e-learning effectiveness model, both self-efficacy and self-regulatory learning strategies are important for perceived satisfaction and usefulness of online classes. Some studies have found these two constructs relate to outcomes similarly. Eom (2012) found that self-regulation and LMS self-efficacy were positively correlated but neither significantly predicted satisfaction with the online learning platform. Liaw and Huang (2013) found LMS self-efficacy and self-regulation were moderately positively correlated with each other and both were related positively with LMS satisfaction and usefulness. Yet, researchers have found that these two constructs do relate to outcomes differently. Self-regulation was connected with higher levels of student engagement in online classes, but computer self-efficacy was not (Sun & Rueda, 2012). Based on these inconsistent findings, this study will jointly explore both self-efficacy and self-regulation as predictors of satisfaction and usefulness.

Past Experience

Students' self-efficacy and self-regulation behaviors might improve over time with more experience in online classes. Students with more online class experience report higher self-efficacy to learn online (Artino, 2008; Bradley et al., 2017) and use more self-regulation and effective learning strategies (Bradley et al., 2017; Wang et al., 2013). In addition, students with past online experience report greater satisfaction (Artino, 2008; Jan, 2015) and more positive learning experiences in online classes (Li, Marsh, Rienties, & Whitelock, 2017). The use of effective learning strategies along with technology self-efficacy acted as mediators for the relationship between past online experience and satisfaction (Wang et al., 2013). Online class experience might alter how self-efficacy and self-regulation strategies relate to both satisfaction and perceived usefulness of online learning. Among students with high and low online class experience, students' confidence and use of learning strategies might relate differently with perceived satisfaction and usefulness of online classes.

Current Study

The current study answers the call for more research into self-efficacy within online learning (Alqurashi, 2016), specifically exploring two less studied aspects of self-efficacy: online learning platform and learning online. This project aims to explore how students' confidence regarding their ability to use online learning platforms, utilize self-regulation strategies, and their ability to learn in online classes predict both their satisfaction with and perceived usefulness of online classes. Moreover, these initial relationships might be moderated by online class experience. Specifically, this study answers the following questions: to what extent do LMS self-efficacy, self-efficacy to learn online, and self-regulation measures, both alone and in combination, relate to perceived satisfaction with the online platform, satisfaction with online learning and usefulness of online learning and which of these predictors is the strongest? Does past online learning experience interact with any of the significant relationships found in the multiple regression analyses?

Methods

Sample

A total of $N = 88$ undergraduate and graduate students currently enrolled in an online psychology class, 72 females (81.82%), from two universities in Texas completed the survey. One university is a small private religiously affiliated school and the other university is a small state school. Students were offered minimal extra credit for participating. Students' average age was 28.7 ($SD = 8.54$), ranging from 18 to 50. Roughly half of the sample (48.9%) was between the ages of 18–25. On average, students had taken 8.95 ($SD = 8.38$) online classes, ranging from 1 to 40. This research was approved by the institutional review boards.

Survey

Participants answered demographic questions (sex and age) as well as reported the number of online classes they have taken or are currently taking as a measure of online experience. Then they completed a 57-item survey to measure self-efficacy, self-regulation, satisfaction, and usefulness concerning online classes.

Predictors

Self-efficacy. Two scales measured self-efficacy. First, self-efficacy to use the online learning platform (*LMS self-efficacy*) was measured using the 13-item scale from the Online Academic Success Indicators Scale (OASIS; Bradley et al., 2017). Sample items included students' confidence to "upload an assignment" and "take a test or quiz online" and thus captures students' confidence in their ability to navigate and utilize the online learning platform effectively to interact with the online material. Students rated their confidence on a 7-point scale (1 = not confident to 7 = very confident).

In addition to being able to use the online platform to gain access to the course content, students also have beliefs about their ability to learn in an online environment (*self-efficacy for learning*). Thus, students' confidence regarding their ability to learn online was measured using the 7-item scale from the Online Learning Self-Efficacy Scale (OLSES; Zimmerman & Kulikowich, 2016). Sample items included students' confidence to learn "without being in the same room as the instructor" and "communicate using asynchronous technologies" thus measuring how confident students are about learning online. Students rated their confidence on a 6-point scale (1 = not at all confident to 6 = complete confidence).

Self-regulation Efficacy. Two scales were used to measure self-regulation strategies. First, students' self-efficacy for time management was measured using the 5-item scale from OLSES (Zimmerman & Kulikowich, 2016). This scale, referred to as *time management regulation,* measures students' confidence to "manage time effectively" and "develop and follow a plan for completing all required work on time." Students rated their confidence on a 6-point scale (1 = not at all confident to 6 = complete confidence).

Students are not only facing time management concerns but also need to have the ability to ask for help when they need it and utilize external resources to help them succeed in online courses. These additional self-regulation strategies are captured in the scale *self-regulation learning strategies* in online courses, a 10-item scale from the OASIS (Bradley et al., 2017). Sample items included students' confidence to "maintain focus on an assigned task" and "ask for help from your online peers." Students rated their confidence on a 7-point scale (1 = not confident to 7 = very confident).

Outcomes

Perceived satisfaction was measured using two scales. First, *satisfaction with the online platform* was measured using a 5-item scale (Liaw & Huang, 2013) assessing students' satisfaction with several elements of the online platform and learning content. Sample items included being satisfied with "using e-learning functions" and "multimedia instruction." Students rated their satisfaction on a 7-point scale (1 = strongly disagree to 7 = strongly agree).

Second, *satisfaction with online learning* was measured using an 11-item scale (Zakariah, Hashim, & Musa, 2016) assessing students' satisfaction with online learning. This scale measures how satisfied students are with their online learning in general as well as compared to face-to-face classes. Sample items included "I enjoy learning from the web based lessons" and "I prefer web based courses to traditional classroom instruction." Students rated their satisfaction on 7-point scale (1 = extremely dissatisfied to 7 = extremely satisfied).

For perceived *usefulness of online classes*, a 6-item scale (Liaw & Huang, 2013) was used to measure how useful online classes are in terms of their effectiveness and as an aid in learning. Sample items included the belief that "e-learning systems are useful learning tools" and students' intention to: "use e-learning content to assist my learning." Students rated these items on a 7-point scale (1 = strongly disagree to 7 = strongly agree).

Statistical Analysis

To answer the first research question, a correlation matrix was run with all the variables to detect how measures of self-efficacy and self-regulation individually relate to satisfaction and usefulness. Then ordinary least squares multiple regression analyses were run for each of the three outcome variables (two satisfaction measures and one usefulness measure) to discern which predictor was the strongest; each regression had five predictors: number of online classes, LMS self-efficacy, confidence to learn online, time management regulation, and self-regulation learning strategies. To test the possible moderating effect (Baron & Kenny, 1986) of past online experience, an interaction term was created with only the significant predictors from the three regression analyses.

Results

First, a Pearson correlation matrix was run between all of the variables to investigate how measures of self-efficacy and self-regulation individually relate to satisfaction and usefulness. There were strong to moderate correlations between most of the variables (see Table 1) indicating that the more confidence one has to use the online platform, to learn online, to use self-regulation strategies, and manage one's time, the more satisfied one is with the online platform and with learning online as well as perceiving online classes to be useful. Additionally, both measures of self-efficacy were strongly positively correlated with both measures of self-regulation learning strategies.

Table 1

Pearson Correlations and Alpha Coefficients for all Measures

		1	2	3	4	5	6	7	8
1. # online classes	Pearson's r	—							
	p-value	—							
2. LMS SE	Pearson's r	0.084	.95						
	p-value	0.437	—						
3. SE learn	Pearson's r	0.118	0.853 ***	.908					
	p-value	0.273	< .001	—					
4. SR time	Pearson's r	0.101	0.841 ***	0.841 ***	.912				
	p-value	0.349	< .001	< .001	—				
5. SR	Pearson's r	0.079	0.902 ***	0.807 ***	0.856 ***	.902			
	p-value	0.463	< .001	< .001	< .001	—			
6. Satisfaction online platform	Pearson's r	0.210 *	0.560 ***	0.662 ***	0.568 ***	0.623 ***	.922		
	p-value	0.050	< .001	< .001	< .001	< .001	—		
7. Satisfaction online learning	Pearson's r	0.243 *	0.475 ***	0.568 ***	0.516 ***	0.483 ***	0.710 ***	.917	
	p-value	0.023	< .001	< .001	< .001	< .001	< .001	—	
8. Usefulness	Pearson's r	0.202	0.482 ***	0.557 ***	0.504 ***	0.530 ***	0.884 ***	0.743 ***	.948
	p-value	0.060	< .001	< .001	< .001	< .001	< .001	< .001	—

* $p < .05$, ** $p < .01$, *** $p < .001$

Note. Cronbach's alpha coefficients are reported on the diagonal. 1. # of online classes is the number of online classes students have taken or currently taking; 2. LMS SE measures students' self-efficacy to use and navigate online courses using the learning management platform; 3. SE learn measures students' self-efficacy to learn online; 4. SR time measures students' time management regulation; 5. SR measures students' use of self-regulated learning strategies online; 6. Satisfaction online platform measures perceived satisfaction with the online learning platform; 7. Satisfaction online learning measures perceived satisfaction with learning online; 8. Usefulness measures perceived usefulness of online classes.

To discern how these variables together predict the three perceptions, three multiple regression analyses were conducted. Given the moderate to strong correlations between the predictors, the tolerance and VIF values are provided in Table 2 below. Number of online classes had the highest tolerance value (.984) indicating it has the potential to provide the greatest amount of unique predictive information. Multicollinearity was a concern for the remaining predictor variables which had lower tolerance values and higher VIF values. These values indicate that the proportion of variance not already attributable to the other predictors was much lower and thus these variables are contributing less unique predictive information. The first regression analysis predicted *satisfaction with the online platform.* All five predictors accounted for 50.7% of the variation in this measure of satisfaction, F (5,82) = 16.9, $p < .001$ (see Table 2).

Table 2

Multiple Regression Predicting Satisfaction with the Online Platform

Predictors	Unstandardized	SE	Standardized	t	p	Tolerance	VIF
Constant	1.998	.476		4.201	<.001		
# online classes	0.018	0.010	0.137	1.748	0.084	.984	1.016
LMS SE	-0.396	0.208	-0.393	-1.901	0.061	.140	7.128
SE learn	**0.740**	**0.192**	**0.638**	**3.850**	**< .001**	**.219**	**4.570**
SR time	-0.157	0.186	-0.146	-0.842	0.402	.201	4.979
SR	**0.559**	**0.191**	**0.577**	**2.928**	**0.004**	**.154**	**6.474**

Note. # of online classes is the number of online classes students have taken or currently taking; LMS SE measures students' self-efficacy to use and navigate online courses using the learning management platform; SE learn measures students' self-efficacy to learn online; SR time measures students' time management regulation; SR measures students' use of self-regulated learning strategies online; Satisfaction with the online platform measures perceived satisfaction with the online learning platform.

There were only two significant predictors for perceived satisfaction with the online platform: *self-regulated learning strategies* and *self-efficacy to learn online*. Students were more satisfied with the online learning platform when they reported higher self-reported ability to self-regulate online (e.g., maintaining focus, asking for help) and higher confidence to learn online.

The second regression analysis predicted *satisfaction with online learning.* All five predictors accounted for 36.4% of the variation in this measure of satisfaction, F (5,82) = 9.37, p < .001 (see Table 3).

Table 3

Multiple Regression Predicting Satisfaction with Online Learning

Predictors	Unstandardized	SE	Standardized	t	P
Constant	1.44	.595		2.42	.018
# online classes	**0.025**	**0.013**	**0.176**	**1.987**	**0.050**
LMS SE	-0.196	0.261	-0.177	-0.753	0.454
SE learn	**0.630**	**0.241**	**0.493**	**2.617**	**0.011**
SR time	0.155	0.233	0.131	0.667	0.507
SR	0.126	0.239	0.119	0.529	0.598

Note. # of online classes is the number of online classes students have taken or currently taking; LMS SE measures students' self-efficacy to use and navigate online courses using the learning management platform; SE learn measures students' self-efficacy to learn online; SR time measures students' time management regulation; SR measures students' use of self-regulated learning strategies online; satisfaction with online learning measures perceived satisfaction with learning online.

There were only two significant predictors of perceived *satisfaction with online learning*: *number of online classes* and *self-efficacy to learn online*. As online class experience and confidence in one's ability to learn online increased, students reported being more satisfied with learning online.

The third regression analysis predicted *usefulness of online classes.* All five predictors accounted for 36% of the variation in usefulness, F (5,82) = 9.24, p < .001 (see Table 4).

Table 4

Multiple Regression Predicting Usefulness of Online Classes

Predictors	Unstandardized	SE	Standardized	t	P
Constant	2.051	.609		3.369	.001
# online classes	0.020	0.013	0.140	1.568	0.121
LMS SE	-0.329	0.267	-0.291	-1.234	0.221
SE learn	**0.596**	**0.246**	**0.457**	**2.422**	**0.018**
SR time	-0.010	0.238	-0.009	-0.043	0.966
SR	0.456	0.244	0.420	1.867	0.065

Note. # of online classes is the number of online classes students have taken or currently taking; LMS SE measures students' self-efficacy to use and navigate online courses using the learning management platform; SE learn measures students' self-efficacy to learn online; SR time measures students' time management regulation; SR measures students' use of self-regulated learning strategies online; usefulness measures perceived usefulness of online classes.

There was only one significant predictor of perceived *usefulness: self-efficacy to learn online*. The higher confidence students had regarding their ability to learn online, the higher the perceived usefulness of online classes.

Next, past online experience (number of online classes) was tested as a possible moderator of the relationship between the significant predictors of each of the three outcomes (*self-regulated learning strategies* and the outcome *satisfaction with online platform*; *self-efficacy to learn online* and each of the three outcomes). The predictors and moderator variables were grand-mean centered to control for multicollinearity. However, the interaction term (predictor x number of online classes) was not significant in any of the four regression analyses.

While past online experience did not significantly moderate the relationship between self-efficacy to learn online and satisfaction with online learning, a between-groups test was run to replicate findings reported in the literature. A *t*-test was run to examine differences in the outcome measures between those who had taken a high versus low number of online classes, as one measure of experience with this modality. A median split was used to create the two groups with those at the median (i.e., 6) categorized into the low group. The only significant difference was on *satisfaction with online learning*. Those who had taken between 7 and 40 online classes (high experience, $n = 40$) reported significantly higher satisfaction with their learning ($M = 5.42$) compared to those who had taken between 1 and 6 online classes ($M = 4.77$; low experience, $n = 48$), $t(86) = -2.64$, $p = .01$, $d = -0.564$. The effect size indicated this was a moderate sized difference.

Discussion

The current study sought to examine how students' confidence (self-efficacy measures) and use of learning strategies (self-regulation measures) relate to students' perceptions of online classes. The correlation analysis revealed positive and significant correlations between LMS self-efficacy, learning self-efficacy, self-regulation, and time management with perceived satisfaction and usefulness. Specifically, satisfaction with the online platform was higher for students who reported greater confidence to learn online and adoption of online learning strategies. The LMS platform is more satisfactory when students are confident in their ability to learn online and have the skills necessary to implement this ability. Greater satisfaction with online learning was reported by those who had more experience with online classes and were more confident in their ability to learn online. Additionally, online classes were perceived as more useful when students reported greater confidence to learn online.

The strong correlations between the predictor variables and the relatively low tolerance values indicate that multicollinearity is a concern making it difficult to isolate the unique effects of each variable in the regression models. Similar to other studies, the predictor variables were significantly correlated with the outcomes individually but not when combined in multiple regression analyses. Specifically, LMS self-efficacy, when compared to other predictors, lacked a significant relationship with satisfaction and usefulness, supporting Eom (2012) and Shen et al. (2013). Self-regulation strategies were not significant predictors of satisfaction with learning or usefulness, supporting Eom and Ashill (2016) and Kuo et al. (2013). While there was a strong positive correlation between LMS self-efficacy and self-regulation strategies, supporting other researchers' findings (Bradley et al., 2017; Eom, 2012; Liaw & Huang, 2013), and despite the positive correlations with satisfaction and usefulness (supporting Liaw & Huang, 2013; Su et al.,

2018), confidence in one's ability to use the online platform and adopt learning strategies online lacked a significant predictive relationship with learning satisfaction and usefulness. The concerns with multicollinearity call into question the ability to identify the strongest predictor and perhaps rather than trying to isolate a single variable responsible for students' perceptions (see Hobson & Puruhito, 2018), the current study reveals that there are many variables related to satisfaction and usefulness. As the correlations revealed, confidence and learning strategies were correlated with each other and related to students' perceptions of online classes. A path analysis model might better capture the interrelatedness of these constructs to explore how these student factors, combined with faculty and course factors (e.g., Cochran et al., 2016; Endres et al., 2009; Kucuk & Richardson, 2019), relate to each other as well as with various outcomes.

The strong, positive, and significant correlations between the measures of self-efficacy and the use of self-regulation strategies provide support for Zimmerman's self-regulation learning model (2000) and Lee and Hwang's (2007) e-learning effectiveness model. Students who are more confident in their use of the LMS and their ability to learn online are also adopting and practicing skills and strategies in their online classes. Given that all the variables were measured at the same time, the cyclical nature of Zimmerman's model could not be explored in this study. The multicollinearity in this study points to the interrelatedness of the variables and the complexity of students' perceptions. Future research could measure these variables multiple times during a semester to better capture the interrelationships between and amongst these variables.

This study adds to the growing body of literature exploring LMS self-efficacy finding a positive and strong correlation with satisfaction with the online platform and online learning (see Palmer & Holt, 2009) as well as usefulness of online classes. This study also supports the positive relationships found between online learning self-efficacy with satisfaction, learning, and academic outcomes (Alqurashi, 2019; Artino, 2018; Hodges, 2008; Joo et al., 2013; Lin et al., 2008). Moreover, there was a strong positive correlation between both measures of self-efficacy: LMS and to learn online. Both of these dimensions seem important for achieving one's goals and successfully completing an online class. Future research exploring multiple dimensions of students' self-efficacy are fruitful directions to pursue, particularly exploring how they might relate to the self-reflection phase of Zimmerman's model.

When students feel capable and confident in their ability to learn and take something away from the class, they are more satisfied with their experiences and thus at a lower risk of dropping out (Levy, 2007). This also means that if the students have less confidence in their ability to learn by taking online classes, they perceived online classes as being less useful and were more dissatisfied with both the platform and learning online. Thus, a student needs to have confidence that one can learn in order for the online classes to be perceived as useful. If a student feels they are not going to learn anything, then the classes are not useful and perceived as a waste of time. This might also contribute to the lower rate of participation seen in those who drop out of online classes (Nistor & Neubauer, 2010); the issue may not be one of not knowing how to use the technology (technology self-efficacies) or effectively carrying out the task (self-regulation), but rather one of lacking a learning objective. Indeed, research exploring students' perceptions of faculty factors has found that students were more satisfied with their online classes when teachers were perceived as providing direction and clear expectations (Jackson, Jones, & Rodriguez, 2010). Thus, future research should assess not only students' confidence to learn but also their sense of the guidance and direction offered by the teacher.

Prior experience was correlated with satisfaction with the platform and online learning, but only had a predictive relationship with the latter. Unlike Jan (2015), this study found that prior experience did retain a significant relationship with online learning satisfaction when included in a multiple regression analysis. Prior experience was not found to moderate the relationship between self-efficacy to learn online and online learning satisfaction. Using a median split to categorize number of online classes into those with high versus low experience, this study found the only significant difference was satisfaction with online learning. As students gain more experience with this online modality, they report being more satisfied with their learning through this online modality. Given that it was unrelated to confidence using the platform, or being able to use effective learning strategies, this suggests these are not being learned over time or with additional experience but could perhaps be tied to familiarity with using computers and being online in everyday life (separate from school) or based on training that is offered by the schools (help, support, how to take an online class, etc.; see Lai et al., 2018). The current study did not support Bradley et al.'s (2017) finding that students with more online experience reported higher self-efficacy to learn and self-regulation, but it should be noted that Bradley et al. compared students with zero or one online class to those with two or more. Perhaps students are able to learn these strategies and become confident after just a few online classes, but the lack of a correlation in this study would suggest this was not the case. More research should investigate self-efficacy and self-regulation among students with no online class experience and those with more experience. However, this study did reveal that students with more online class experience are more satisfied with online learning than those with less experience. While the use of strategies and confidence may not differ, satisfaction with learning appears to improve with more experience.

The results of this study should be considered in light of the limitations of the convenience sample that comprised students taking psychology classes and thus the results may not be generalizable to all students. Additionally, very few males responded and while this proportion of males is not unusual among psychology classes, future research should attempt to survey a more representative sample of college students. Considering the wide range of ages represented in this sample, future research could investigate if traditional and nontraditional students differ in their perceptions and experiences with online courses. The measure of past experience with online classes only considered how many online classes the students had taken or were currently taking and did not measure their experience with those classes. The sample of students could have had a wide range of experiences with online classes, taught at multiple universities and by multiple teachers. Not all online classes are the same and future research can explore how specific elements and factors of online classes are perceived by students.

The current study only investigated a narrow range of student factors limited to LMS efficacy and learning skills. Students rated their overall experience with online classes, rather than a particular class, thus identifying specific course elements, course design, or pedagogical techniques was not possible. Given the wide range of course designs and varying experiences with online classes, the results only shed light on overall ratings of satisfaction and how these are associated with a handful of student factors. The focused analysis on LMS efficacy in the current study did not consider other student factors that past research has indicated are important, including students' agency and expectations regarding the class (see Dziuban et al., 2015). Based on past research showing that students' positive perceptions of online classes were tied to both technology efficacy and interactions with both content and instructors (Kuo et al., 2013), future research should explore these opportunities for interactions and expand the scope to consider course and faculty factors as well (Blackmon & Major, 2012; Cochran et al., 2016; Endres et al., 2009).

According to an analysis of focus groups, Parahoo et al. (2016) found that students' interactions with classmates, faculty and staff were important dimensions of the students' experienced satisfaction. Moreover, students' perceptions of the teacher (e.g., availability, clear expectations, comfortable atmosphere) are positively related with students' satisfaction (Jackson et al., 2010). Likewise, a structural equation model revealed teaching presence to be the primary factor related to student satisfaction (Kucuk & Richardson, 2019). As the current study highlights the importance of students' self-efficacy to learn online, additional research should also explore the collaborative aspects of taking a course, along with the students' expectations and perceptions of the teacher, to shed more light on perceptions of online classes.

Future research should also explore other factors related to students' motivations for taking an online class that were not considered here. These include the ability to choose the modality where students self-select their preferred format if the class has multiple format offerings. Students may find the online modality more convenient and suited to life circumstances (e.g., working full-time, taking care of young children), which might render the flexibility afforded by online classes appealing (see Dyrbye et al., 2009; Kokko et al., 2015). Discerning other motivations to take an online class could expand on past qualitative studies exploring students' experiences of satisfying and unsatisfying online classes. Further exploration into the interrelatedness and cyclical relationship between confidence and self-regulation would help to address the high drop-out rate and help improve overall experiences with online classes.

References

Al-Azawei, A., & Lundqvist, K. (2015). Learner differences in perceived satisfaction of an online learning: An extension to the technology acceptance model in an Arabic sample. *Electronic Journal of E-Learning, 13*(5), 408–426.

Alqurashi, E. (2016). Self-efficacy in online learning environments: A literature review. *Contemporary Issues in Education Research, 9*(1), 45–51.

Alqurashi, E. (2019). Predicting student satisfaction and perceived learning within online learning environments. *Distance Education, 40*(1), 133–148.

Artino, A. R. (2008). Motivational beliefs and perceptions of instructional quality: Predicting satisfaction with online training. *Journal of Computer Assisted Learning, 24*(3), 260–270.

Artino, A. R., Jr., & McCoach, D. B. (2008). Development and initial validation of the Online Learning Value and Self-Efficacy Scale. *Journal of Educational Computing Research, 38*(3), 279–303.

Bandura, A. (1986). The explanatory and predictive scope of self-efficacy theory. *Journal of Social and Clinical Psychology, 4*(3), 359–373.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173–1182.

Blackmon, S. J., & Major, C. (2012). Student experiences in online courses: A qualitative research synthesis. *Quarterly Review of Distance Education, 13*(2), 77–85.

Blau, G., Mittal, N., Schirmer, M., & Ozkan B. (2017). Differences in business undergraduate perceptions by preferred classroom learning environment. *Journal of Education for Business, 92*(6), 280–287.

Bowers, J., & Kumar, P. (2015). Students' perceptions of teaching and social presence: A comparative analysis of face-to-face and online learning environments. *International Journal of Web Based Learning and Teaching Technologies, 10*, 27–44. doi: 10.4018/ijwltt.2015010103

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.

Bristow, D., Shepherd, C. D., Humphreys, M., & Ziebell, M. (2011). To be or not to be: That isn't the question! An empirical look at online versus traditional brick-and-mortar courses at the university level. *Marketing Education Review, 21*(3), 241–250.

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.

Chang, C.-S., Liu, E. Z.-F., Sung, H.-Y., Lin, C.-H., Chen, N.-S., & Cheng, S.-S. (2014). Effects of online college student's internet self-efficacy on learning motivation and performance. *Innovations in Education and Teaching International, 51*(4), 366–377. https://doi.org/10.1080/14703297.2013.771429

Chen, H., Islam, A. Y. M. A., Gu, X., Teo, T., & Peng, Z. (2019). Technology-enhanced learning and research using databases in higher education: The application of the ODAS model. *Educational Psychology*. https://doi.org/10.1080/01443410.2019.1614149

Chu, R. J. (2010). How family support and internet self-efficacy influence the effects of e-learning among higher aged adults—Analyses of gender and age differences. *Computers & Education, 55*(1), 255–264.

Cochran, J. D., Baker, H. M., Benson, D., & Rhea, W. (2016). Business student perceptions of online learning: Using focus groups for richer understanding of student perspectives. *Organization Management Journal, 13*(3), 149–166.

Dyrbye, L., Cumyn, A., Day, H., & Heflin, M. (2009). A qualitative study of physicians' experiences with online learning in a master's degree program: Benefits, challenges, and proposed solutions. *Medical Teacher, 31*, e40–e46.

Dziuban, C., Moskal, P., Thompson, J., Kramer, L., DeCantis, G., & Hermsdorfer, A. (2015). Student satisfaction with online learning: Is it a psychological contract? *Online Learning, 19*(2), 122–136. https://doi.org/10.24059/olj.v19i2.496

Endres, M. L., Chowdhury, S., Frye, C., & Hurtubis, C. A. (2009). The multifaceted nature of online MBA student satisfaction and impacts on behavioral intentions. *Journal of Education for Business, 84*(5), 304–312.

Eom, S. B. (2012). Effects of LMS, Self-efficacy, and self-regulated learning on LMS effectiveness in business education. *Journal of International Education in Business, 5*(2), 129–144.

Eom, S. B., & Ashill, N. (2016). The determinants of students' perceived learning outcomes and satisfaction in university online education: An update. *Decision Sciences Journal of Innovative Education, 14*(2), 185–215.

Francis, M. K., Wormington, S. V., & Hulleman, C. (2019). The costs of online learning: Examining differences in motivation and academic outcomes in online and face-to-face community college developmental mathematics courses. *Frontiers in Psychology, 10*. https://doi.org/10.3389/fpsyg.2019.02054

Garratt-Reed, D., Roberts, L. D., & Heritage, B. (2016). Grades, student satisfaction and retention in online and face-to-face introductory psychology units: A test of equivalency theory. *Frontiers in Psychology, 7*, 1–10.

Gaytan, J. (2015). Comparing faculty and student perceptions regarding factors that affect student retention in online education. *American Journal of Distance Education, 29*, 56–66. doi: 10.1080/08923647.2015.994365

Hammouri, Q., & Abu-Shanab, E. (2018). Exploring factors affecting users' satisfaction toward E-learning systems. *International Journal of Information and Communication Technology Education, 14*(1), 44–57.

Hobson, T. D., & Puruhito, K. K. (2018). Going the distance: Online course performance and motivation of distance learning students. *Online Learning, 22*(4), 129–140.

Hodges, C. B. (2008). Self-efficacy, motivational email, and achievement in an asynchronous math course. *Journal of Computers in Mathematics and Science Teaching, 27*(3), 265–285.

Horspool, A., & Lange, C. (2012). Applying the scholarship of teaching and learning: student perceptions, behaviours and success online and face-to-face. *Assessment & Evaluation in Higher Education, 37*(1), 73–88.

Islam, A. Y. M. A., Leng, C. H., & Singh, D. (2015). Efficacy of the Technology Satisfaction Model (TSM): An empirical study. *International Journal of Technology and Human Interaction (IJTHI), 11*(2), 45–60.

Jackson, L. C., Jones, S. J., & Rodriguez, R. C. (2010). Faculty actions that result in student satisfaction in online courses. *Journal of Asynchronous Learning Networks, 14*, 78–96.

Jan, S. K. (2015). The relationships between academic self-efficacy, computer self-efficacy, prior experience, and satisfaction with online learning. *American Journal of Distance Education, 29*(1), 30–40.

Jensen, S. A. (2011). In-class versus online video lectures: Similar learning outcomes, but a preference for in-class. *Teaching of Psychology, 38*(4), 298–302.

Joo, Y. J., Lim, K. Y., & Kim, J. (2013). Locus of control, self-efficacy, and task value as predictors of learning outcome in an online university context. *Computers & Education, 62*, 149–158.

Jung, H.-J. (2014). Ubiquitous learning: Determinants impacting learners' satisfaction and performance with smartphones. *Language Learning & Technology, 18*(3), 97–119.

Kırmızı, Ö. (2015). The influence of learner readiness on student satisfaction and academic achievement in an online program at higher education. *TOJET: The Turkish Online Journal of Educational Technology, 14*(1), 133–142

Kokko, T., Pesonen, H., Kontu, E., & Pirttimaa, R. (2015). Why study online in upper secondary school? Qualitative analysis of online learning experiences. *Human Technology, 11*(1), 57–70.

Kucuk, S., & Richardson, J.C. (2019). A structural equation model of predictors of online learners' engagement and satisfaction. *Online Learning, 23*(2), 196–216. doi: 10.24059/olj.v23i2.1455

Kuo, Y.-C., & Belland, B. R. (2016). An exploratory study of adult learners' perceptions of online learning: Minority students in continuing education. *Educational Technology Research and Development, 64*(4), 661–680.

Kuo, Y.-C., Walker, A. E., Belland, B. R., & Schroder, K. E. E. (2013). A predictive study of student satisfaction in online education programs. *International Review of Research in Open and Distance Learning, 14*(1), 16–39.

Lai, C.-L., Hwang, G.-J., & Tu, Y.-H. (2018). The effects of computer-supported self-regulation in science inquiry on learning outcomes, learning processes, and self-efficacy. *Educational Technology Research and Development, 66*(4), 863–892. https://doi.org/10.1007/s11423-018-9585-y

Lederman, D. (2018, Nov 7). *Online education ascends*. Inside Higher Ed. https://www.insidehighered.com/digital-learning/article/2018/11/07/new-data-online-enrollments-grow-and-share-overall-enrollment

Lee, Y., Choi, J., & Kim, T. (2013). Discriminating factors between completers of and dropouts from online learning courses. *British Journal of Educational Technology, 44*(2), 328–337.

Lee, J. K. & Hwang, C. Y. (2007). The effects of computer self-efficacy and learning management system quality on e-Learner's satisfaction. In L. Cameron, A. Voerman, & J. Dalziel (Eds), *Proceedings of the 2007 European LAMS Conference: Designing the future of learning* (pp. 73–79). LAMS Foundation.

Levy, Y. (2007). Comparing dropouts and persistence in e-learning courses. *Computers & Education, 48*(2), 185–204.

Li, N., Marsh, V., Rienties, B., & Whitelock, D. (2017). Online learning experiences of new versus continuing learners: A large-scale replication study. *Assessment & Evaluation in Higher Education, 42*(4), 657–672. https://doi.org/10.1080/02602938.2016.1176989

Liaw, S.-S., & Huang, H.-M. (2013). Perceived satisfaction, perceived usefulness and interactive learning environments as predictors to self-regulation in e-learning environments. *Computers & Education, 60*(1), 14–24.

Lim, C. K. (2001). Computer self-efficacy, academic self-concept, and other predictors of satisfaction and future participation of adult distance learners. *American Journal of Distance Education, 15*(2), 41–51.

Lin, Y.-M., Lin, G.-Y., & Laffey, J. M. (2008). Building a social and motivational framework for understanding satisfaction in online learning. *Journal of Educational Computing Research, 38*(1), 1–27.

Martin, F., Tutty, J. I., & Su, Y. (2010). Influence of learning management systems self-efficacy on e-learning performance. *Journal on School Educational Technology, 5*(3), 26–35.

Nistor, N., & Neubauer, K. (2010). From participation to dropout: Quantitative participation patterns in online university courses. *Computers & Education, 55*(2), 663–672.

Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research, 66*(4), 543–578.

Palmer, S. R., & Holt, D. M. (2009). Examining student satisfaction with wholly online learning. *Journal of Computer Assisted Learning, 25*(2), 101–113.

Palmer, S., & Holt, D. (2010). Students' perceptions of the value of the elements of an online learning environment: Looking back in moving forward. *Interactive Learning Environments, 18*(2), 135–151.

Parahoo, S., Santally, M., Rajabalee, Y., & Harvey, H. (2016). Designing a predictive model of student satisfaction in online learning. *Journal of Marketing for Higher Education, 26*(1), 1–19.

Panadero, E., & Alonso-Tapia, J. (2014). How do students self-regulate? Review of Zimmerman's cyclical model of self-regulated learning. *Anales de Psicología, 30*(2), 450–462.

Riley, K., & Schmidt, D. (2016). Does online learning click with rural nurses? A qualitative study. *Australian Journal of Rural Health, 24*, 265–270.

Shen, D., Cho, M.-H., Tsai, C.-L., & Marra, R. (2013). Unpacking online learning experiences: Online learning self-efficacy and learning satisfaction. *The Internet and Higher Education, 19*, 10–17.

Simmering, M. J., Posey, C., & Piccoli, G. (2009). Computer self-efficacy and motivation to learn in a self-directed online course. *Decision Sciences Journal of Innovative Education, 7*(1), 99–121.

Su, Y., Li, Y., Liang, J.-C., & Tsai, C.-C. (2018). Moving literature circles into wiki-based environment: The role of online self-regulation in EFL learners' attitude toward collaborative learning. *Computer Assisted Language Learning.* doi: 10.1080/09588221.2018.1527363

Sun, J. C.-Y., & Rueda, R. (2012). Situational interest, computer self-efficacy and self-regulation: Their impact on student engagement in distance education. *British Journal of Educational Technology, 43*(2), 191–204.

Sun, Z., Xie, K., & Anderman, L. H. (2018). The role of self-regulated learning in students' success in flipped undergraduate math courses. *The Internet and Higher Education, 36*, 41–53.

Waldman, L., Perreault, H., Alexander, M., & Zhao, J. (2009). Comparing the perceptions of online learning between students with experience and those new to online learning. *Information Technology, Learning, and Performance Journal, 25*(2), 20–29.

Wang, C.-H., Shannon, D. M., & Ross, M. E. (2013). Students' characteristics, self-regulated learning, technology self-efficacy, and course outcomes in online learning. *Distance Education, 34*(3), 302–323.

Wu, J.-H., Tennyson, R. D., & Hsia, T.-L. (2010). A study of student satisfaction in a blended e-learning system environment. *Computers & Education, 55*(1), 155–164.

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.

Zakariah, Z., Hashim, R. A., & Musa, N. (2016). *Motivation, experience, and satisfaction among adult learners with fully online web-based courses*. Commonwealth of Learning. http://oasis.col.org/handle/11599/2548

Zimmerman, B. J. (1995a). Attaining reciprocality between learning and development through self-regulation. *Human Development, 38*(6), 367–372.

Zimmerman, B. J. (1995b). Self-regulation involves more than metacognition: A social cognitive perspective. *Educational Psychologist, 30*(4), 217–221.

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 13–40). Academic Press.

Zimmerman, W. A., & Kulikowich, J. M. (2016). Online learning self-efficacy in students with and without online learning experience. *American Journal of Distance Education, 30*(3), 180–191.

Zimmerman, B. J., & Martinez-Pons, M. (1988). Construct validation of a strategy model of student self-regulated learning. *Journal of Educational Psychology, 80*, 284–290.

Zimmerman, B. J., Schunk, D. H., & DiBenedetto, M. K. (2017). The role of self-efficacy and related beliefs in self-regulation of learning and performance. In A. J. Elliot, C. S. Dweck, & D. S. Yeager (Eds.), *Handbook of competence and motivation: Theory and application* (2nd ed., pp. 313–333). Guilford Press.

The Impact of Multimedia in Course Design on Students' Performance and Online Learning Experience: A Pilot Study of an Introductory Educational Computing Course

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Abstract
The creation of multimedia assets for online courses is a time-intensive endeavor. Faculty have limited access to instructional designers for this and other course design functions. This study sought to determine if multimedia use in course design contributes positively to student performance or their perception of the online learning experience, after controlling for faculty course design expertise. Students (totaling 142) were enrolled in an Introductory Educational Computing Course between 2016 and 2018 designed according to Quality Matters standards based on an informal internal review as well as a course designed according to instructor preferences. Eighty-four students, who participated in the courses designed according to Quality Matters standards based on an informal internal review, were surveyed about their perceptions. While it may be of no surprise that multimedia use did not impact student performance directly, based on end-of-point course totals, it did positively influence student perceptions of the online learning experience. A performance gap between ethnicities in this study was not observed, as evidence through end-of-course total points. This may be salient given the prevalence of such performance gaps in most educational settings. Course policies and instructional strategies perceived by students as helpful may be one contributing factor to this lack of performance gap. Furthermore, the use of multimedia in course design was found to reduce cognitive load, as shown by the amount of time spent inside the learning management system. What this means for multimedia use in course design and the student online learning experience concludes this paper.

Keywords: multimedia, Quality Matters, community and learner engagement, cognitive load, equitable learning outcomes, achievement gap, online learning experience, course design

Davis, T. & Frederick, T.V. (2020). The impact of multimedia in course design on students' performance and online learning experience: A pilot study of an introductory educational computing course. *Online Learning, 24*(3), 147-162. https://doi.org/10.24059/olj.v24i3.2069

The Impact of Multimedia in Course Design on Students' Performance and Online Learning Experience: A Pilot Study of an Introductory Educational Computing Course

Of the many tasks with which higher education instructional designers are immersed, the production of multimedia is the most time intensive. According to a 2010 study published by the consulting firm of Bryan Chapman, one hour of multimedia production can range from an average low of 49 development hours for simple text, graphics, and assessment questions using template driven rapid authoring tools, to an average low of 217 hours for highly interactive simulations that take advantage of audio, video, and animations. Aside from multimedia production, the overall process of developing a learning solution or an academic course also includes conducting a needs assessment, developing a course outline, working with subject matter experts, designing the course in a learning management system or course authoring tool, identifying appropriate approaches, and collaborating with a variety of stakeholders (Association of Talent Development, 2015). This process is in addition to the managing, training, and support functions that instructional designers undertake daily. Because of their many roles and functions, higher education faculty are limited in their access to instructional designers for course design and technology integration assistance. In a survey conducted by Intentional Futures (2016) of 780 higher education instructional designers, 41% of the instructional designers surveyed came from institutions that had a staff of 1 to 5. The institutions that had instructional designers on staff were from small, medium, and large enrollments and the range of instructional designers on staff was the same. Given this context, the need to measure the impact of multimedia in course design on student performance and their perception of the online learning experience is relevant to the time allocated for the various functions of instructional designers and to faculty who develop and design online content in learning management systems.

This paper will discuss the conclusions of past studies on the topic of multimedia use in course design as it pertains to student performance and perceptions of the online learning experience. In addition, a discussion of the research questions, methods, and the student participants will follow. The paper will conclude with the results of the study, followed by implications of multimedia use in course design.

Review of Related Literature

The use of multimedia in online course design in higher education is considered one of many best practices. According to Meyer, Rose, and Gordon (2014), flexibility and individuality are vital components to removing barriers to learning. Their universal design for learning framework proposes that barriers to learning would be minimized if instructors provided multiple means of engaging learners and representing instructional content, along with allowing students multiple means of expressing what they have learned. Multimedia integration is often used and recommended for these purposes.

According to Bledsoe and Simmerok (2013), videos, audio clips, and photos were used to produce a virtual comprehensive counseling center environment for online graduate psychology students. They found that students had an opportunity to practice statistical concepts, collaborate on a research project, and demonstrate knowledge through tests and quizzes. The author's concluded that the multimedia environment enhanced their understanding of the course content.

The CHLOE Report (2017), jointly published by Quality Matters (QM), an organization that promotes quality standards for course design in all delivery formats, and Eduventures, a provider of research analysis and advisory services to higher education, surveyed 104 chief online officers. They found that lecture capture, authoring tools, and video platforms were perceived as important multimedia technologies. The Online Learning Consortium's course design scorecard references required course design content such as a course welcome and a course orientation, which are often created with multimedia. The same is true of the course design rubric published by the California Community Colleges' Online Education Initiative (2016). Given that the integration of a variety of multimedia is strongly encouraged in online course design, a study of its use and the impact on students' performance and online learning experience is timely.

Across many disciplines, courses infused with multimedia are perceived as more effective than those without. For example, in comparison to voiceover lectures, Chen and Wu (2015) found that video recordings of lectures through lecture capture and picture-in-picture lectures produced superior student performance based on an instructor-created learner performance test sheet. As a result, they concluded that video lecture type is a worthwhile consideration for online learning. In comparison to publisher-provided multimedia content through MyMathLab, Hegeman (2015) found that college algebra students performed significantly better on online and handwritten assessments when the instructor was in the role of content provider, as shown through instructor-generated video lectures and recorded handwritten solutions and oral explanations. Similarly, Vazquez and Chiang (2016) found that students who accessed multimedia pre-lectures scored higher on comprehension and retention than students with access to only textbooks in an economics course. Stanley and Zhang (2018) in their study on student-produced videos and academic performance found students who engaged in the course by producing their own videos had better learning gains than those that did not. While these studies report improved performance with multimedia, Lang (2016) concluded there was no difference in student performance in a computer education course using video lectures versus text tutorials for the same content. Liaw et al. (2015) also concluded there was no difference in student performance when acute nursing care students completed a hands-on patient simulation versus a web-based simulation of the same content. Research studies on the impact of multimedia on students' performance and online learning experience is nonconclusive. Quality assurance measures for course design in the learning management system were not controlled for in these studies but could influence student performance. Specifically, best practices for curricular alignment between learning objectives, materials, and assessments, as advocated by Quality Matters, were not addressed in these studies.

Online courses that do not integrate multimedia are often perceived as not accommodating of diverse learning styles. Higher education instructors are strongly encouraged to accommodate a variety of learning styles in the development and design of their courses. Cakiroglu (2014) in a study analyzing the effect of learning styles and study habits of distance learners on learning performance, used Kolb's Learning Style Inventory to measure student learning styles and a researcher developed achievement test to measure performance. Cakiroglu found some learning styles performed better than others and concluded that learning styles might have an impact on the effectiveness of instructional strategies in online courses. Also using Kolb's Learning Style Inventory, Tan and Laswad (2015) examined the impact of learning styles on academic performance of introductory accounting students. Their performance was measured using multiple-choice and constructed response questions. Because some learning styles were found to perform better on some of the assessments, it was concluded that learning styles should be considered when designing assessments so as not to diminish the validity and fairness of the

assessment. Also using Kolb's Learning Style Inventory, Chen (2015) found differences in student performance based on learning styles. Because of those differences, she concluded that accommodating learners with different needs is essential to learning, particularly in the online classroom. Multimedia is often used to accommodate diverse learning styles. Avoiding its use suggests that the curriculum may not be accessible to all learners.

Because the production of multimedia can be a time-intensive process and access to instructional design services is limited in most higher education institutions, identifying the impact of multimedia in course design on student performance and their perception of the online learning experience is essential. According to Garrison et al., the online learning experience includes teacher presence, peer presence, and cognitive presence. Online instructors often facilitate these three types of presence through the use of multimedia. These online learning experience elements are believed to influence student performance as measured by course grades, (Chen and Wu, 2015; Hegeman, 2015; Vazquez and Chiang, 2016) as well as student satisfaction as measured by perceptual surveys (Dixson, 2010; Young and Bruce, 2011; Leppink et al., 2013). These three types of presence translate into learner engagement strategies. Martin and Bolliger (2018) found that learner-to-learner, learner-to-content, and learner-to-instructor interactions were equally important and that students rated instructor interaction strategies the highest. Krause, Portolese, and Bonner (2017) found that students enjoyed the instructor's use of multimedia for instructor-to-learner communication even though they were unlikely to use the same for communication purposes. These three types of interactions often utilize a variety of multimedia, making the identification of the impact of multimedia on student performance and their online learning experience salient.

Studies of the impact of multimedia in course design on student performance and their perception of the online learning experience is growing. However, there has been very little discussion of the expertise required of course designers to infuse multimedia and apply best course design practices using a learning management system that contributes to successful student outcomes. This study seeks to determine the following:

1. Does course design expertise contribute positively to student performance as determined by total points at the end of the course?
2. Does multimedia use in course design positively contribute to student performance by total points at the end of the course?
3. Does student perception of the online experience influence their performance based on total points at the end of the course?

This study proposes to add to the growing body of literature by assessing the impact of multimedia in well-designed online courses delivered through a learning management system.

Methods

This study used a mixed-methods approach to determine the impact of multimedia in course design on student performance and student perception of the online learning experience. The impact and perception were measured using a 60-item, five-point Likert scale survey administered anonymously through the learning management system that included open-ended questions. Some questions were used as written from published surveys, while others were modified to fit the context of the study (Dixson, 2010; Young & Bruce, 2011; Hadie & Yusoff,

2016; Leppink, Paas, Van Der Vleuten, et al., 2013). This provided evidence for the validity for some of the items and scaled Likert responses followed acceptable practices for social science research (Fowler, 2009). Because the survey assessed a learning objective, students earned 100 points for completing the anonymous survey, which made up approximately 10% of the course grade. Student responses to the Likert-scaled survey were compared to the end-of-course total points to determine whether or not course design expertise and multimedia use positively contributed to student performance. Two nonequivalent group designs were applied to several online sections of the same Educational Computing Level 1 course offered from Spring 2016 to Spring 2018.

Study One Design

The design of study one consisted of eight sections of Educational Computing Level 1 delivered through the learning management system. Four sections of the course were QM-designed, as determined through internal informal assessment, and compared to four sections of the same course designed according to instructor preferences. A course template for each of the two design types was created and each course section for each design type was copied from the respective template during the two-year study period. The online course design met Quality Matter's standards based on an informal internal review using the fifth edition rubric and was later reviewed using the sixth edition rubric. The reviewer was a QM-certified peer reviewer, having completed a minimum of 16 hours of training for the purpose of assessing courses according to QM standards. All essential standards were met and the course earned 94 of 100 points in the informal QM internal review. The course design of each section explicitly articulated the alignment of learning objectives, instructional materials, and course activities, among other course design components. For comparison, four sections of the same course were designed according to instructor preferences. T-tests were used to analyze if students performed better in the Quality Matters courses or the courses built according to instructor preferences based on end-of-course total points, not letter grades determined by the grading scale provided in the course syllabi.

A total of 142 students participated in the study one design. Students were predominately female (81%), Hispanic (36%), and white (41%), and enrolled in online programs (72%). The ethnic and online programs aspects of the student demographics represent the general student demographics of the university used in this project. Sixty percent of the students were between the ages of 19 and 29, 26% were between the ages of 30 and 39, 7% were between the ages of 40 and 49, and 1% were between the ages of 50 and 59. Students enrolled in the Quality Matters course sections totaled 84 and 58 were enrolled in the non-Quality Matters courses. To determine the effect of course design on end-of-course point totals, a t-test was used to determine any statistically significant difference between mean point totals from the two groups.

Study Two Design

The study two design involved the course design of four sections of educational computing Level 1 in the learning management system. Two sections were enriched with a variety of multimedia content—i.e., embedded instructor created videos of assignment directions, embedded instructional content videos, software simulations, and images. For comparison, the course content of two sections was built using formatted text—i.e., written assignment directions, and text transcripts to required video content that included a text link to the required video. Both groups used the same textbook with images, step-by-step instructions, and adhered to Quality Matters standards based on the same informal internal review described in the study one design.

A total of 84 students participated in the study two design. Students in the multimedia-rich sections totaled 46, while 38 students made up the text-based sections. Similar to the study one design, students were predominantly female (80%), ethnically Hispanic (37%), and white (41%), and students enrolled in online programs (66%). Sixty percent of the students were between the ages of 19 and 29, 26% were between the ages of 30 and 39, 6% were between the ages of 40 and 49, and 1% were between the ages of 50 and 59.

Multiple Regression and T-Test

Academic performance is only one aspect of a student's online learning experience. Another aspect is their perception of and overall satisfaction with a course. A survey was administered in study two during the last week of an eight-week course with both Likert-scale and open-ended questions. Some questions were used as written from published surveys, while others were modified to fit the context of the study (Dixson, 2010; Young & Bruce, 2011; Hadie & Yusoff, 2016; Leppink, Paas, Van Der Vleuten et al., 2013). Once the questions were identified, they were combined into scales from which end-of-course total points were analyzed using a t-test and multiple regression. The five-point Likert-scale answer choices included two positive options, two negative options, and a middle neutral option. The survey designed follows quantitative research norms in the social sciences (Fowler, 2009). Each scale was assessed for reliability using Cronbach's alpha. Questions were added to or deleted from a scale to strengthen the scale's reliability score. The resulting four scales and their reliability coefficients appear below:

- Course Design Scale—Cronbach's Alpha = .94
- Community and Learner Engagement Scale—Cronbach's Alpha = .70
- Teaching Style Scale—Cronbach's Alpha = .85
- Cognitive Load Scale—Cronbach's Alpha = .83

Content Analysis of Open-Ended Survey Responses

A content analysis of student responses to the open-ended questions made up the qualitative approach used to determine the influences on student perceptions of the online experience. Of the 60 survey items, the following three open-ended questions were analyzed:

1. What parts of this course were most useful?
2. What parts of this course need improvement?
3. Is there anything about this course that you'd like us to know that we didn't ask? Please provide additional comments.

Similar responses to these open-ended questions were grouped and a classification assigned. Axial themes were then identified and reported.

Results

Several variables were evaluated after the implementation of the study one design, the study two design, the four scales, and the content analysis of the open-ended survey responses. The study one design compared courses designed according to Quality Matters standards to courses designed according to instructor preferences. The study one design compared two course sections of an informally and internally evaluated course designed according to Quality Matters

standards to two course sections that were designed according to instructor preferences to determine if course design expertise improved student performance based on end-of-course total points. As a point of interest, performance gaps between the sexes, age groups, and ethnicities based on the same measure, were reported given the availability of the data. The study two design compared a course rich with multimedia to a course designed with formatted text. End-of-course total points were used to determine if students in a given course design performed higher. In addition, students in the study two design were given a survey to assess their perceptions of the online course design. The results were used to predict the influence of their perceptions on their performance, based on end-of-course total points.

Study One Design Results

Of the 142 students whose end of course point totals were used in the study, 59% were enrolled in courses that adhered to Quality Matters (QM) standards based on an informal internal review using the fifth edition rubric, which was later scored using the 6th edition rubric. The remaining 41% of the participants were enrolled in a course that was designed according to instructor preferences. Students in the QM developed courses earned higher end-of-point total scores ($\bar{x}$ = 907.80) than those in the non-QM courses ($\bar{x}$ = 847.93) t (140) = 2.47, p = 0.02. However, there were no statistically significant performance gaps between age groups [F(3, 131) = 1.895, p = .134] or ethnicities [F(2, 134) = 1.343, p = .257] in either group. Performance differences between males and females were statistically significant [F(1, 140) = 5.862, p = .017], perhaps due to the large discrepancy between the number of males and females in the sample.

The reduction in score variance is also significant to note. The majority of students in the QM course earned a final letter grade ranging from B- to A+. Student scores in the non-QM courses ranged from D+ to A+. This means the end-of-course total points score variance is smaller for the QM course, as graphically displayed in Figure 1 below.

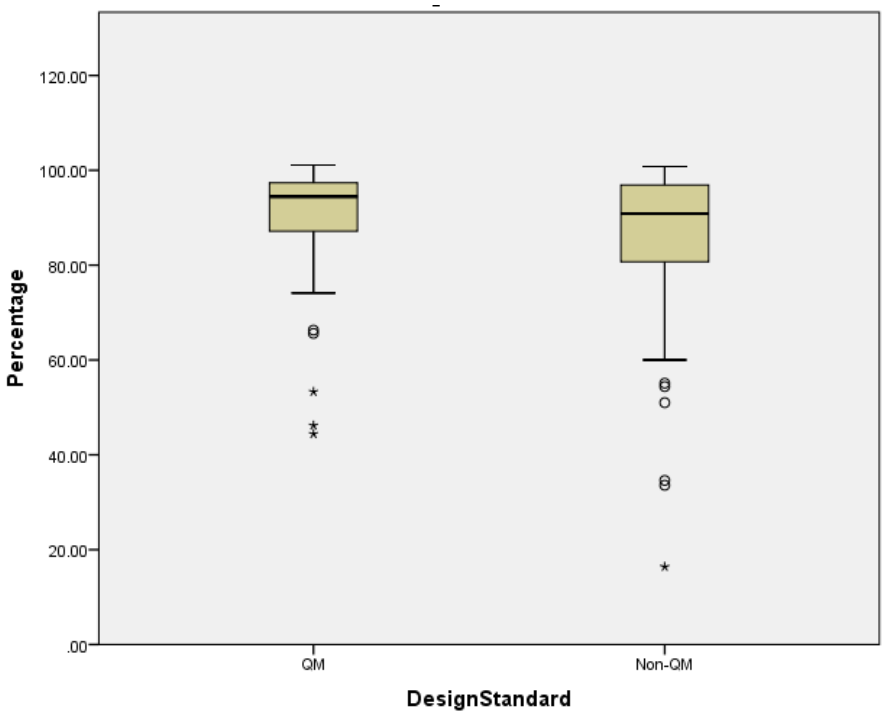

Figure 1. Reduction of Score Variance for Participants in Quality Matter's Courses

Study Two Results

Of the 84 students who participated in courses with two different visual designs, 55% were enrolled in a multimedia-rich design and the remaining 45% were enrolled in a text-based design. The multimedia-rich course contained images, text, embedded media, hyperlinks, and interactive simulations. The text-based course included written assignment directions, images needed for assignment completion, and text transcripts to required video content with a text hyperlink to required videos. Although participants in the text-based course design scored slightly lower than those in the multimedia course, both of which adhered to Quality Matters standards based on an informal internal view using the fifth edition rubric, and then later scored using the sixth edition, the outcome was not statistically significant. The mean score for participants in the multimedia-rich course was 920.76 and the mean score for the participants in the text-based course was 897.09, t (82) = -.98, p = .33.

Results of Perception Survey Scales

A 60-item survey was administered to study two participants to ascertain their overall perceptions of the online learning experience. The scales were course design, community and learner engagement, teaching style, and cognitive load. Of the four scales administered, participants in the multimedia-rich course design experienced a lower cognitive load. The higher the score on this scale indicates a lower level of cognitive load. The mean for the multimedia-rich course was 2.96 and the mean for the text-based course was 2.68 [t (81) = 2.31, p = .02].

A regression was used to predict the influences of student perceptions given end-of-point total scores. Of the four scales, "community and learner engagement" most influenced end-of-point total scores in the course, as shown in Model 2, which consists of course design and community and learning engagement. The adjusted R^2 accounts for 7% of the change between models 1 and 2 in comparison to the minimal change between the other models. This indicates that community and learner engagement account for 8% of the variance associated with the end-of-course point totals.

Table 1
Hierarchical Regression Analyses for Variables Predicting End-of-Course Point Totals

Variables	**Model 1**		**Model 2**		**Model 3**		**Model 4**		**Model 5**		**Model 6**	
Block 1	B	SE B	B	SE B	B	SE B	B	SE B	B	SE B	B	SE B
Course Design Scale	2.31	27.59	-36.26	29.40	-0.31	38.70	-6.36	39.18	-5.41	39.50	-4.80	40.58
Block 2												
Community and Learner Engagement Scale	-	-	78.42	26.79	90.19	27.88	98.52	29.13	97.48	29.43	95.92	30.26
Block 3												
Teaching Style Scale	-	-	-	-	-51.08	36.09	-50.86	36.10	-51.16	36.32	-48.91	37.53
Block 4												
Cognitive Load Scale	-	-	-	-	-	-	19.65	19.82	21.37	20.44	23.39	21.73
Block 5												
Visual Design Type	-	-	-	-	-	-	-	-	8.86	22.97	10.03	24.35
Block 6												
Ethnicity	-	-	-	-	-	-	-	-	-	-	-1.94	12.38
Age	-	-	-	-	-	-	-	-	-	-	0.34	1.49
Constant		899.84		775.05		790.42		729.41		712.58		717.37
Adjusted R2		-0.01		0.08		0.09		0.09		0.08		0.04
F Change		0.01		8.57**		2.00		0.98		0.15		0.09

Results of Course Activity Overview Report

The course activity overview is a report run from within the learning management system. The report includes the total and average time spent per active student and the total amount and type of activity each student had in the course. This report was gathered for each of the four course sections in the study two design. Students enrolled in the text-based course design sections spent more time in the course on average than did students enrolled in the multimedia-rich course design sections. Students in the multimedia-rich course logged an average of 37 hours in the learning management course, while students in the text-based course logged an average of 51 hours in the

course [t (81) = -2.81, p = .01]. The 26% decrease in the average logged time between the different visual designs of the course is statistically significant.

Results of Content Analysis of Open-Ended Survey Responses

Qualitative data responses from the three open-ended questions were grouped according to their similarity in meaning. For example, the following responses to the question, "What parts of this course were most useful to you?" were grouped because they conveyed similar thoughts:

- "On the critical and other assignments, having the description of the assignment, and the rubric on the same page so there won't be any need to miss vital information."
- "The instructor was very organized and stated everything that was required for submission."
- "The instructor provided everything needed to complete the assignments, which was very helpful."

Once comments were grouped based on similar thoughts or meanings, a classification was assigned. For example, the three responses above were given the designation "organization" because they conveyed the benefit of organizing content well in an online course. Similarly, responses to the question "What parts of this course need improvement?" could also be grouped under the designation organization. The following responses illustrate this occurrence:

- "I had some trouble with getting all the information for each assignment in one place."
- "I didn't like the way the discussion board was set up."
- "The discussion board was unorganized … it was hard to see who's [sic] post was their response or their reply"

Axial themes that influenced student perceptions of the online course experience emerged from the open-ended questions. Axial themes were identified based on patterns present in student responses and classifications assigned to those patterns. Student perceptions of the online experience were most influenced by the following:

- Course Organization
- Instructor and Social Presence
- Instructional Strategies
- Assignments

The organization of the courses in this study influenced student perceptions of the online course experience. Students in the online courses in this study experienced a weekly course structure. Comments regarding course organization focused on expectations, finding information, and navigating the course. A sense of clear expectations was perceived when students felt like they understood assignment requirements, "The professor was very organized and stated everything that was required prior to submission." The course organization is not perceived positively when students can't find what they need, "Important information was located in multiple places … and I missed a few things." Because each online class differs from the next, it is important to explain the course components, "In my other classes it is set up a little differently."

Instructor and social presence also influenced student perceptions of the online course experience in this study. Interactions between the instructor and students as well as among the students themselves were noted and requested. The course included text and verbal discussions to foster interactions among students. Although one student commented the verbal conversations, "made [her] feel more connected to peers and made [her] classmates feel like real people," other students wanted more interactions in the course, "I would have liked more opportunities to interact with the teacher and other students." Instructor communication with students via email and instructional videos with students was noted as helpful. One student stated, "The weekly emails of what was expected and how to do it is what I found most helpful," and another student commented the "… video explanation of the assignments was helpful …"

Instructional strategies used in the courses in this study influenced student perceptions of the online course experience. Strategies such as modeling assignment expectations, allowing resubmissions based on instructor feedback, and scaffolding the large assignment were used. Students found each of these strategies helpful. Many students mentioned the "… instructional step-by-step videos for each project …" were helpful. Several students expressed, "The way that the critical assignment was split up into sections. It helped us to contribute to the critical assignment piece by piece." Other students commented they "…liked how we were able to use the instructor's feedback and resubmit assignments to help get a better grade." The use of these strategies may be one reason there was no performance gaps among students that were statistically significant based on sex, age, or ethnicity.

Assignments in this study were noted as influencing the online course experience when they were perceived by students as relevant and doable. Students defined relevance as skills they could use beyond the classroom: "I feel like this course will benefit me in the future despite going into education or not." Students defined doable as something that can be completed "… provide specific website building templates that are compatible to uploading excel worksheets, PowerPoint and so on."

Discussion

This study was conducted to measure the impact of multimedia in course design on student performance and their perception of the online learning experience. Given the limited time instructional designers have available to dedicate to the creation of multimedia assets in course design, it is essential to identify the impact of the time investment on student performance of learning outcomes and their perception of their overall online learning experience in the course.

It's not a surprise that students perform better in a course designed according to internationally recognized research-based course design standards like Quality Matters. While we may know this intuitively, quality online course design does not always occur. The fact that students performed better in a course designed according to Quality Matters is worthy of mention because online courses are generally fully designed before students enter. If they are not designed according to best practices in course design, students are likely set up to perform less optimally before they even begin the course.

It may also not be surprising that there is no statistical significance in student performance between text-based and multimedia rich visual course designs. Once both visual designs were controlled for course design expertise through adherence to Quality Matters standards, as

determined through informal and internal review, students in both visual designs performed equally well. It is important to note that the strength of multimedia in course design lies in its ability to reduce cognitive load and facilitate community and learner engagement. Student perceptions of community and learner engagement, in this study, were the strongest predictors of high student performance. The likelihood that students will perceive the course well, and thus perform well, is influenced by the strategic use of multimedia in the course to reduce cognitive load and facilitate community and learner engagement. The degree to which this is planned can support student performance before the course even begins.

An unexpected finding of this study that is worthy of further investigation is the absence of performance gaps, particularly between ethnicities. The California Assessment of Student Performance and Progress documents performance gaps in test scores between ethnicities in K–12 schools and educational researchers have discussed inequitable outcomes in graduation rates between ethnicities in higher educational settings (Steel, 1992; Graduation Rates by Sector, Gender, and Race/Ethnicity, 2006; Flores & Park, 2013). The absence of performance gaps between ethnicities is in stark contrast to the norm. The intersection between course policies, such as the ability to resubmit assignments for up to full credit, and instructional strategies, such as modeling and scaffolding assignment expectations, are potentially replicable practices that could produce similar results for others. The performance gap between males and females was another unexpected finding. While further study is warranted, the overrepresentation of females in the study may be a contributing factor to the results versus an ontological difference between males and females.

The realization that student perception of community and learner engagement in an online course as a strong indicator of high student performance is salient. It places a moral burden on course designers to do this work well. Course design has the potential to exacerbate or mitigate societal inequities as well as larger university outcomes related to student performance, retention, persistence, and graduation. In a society where the benefits of earned degrees are not rewarded to everyone equally regardless of race, gender, socioeconomic status, sexual orientation, and abilities, it is essential to design quality online courses that set adult learners up for success before the course begins.

Limitations and Future Research

As a pilot study, the mixed study research methodologies employed were appropriate. Creswell (2003) noted that mixed studies can potentially reduce biases present using a single method. To find the axial themes within student open-ended responses, discovery methods used included several readings of the written responses, identifying themes that emerged, and constructing typologies (Taylor & Bogden, 1998). Quantitative data from Likert-scale questions on the student survey was analyzed through multiple regression statistics to determine influences. Mertens (1998) noted that surveys allow the collection of data from large numbers of people. While student responses may potentially be less than genuine within the confines of a graded anonymous assignment, the administration of the survey and the results were consistent across all course sections. Furthermore, the methods chosen support the investigation of the study.

The number of students enrolled in the courses during the research period is appropriate for a small pilot study, even though the results are not generalizable beyond its setting. Future research might invite more professors to assess a course designed to meet Quality Matters standards in an informal internal review and compare student outcomes to previously taught

sections of the same course designed according to their preferences. In addition, if the instructional strategies employed were replicated in future studies and performance compared between ethnicities, the scalability of the practices and potential to reduce performance gaps could also be determined. If such opportunities were extended to faculty across the nation, findings could be confirmed or denied with broader generalizability.

As with all perception surveys, participants may not be aware of their thoughts and feelings as it pertains to the questions asked. A George Burns quote was used by Mertens (1998) to describe this phenomenon.

> If you were to go around asking people what would make them happier, you'd get answers like a new car, a bigger house, a raise in pay, winning a lottery, a facelift, more kids, less kids, a new restaurant to go to—probably not one in a hundred would say a chance to help people. And yet that may bring the most happiness of all (Mertens, 1998, p. 106).

Although, in this study, this phenomenon does not seem to be in effect, as there were no contradictions between the quantitative and qualitative data analyzed.

Acknowledgments

The authors would like to thank Dr. Robert Shields and Dr. Riste Simnjanovski who participated in the study by teaching one or more sections of the course during the study period and conducting informal internal reviews of the course sections based on Quality Matters standards. Also, sincere appreciation is extended to Dr. Robert Crosby for support with specific statistical procedures. Thanks are also extended to Dr. Tran Hong, Dr. Dirk Davis, and Dr. Linda Marie Sundstrum who supported the study and engaged in critical conversations regarding the implementation of the study.

References

Association of Talent Development. (2015). *Skills, challenges, and trends in instructional design: Connecting research to performance*. Association of Talent Development

Babiker, M. (2015). For effective use of multimedia in education, teachers must develop their own educational multimedia applications. *The Turkish Online Journal of Educational Technology, 14*(4), 62–68.

Bledsoe, T., & Simmerok, B. (2013). A multimedia-rich platform to enhance student engagement and learning in an online environment. *Journal of Asynchronous Learning Networks, 17*(4), 1–10. https://olj.onlinelearningconsortium.org/index.php/olj/article/view/398/56

Cakiroglu, U. (2014). Analyzing the effect of learning styles and study habits of distance learners on learning performances: A case of an introductory programming course. *International Review of Research in Open and Distance Learning, 15*(4), 161–185.

California Community Colleges Online Education Initiative. (2016). *Course Design Rubric*. Quality Matters. https://www.qualitymatters.org/qa-resources/resource-center/articles-resources/CHLOE-report-2017

Chapman, B. (2010). *How long does it take to create learning?* Chapman Alliance LLC. http://www.chapmanalliance.com/howlong

Chen, C., & Wu, C. (2015). Effects of different video lecture type on sustained attention, emotion, cognitive load, and learning performance. *Computers & Education*, *80*, 108–121. doi: 10.1016/j.compedu.2014.08.015

Chen, Y. (2015). Linking learning styles and learning on mobile Facebook. *International Review of Research in Open and Distributed Learning*, *16*(2), 94–114.

Creswell, J. W. (2003). *Research designs: Qualitative, quantitative, and mixed methods approaches*. Sage Publications.

Dixson, M. (2010). Creating effective student engagement in online courses: What do students find engaging? *Journal of the Scholarship of Teaching and Learning, 10*(2), 1–13.

Flores, S. M., & Park, T. J. (2013). Race, ethnicity, and college success: Examining the continued significance of the minority-serving institution. *Educational Researcher*, *42*(3), 115. https://search.ebscohost.com/login.aspx?direct=true&db=edb&AN=87039274&site=eds-live&scope=site

Fowler, F. J. (2009). *Survey research methods* (5th ed.). Sage Publications.

Garrison, 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.

Gay, G. (2018). *Culturally responsive teaching: Theory, research, and practice*. Teacher's College Press.

Graduation Rates by Sector, Gender, and Race/Ethnicity. (2006). *Placing College Graduation Rates in Context: How 4-Year College Graduation Rates Vary With Selectivity & the Size of Low-Income Enrollment*, 21–31. https://nces.ed.gov/pubs2007/2007161.pdf

Hadie, S., & Yusoff, M. (2016). Assessing the validity of the cognitive load scale in a problem-based learning setting. *Journal of Taibah University Medical Sciences, 11*(3), 194–202.

Hegeman, J. (2015). Using instructor-generated video lectures in online mathematics courses improves student learning. *Online Learning, 19*(3), 70–87. https://olj.onlinelearningconsortium.org/index.php/olj/article/view/484/145

Intentional Futures. (2016). *Instructional design in higher education: A report on the role, workflow, and experience of instructional designers*. https://intentionalfutures.com/static/instructional-design-in-higher-education-report-5129d9d1e6c988c254567f91f3ab0d2c.pdf

Krause, J., Portolese, L., & Bonner, J. (2017). Student perceptions of the use of multimedia for online course communication. *Online Learning, 21*(3), 36–49. https://olj.onlinelearningconsortium.org/index.php/olj/article/view/1198/302

Lang, G. (2016). The relative efficacy of video and text tutorials in online computing education. *Information Systems Education Journal, 14*(5), 33–43.

Legon, R., & Garrett, R. (2017). The changing landscape of online education (CHLOE): Quality matters and eduventures survey of chief online officers, 2017. https://www.qualitymatters.org/qa-resources/resource-center/articles-resources/CHLOE-report-2017

Leppink, J., Paas, F., Van Der Vleuten, C. PM., Van Gog, T., & Van Merrienboer, J. J. G. (2013). Development of an instrument for measuring different types of cognitive load. *Behavior Research Methods, 45*(4), 1058–1072

Liaw, S., Wong, L., Chan, S., Ho, J., Mordiffi, S., Ang, S., … Ang, E. (2015). Designing and evaluating an interactive multimedia web-based simulation for developing nurses' competencies in acute nursing care: Randomized controlled trial. *Journal of Medical Internet Research, 17*(1), e5. doi: 10.2196/jmir.3853

Martin, F., & Bolliger, D. (2018). Engagement matters: Student perceptions on the importance of engagement strategies in the online learning environment. *Online Learning Journal, 22*(1), 205–222. https://olj.onlinelearningconsortium.org/index.php/olj/article/view/484/145

Mertens, D. M. (1998). *Research methods I education and psychology: Integrating diversity with quantitative and qualitative approaches*. Sage Publications.

Meyer, A., Rose, D. H., & Gordon, D. (2014). *Universal design for learning: Theory and practice*. CAST.

National Center for Education Statistics (n.d.). *Digest of education statistics.* Retrieved July 24, 2020, from https://nces.ed.gov/programs/digest/d14/tables/dt14_317.40.asp

Online Learning Consortium (n.d.). OLC OSCQR Course design review scorecard. Online Learning Consortium. Retrieved July 24, 2020, from https://onlinelearningconsortium.org/consult/oscqr-course-design-review/

Stanley, D., & Zhang, Y. (2018). Student-produced videos can enhance engagement and learning in the online environment. *Online Learning, 22*(2), 5–26.

Steele, C. (1992). Race and the schooling of Black Americans. *The Atlantic Online.* https://www.theatlantic.com/past/docs/unbound/flashbks/blacked/steele.htm

Tan, L., & Laswad, F. (2015) Academic performance in introductory accounting: do learning styles matter? *Accounting Education: an international journal*, *24*(5), 383–402.

Taylor, S. J., & Bogden, R. (1998) *Introduction to qualitative research methods: A guide book and resource*. John Wiley and Sons, Inc.

Vazquez, J., & Chiang, E. (2016). Preparing students for class: A clinical trial testing the efficacy between multimedia pre-lectures and textbooks in an economics course. *Journal of College Teaching and Learning*, *13*(2), 37–45.

Young, S., & Bruce, M. (2011). Classroom Community and Student Engagement in Online Courses. *Merlot Journal of Online Learning and Teaching*, *7*(2), 219–230.

Using Crowdsourced Wikis to Teach an Online Undergraduate Course

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Abstract

A number of barriers exist that make using wikis in online teaching more challenging. Monitoring and correcting student actions is more difficult online than in a face-to-face classroom. Most students hesitate to edit and change other student writing and so incentives need to be used to get students to edit each other's work. Students should receive an orientation where they learn the purpose and benefits of wikis and receive instruction on how to use wikis. This study examined student use of wikis in an online assignment. As a course evaluation, students were asked to respond to five questions about their experience in using a wiki in the assignment. Conclusions were drawn about the practicality of using wikis in teaching online. Students affirmed that collaboration leads to learning and knowledge acquisition. By engaging in collaboration, learners observe and improve upon weaknesses or gaps in learning. Students learn from each other by examining and improving the work of others. Students also recognized that using wikis to develop documents is a valuable skill to take into the workplace. The study confirms much of the research on the topic of using wikis as a learning strategy. Also, the study shows that process is as important to learning as is outcome. The benefits of using wikis for learning are equally important as the final product produced.

Keywords: collaboration, crowdsourcing, emergency services, learning strategies, online learning, wikis

Fisher, J.R. & Allred, S.D. (2020). Using crowdsourced wikis to teach an online undergraduate course. *Online Learning, 24*(3), 163-183. https:///doi.org/10.24059/olj.v24i3.2152

Using Crowdsourced Wikis to Teach an Online Undergraduate Course

Wikis have long been used for the collaborative creation of works. A prime example of a successful wiki is Wikipedia, which has taken over the business of ready references, replacing big names like *The Encyclopedia Britannica and World Book* (Rothman, 2016). Wikis are a valuable business tool, permitting collaboration and creation of works on the job (Bolisani & Scarso, 2016; Grace, 2009; Ojala, 2008). In the learning field, studies have shown their successful inclusion in face-to-face classes (Hubble, 2011; Roussinos & Jimoyiannis, 2013). With other social media,

wikis are particularly suited for online learning (Abdelmalak, 2014; Zgheib and Dabbagh, 2020). This paper explores the use of wikis in online learning.

Most young Americans use Wikipedia. Among those in the age range of most university students (18–29 years old), Pew (2011) reports 62% turn to Wikipedia, despite it not being acceptable to cite Wikipedia as a source in academic papers (Infeld and Adams, 2013). Wikipedia has become the initial source students check to get an understanding and find sources for topics in their areas of study. Wikipedia is an example of a crowdsourced document.

Crowdsourcing is the process of obtaining information from a large number of people, usually using the internet (Howe, 2008). Many applications rely on crowdsourced information to function and provide on-demand services. One of these is the wiki, which uses the input of volunteers to create and improve contributions to a crowdsourced document (Leal et al., 2019).

A wiki is a collaborative website where many people contribute to the development of content online. In addition to making their own contribution, individuals can edit and add to each other's work. Wikis operate on the Aristotelian principle that the whole is greater than the sum of its parts, the modern concept of synergy. A search of the literature supports the following claims about wikis (Palomo-Duarte et al., 2014; Page & Reynolds, 2015; Trocky & Buckley, 2016). Wikis help student writing skills, group collaboration, and knowledge acquisition. Student outcomes are improved, by providing a context for learning. Through cognitive and social engagement, wikis support the development of a community of learners.

Yarbrough (2018) summarized the benefits of wikis: (a) engagement and collaboration, (b) learning from other students, (c) group work, (d) community building, (e) critical thinking, (f) reflection, (g) construction of knowledge, and (h) extending learning beyond the classroom.

As the focus on higher education learning has shifted from knowledge to skills, some of these skills, particularly interpersonal skills, are difficult to assess and to develop. According to Palomo-Duarte et al. (2014) some of the skills can be assessed objectively through the use of wikis. They provide as examples: collaborative writing, conflict resolution, group management, and leadership. This new environment, Page and Reynolds (2015) claim, requires learning experiences that develop collaborative and mediated social writing practices. They offer wikis as a way to meet these needs. However, while wikis appear to provide suitable tools for teaching, Trocky and Buckley (2016) indicate uncertainty as to their effectiveness in achieving student learning outcomes. They found that, as an instructional strategy, wikis aid students in learning various skills and gaining new knowledge. Wikis improve writing skills, collaboration, knowledge acquisition, and serve as a centralized repository. Wikis appear to focus more on process goals rather than learning outcomes.

In this article, we explore the use of a wiki in online learning. As a data source, we examined student success using wikis in an online crisis communication course for emergency services students. Students were assigned to develop guidelines for preparing a crisis communications plan using a wiki process. Each student contributed original content and was asked to edit the work of other students.

Problem Statement

The purpose of this study was to evaluate the use of a wiki in an online course so as to determine how the wiki assignment design could be adapted to be more effective and provide greater learning.

Research Questions

Five research questions were considered:

1. How can a class wiki contribute to the learning of students in the class?
2. Was the class wiki helpful in a student's own learning about crisis communication plans?
3. Did students read the contributions of other students and learn from their work as they prepared their own submission for the crisis communication plan?
4. What kinds of revisions did students make on the work of other students?
5. What incentives would get students to change and edit or comment and provide feedback to other students using the wiki process?

Review of Relevant Literature

The literature review that follows supports the wide use of wikis in teaching face-to-face and online courses. No articles were found where wikis were studied in teaching either face-to-face or online courses in the emergency services.

Collaboration and the Wiki

Collaboration is an important process outcome of learning. On-the-other hand, collaboration benefits learning. Wikis are a form of collaboration that the Internet enables. The Internet also facilitates other collaborative learning and communication through forums, email, video conferencing and chat rooms. However, according to Oskoz and Elola (2014), wikis make collaborative learning "more efficient." They allow people to work together (p. 144). By engaging in collaboration, students notice gaps in their learning. The students learn from each other by observing the others' contributions and noting and improving upon other's deficiencies. Wikis also allow peer-to-peer writing assistance. Wikis encourage peers to be teachers. Students become both learners and instructors (Oskoz and Elola, 2014, p. 145).

Collaboration is a key aspect of community learning (Woolley & Ludwig-Hardman, 2000). Abdelmalak (2014) studied student reaction to various social media to determine which were most important in creating an online learning community. Students indicated that Google Docs, wikis, blogs, and Twitter helped develop a learning community while Skype did not. Wikis and Google Docs were deemed to have the most impact. The researcher determined that faculty should use a variety of social media to support learning communities and student interaction and communication.

Collaboration using wikis has been successful in second and foreign language learning. (Sykes, Oskoz, and Thorne (2008) point out the various online tools that could be used in transforming traditional approaches for second language education. Zou, Wang, and Xing (2016) studied the use of wikis by students learning English in China and Chinese in the United Kingdom. Students corrected each other's language errors using a wiki. Li and Chu (2018) used a wiki-based collaborative process writing pedagogy (WCPWP) to help the teaching and learning of Chinese writing among mainland Chinese upper primary school students. Collaborating through wikis had positive effects on students' writing ability, writing attitudes, collaboration, reading, and oral expression. They found collaboration benefits learning.

He and Yang (2016) found that using wikis promoted communication and collaboration in teams. While most team collaboration occurs in face-to-face meetings, wikis are particularly suited to online team development.

Wikis and Online Learning

Rather than repackaging face-to-face content, online course developers must provide unique value to keep the quality of their offerings high. Also, well-designed online courses have the unique ability to be student-centered and engaging. Furthermore, online courses can easily adapt to and incorporate emerging technologies and innovative computer applications.

"Student engagement is critical to student learning, especially in the online environment, where students can often feel isolated and disconnected," (Dixson, 2015). A wiki-based course design responds to online concerns of isolation because it creates a student-centered learning environment (Hu and Johnston, 2012). It can both engage and empower students and encourages equitable and quality participation while providing flexibility for student learning (Qian and Erik, 2012). Use of social media learning activities support cognitive processes and ensure student engagement in knowledge acquisition (Zgheib and Dabbagh, 2020). Because of the nature of online studies, faculty have difficulty developing relationships with students and vice versa. Wikis develop teacher to student and student to student relationships (Yarbrough, 2018). Online classes may not suit every learning style. Park and colleagues (2010) suggested use of wikis as a means of crossing these learning styles.

Sharp and Whaley (2018) identified benefits and challenges associated with wikis. Adult learners in their study recognized the collaboration potential of wikis and the benefits of knowledge acquisition and giving and receiving feedback. They viewed wikis as a "kind of brainstorming process" and better than a forum because they were able to edit and add to others' comments (p. 89). Adult learners had a number of doubts and uncertainties going into the wiki project. Most were unfamiliar about the how and function of wikis and some lacked technical capabilities. Others were concerned about the academic acceptability of wikis and some viewed them as not being a productive use of class time. Some were concerned about "learning to work as a team to co-construct content" and others were concerned about group grades (p. 89).

Biasutti (2017) compared the usage of forums and wikis in online teaching. The results showed that inferencing, evaluating, organizing, and supporting characterized forum discussions while wikis encouraged mainly processes of producing and developing. Forums were useful for discussing, sharing ideas while wikis were used for developing a common collaborative document. Forums were easier to access than wikis, while wikis required more time and were more difficult to use than forums. While forums and wikis had different characteristics, Biasutti concluded that using both strategies could provide complementary functions, allowing scaffolding of student learning.

Wiki-based online courses should use a wide-range of technology tools and innovative class activities (Qian and Erik, 2012). Yarbrough (2018) showed how wikis can be used for course evaluations and online quizzes. She found using rubrics helped clarify assignment requirements. Zgheib and Dabbagh (2020) suggested using wikis and blogs as learning management systems. They pointed out that faculty need training and support to incorporate social media learning activities into online course design.

Other Uses and Findings about Wikis

Wikis have been used in many fields to create work through collaboration. In an early use of wikis, Hasan and Pfaff (2006) used the technology to improve employees' interaction with corporate knowledge. Evans and Moore (2011) used chemistry software for the creation of interactive chemistry content on the internet. Ertmer et al. (2011) designed an international wiki-based collaboration in an introductory educational technology course of 346 students in which students created wiki chapters about the educational uses of specific Web 2.0 tools. Survey results showed significant changes in confidence and perceived value, while qualitative results provided insights into students' perceptions of critical project components.

The University of North Carolina at Pembroke (UNCP) uses student-generated content to create encyclopedia entries for the Online Encyclopedia of Criminal Justice (cjencyclopedia.com) on topics related to criminal justice and related fields. Students edit, revise, and organize content using wiki software (Sener, 2019). The U.S. Army constructed a wiki-based system to develop plans and deploy procedural knowledge in emergency situations (Wickler, Tate, & Hansberger, 2013). In Canada, wikis were used as knowledge translation tools to help health professionals implement best practices in acute care (Archambault et al., 2012). Shih, Tseng, and Yang (2008) found wikis can be used to develop teaching materials quickly for online courses.

Teaching Students to Use Wikis

Stoddart, Chan, and Liu (2016) developed a general framework to assist instructors in setting up wiki projects for language learning. The suggestions they made were aimed at providing an environment that fosters student satisfaction, motivation, and learning. Here are eight steps they use in teaching using wikis: (a) introduce the concept of collaboration, (b) teach how to use the wiki software, (c) introduce the assignment, (d) break the assignment into smaller parts, (e) establish feedback procedures, (f) teach a critique process, (g) setup a timetable for group critiques, and (h) provide post-project critiques.

From a study of learning outcomes of non-English speaking, computer-savvy students in an international marketing course, Hewege and Perera (2013) confirmed that wikis promoted collaborative learning, organic discussions, and independent thinking. In addition, they found that students adapted well and with little difficulty to wiki-based pedagogy. While students engaged in the wikis at different levels and sometimes discussions stagnated, the researchers learned that aligning assessment with learning activities helped engage the students. To keep students enthusiastically engaged in wiki discussions, wiki-based activities must be embedded into other learning activities.

During the 2010–2011 academic year, the Wikimedia Foundation launched WikiProject U.S. Public Policy, to recruit experts and students to help improve Wikipedia content. Infeld and Adams (2013) used the Wikipedia project to examine the learning that occurred by using open-source, wiki-based assignments in policy analysis courses. The researchers had their students take Wikipedia training on how to use a wiki and then required them to find and add content to Wikipedia articles related to policy analysis topics discussed in their classes and based on a major policy paper they wrote. Infeld and Adams (2013) found they had to be explicit in describing how the exercise was relevant to the study of public policy in order to convince all students of the value of the project. Students found that using Wikipedia was engaging and allowed them to test their knowledge by contributing to the public thought (p. 456).

Rott and Weber (2013) provided a framework to effectively structure a collaborative and cooperative student research assignment using a wiki site as a writing platform. Students learned how to post text and pictures and to productively collaborate on composing, revising, and editing. In their early attempts to use wiki, students did well in composing and sharing information but were hesitant in critiquing or changing the work of other people. To make students aware of the revision process, the researchers provided actual examples of student feedback and changes made from previous classes. They also showed how students would be evaluated using rubrics and given a grade for their revisions to others' work.

Prior familiarity with the internet gives students a step up when learning to use wiki and other social media. He and Yang (2016) found wikis are used more frequently in information technology courses, probably because technology students are more ready to experiment with new technologies. In a study that included 58 postgraduate students, Page and Reynolds (2015) found that while students are heavy users of social media, they have not learned to work collaboratively in groups or in social media contexts (p. 1004). Prior to the project, students had been heavy consumers of wikis, but had had little actual experience in creating, reviewing, or editing wikis. They found that students who had less experience with the web participated less in the wiki project (p. 1007).

Chu et al. (2017) found that discipline of study factored into students' perceptions and actions with wikis in project-based learning. English language students regarded wikis as extra workload while information management students viewed wikis as efficient tools for learning. Mechanical engineering students avoided using wikis if they felt little relationship existed between the learning goal and collaborative learning. The study showed significant differences existed in motivation and knowledge management, affecting level of participation and involvement in wiki processes. The factors that influenced performance were previous learning experiences, technical backgrounds and the relationship between learning goals and collaborative learning.

Methods Used to Study Wikis

Researchers used a combination of mixed methods, both quantitative and qualitative, to study the use of wikis in learning. Park et al. (2010) developed the Perception of Wiki Survey to determine students' perceptions of the value of the technology. They also used the Felder-Silverman Index of Learning Styles to study students' learning style preferences, based on the notion that a student's choice to pursue one career over another, and eventual success or lack of success in that career, may relate to their personal learning style and the learning demands of that discipline.

Palomo-Duarte et al. (2014) compared seven case studies conducted in computer science courses of two Spanish universities: Cádiz and Seville. They used automated tools to assess student interactions, measuring different settings, durations, milestones, contribution sizes, weights in the final grade and assessment methods. Page and Reynolds (2015) used data drawn from multiple sources collected before, during and after to evaluate their project. The Li and Chu (2018) study was conducted in a primary school in Shenzhen, China, and divided into three research phases spanning one and a half years (three semesters). Both quantitative and qualitative methods, including online wiki documents, a course feedback questionnaire, observations, interviews, and a teacher's questionnaire, were used to collect data.

Hewege and Perera (2013) used a qualitative research methodology supported by the Nvivo data analysis software. The researchers used a triangulated approach to collecting data, which

included the identification of themes from 30 student assignments, student description of positive and negative experiences with wikis, and in-depth interviews of teachers.

Dixson (2015) developed an Online Student Engagement Scale (OSE) which measures online student learning experience. She noted that student engagement is supported by two types of student behaviors: application and observation learning behaviors. Examples of application learning behaviors are posting to forums, writing emails, and taking quizzes and observational learning behaviors are reading emails, reading discussion posts, viewing content lectures and documents. Dixson found the OSE correlated positively with application learning behaviors.

Biasutti (2017) used both quantitative and qualitative analyses to compare forums and wikis as tools for online collaborative learning. A quantitative comparison of forums and wikis was developed applying the coding scheme based on the following indicators: (a) inferencing, (b) producing, (c) developing, (d) evaluating, (e) summarizing, (f) organizing, and (g) supporting. The qualitative aspects were assessed using an open-ended questionnaire for collecting participants' perspectives on the functionality of the collaborative tools.

Sharp and Whaley (2018) analyzed pre- and postquestionnaire data from graduate students using statistical analysis to explore perceptions of usefulness and ease of use of wikis. Qualitative data were analyzed using descriptive analysis techniques to explore perceptions and themes related to benefits and challenges with wikis.

Methods

Over a four-year period, emergency service students were required to contribute to a class wiki as part of an assignment to prepare guidelines for developing a crisis communication plan. Students submitted an initial piece of writing on a self-selected topic in the area of study. They were asked to read other people's submissions to avoid duplication and to expand their own submissions. In addition, they were asked to revise other students' work based on their own research and as a means to improve the overall finished product. Over time the course instructors observed that students were making few, if any, revisions. The instructors did the literature review and study to determine how to improve the outcomes of the wiki assignment. Their aim was to increase student motivation to make revisions and overall student satisfaction in using the wiki process.

During the course evaluation at the end of the most recent class students were asked to respond to five questions. Seventeen of 21 students answered the questions. Ten of the respondents were male; seven were female. The respondents were representative of the students in the emergency service program. Eight of 10 males work for police or fire agencies; two women work for agencies. Ten students are studying emergency leadership; six students are studying emergency management. Three students are from out-of-state. The average age of male students is 29 and female students is 26. Three students are under 21. To maintain anonymity respondents were identified by initials, the first indicating the person was male (M) or female (F). The five questions were:

A. How can a class wiki contribute to the learning of students in the class?
B. Was the class wiki helpful to your own learning about crisis communication plans?

C. Did you read the contributions of other students and learn from their work as you prepared your submission for the crisis communication plan? How were they useful?

D. Did you edit or change the work of any other students? What changes did you make?

E. What incentives or means would get students to change and edit or comment and provide feedback to other students using the wiki process?

The student responses were analyzed using descriptive techniques, allowing the researchers to explore the perception and themes about the benefits and challenges of using wikis (Sharp and Whaley, 2018). A qualitative approach was used because it provides rich data. Rich data (also described as thick description) is important when the number of respondents is limited as in this study. "Thick description seeks to present and explore the multifaceted complexities of the situation being studied" (Marx, 2008). Rigor is measured by saturation. As data within a category overlaps, understanding of the phenomenon becomes stronger. Researchers realize saturation as they become aware that the data comprehensively or completely describes the phenomenon. Also, they note that responses begin to be repetitive, duplicating topics and stating the same thing although in different words (Morse, 2015). It is through this process that themes are developed.

Content analysis was used to examine the student submissions about crisis communication plans (Bengtsson, 2016). Thematic analysis was used to study student responses (Castleberry and Nolen, 2018; Kannaley et al, 2019; Talbot et al., 2020). The literature review was used to develop an initial set of codes. Codes were added as new themes became evident. Researchers used the codes to independently review the student comments. After the student comments were coded, the first researcher reviewed all quotations from each category and assigned the quotations to themes. All coded content was included for analysis and quotes were chosen that best supported the themes. As themes were developed and, based on the literature review, recommendations for changes and improvements to the wiki assignment were made. These recommendations are proposed for general application in the use of wikis in online learning.

Results

The literature review suggests a number of possible themes. Wikis encourage people to work together. *Collaboration* benefits *learning,* helps develop writing *skills* and leads to knowledge acquisition (Trocky and Buckley, 2016; Li and Chu, 2018). They encourage peer-to-peer writing assistance (Oskoz and Elola, 2014). They *engage* and *empower* students (Qian and Erik, 2012). As the student responses to questions were examined, some of these themes were validated; others were not. Table 1 shows themes generated from the Literature Review and Codes that were used to examine student responses to the questions.

Table 1

Codes Generated from the Literature Review

Literature Review Topics	References	Codes
construction of knowledge	Trocky & Buckley, 2016; Yarbrough, 2018	knowledge
wikis make learning more efficient, identifies gaps in learning, students learn from each other, get writing assistance	Oskoz & Elola, 2014	learning, gaps, collaboration, help each other
wikis create an online learning community; community building	Abdelmalak, 2014; Yarbrough, 2018	community
fosters satisfaction, motivation, learning	Stoddard, Chan & Liu, 2016	satisfaction, motivation, learning
collaboration in language learning	Sykes, Oskoz & Thorne (2008); Zou, Wang & Xing, 2016	collaboration
correcting each other's language errors	Zou, Wang &Xing, 2016; Yarbrough, 2018	help each other, learn from each other
writing ability, attitude, reading, expression	Li & Chu, 2018	communication
used synchronously and asynchronously online, hesitant to critique or change others' work, provided grading criteria, rubric	Rott & Weber, 2013	online, hesitancy, tools
collaborative learning, organic discussions, independent thinking	Hewege & Perera, 2013; Yarbrough, 2018	collaboration, critical thinking, reflection
students added to Wikipedia, describe relevance, contribute to public thought	Infeld & Adams, 2013	structure, relevance
impact exam performance, web familiarity affected participation, consumers not creators	Page & Reynolds, 2015	outcomes, participation, collaboration, create
communication and collaboration in teams	He & Yang, 2016; Yarbrough, 2018	teams
technology students willing to experiment; differences in motivation and knowledge management among disciplines	He & Yang, 2016; Chiu et al., 2017	area of study
student engagement critical	Dixson, 2015; Yarbrough 2018	engagement
use several social media tools for engagement, faculty need training and support	Zgheib & Dabbagh, 2020	engagement, tools, faculty training
use wikis to develop teaching materials	Shih, Tseng & Yang, 2008	faculty training
encouraged equitable, quality participation, flexibility for student learning	Qian & Erik, 2012	participation, flexibility
student-centered	Hu & Johnston, 2012	student-centered
learner engagement, promote thinking, knowledge acquisition, giving and receiving feedback, brainstorming, wikis better than forums,	Sharp & Whaley, 2018	engagement, critical thinking, knowledge, critical thinking, reflection, feedback, forums
unfamiliar, lacked technical skills, academic acceptability, not wise use of time, working as team, group grades	Sharp & Whaley, 2018	skills, acceptability, value, team, grades
crossing learning styles	Park et al., 2010	learning styles
forums best for discussing, wikis for production; extending learning beyond the classroom	Biasutti, 2017; Yarbrough, 2018	forums, production; application
build relationships online	Yarbrough, 2018	relationships
provide course evaluations	Yarbrough, 2018	evaluation

As student comments were examined, grouped, and analyzed for themes (Castleberry and Nolen, 2018), it became clear that themes would fall into two major categories: benefits and challenges (Sharp and Whaley, 2018). Challenges were deemed to be process-related. The following is a list of the themes, categorized as benefits or challenges, and coding used to identify themes within student comments. The themes are matched to the student questions. Challenge themes are stated as positive actions, rather than negative responses.

The tables that follow show the results from the thematic analysis. They were developed using the following procedure.

1. Using a Microsoft Excel spreadsheet, student responses were grouped under the five research questions.
2. Responses were then coded, using the codes generated from the review of literature about wikis (see Table 1). To generate the codes the literature was summarized into topics.
3. The responses were then summarized and grouped under the questions and codes.
4. Themes were developed from the summaries of student responses. They were categorized as either Benefits or Challenges and numbered.
5. The results were then organized in tables, one table for each theme. The tables show the topic, codes, references, paraphrasing or quotes of student responses, the research questions, and finally themes.

Table 2
Topic: Learning and Knowledge Acquisition

Codes: knowledge, learning, gaps in knowledge **References:** Trocky & Buckley, 2016; Yarbrough, 2018; Oskoz & Elola, 2014; Stoddard, Chan & Liu, 2016; Sharp & Whaley, 2018
Student responses: In response to Question A, respondent FL wrote that wikis provide students a greater range of information instead of students using the same four or five articles. MJ stated the wiki benefits class members by having high-quality information about a topic in one place. By everyone adding to the wiki, all students learn. MJE stated learning together instead of alone students have more of an incentive to learn and discuss as well as provide meaningful information. FS stated, by looking at the work of other students, students gain better understanding. MR suggested that "a class wiki can be beneficial by providing a running document of knowledge that is able to include multiple former classes and different perspectives on understanding points of view." Eleven people found the wiki helped them learn about crisis communication plans (Question B), while four indicated it did not. Two people did not respond to Question B. MR stated, "I found the wiki helpful to me learning about my crisis communication plan, not only for some general guidance of layout, but also overall types of information being presented." MS wrote, "It gave me a good understanding of the different parts of communication and disaster response.
Theme: ***Benefit 1—Wikis provide information that leads to learning and knowledge acquisition.***

Table 3
Topic: Viewpoints

Codes: feedback, viewpoints
References: Sharp & Whaley, 2018; no reference for viewpoints

Student responses:

In response to Question A, respondent FJA indicated she felt contributions helped others increase their knowledge from other points of view. MR also identified varying points of view as a benefit to wikis. FS indicated that taking part in the class wiki made it so she could understand the information from many different angles.

Theme: ***Benefit 1a—Wikis provide many viewpoints.***

Table 4
Topic: Collaboration

Codes: collaboration
References: Oskoz & Elola, 2014; Yarbrough, 2018; Sykes, Oskoz & Thorne (2008); Zou, Wang & Xing, 2016; Hewege & Perera, 2013

Student responses:

In answer to Question A, respondent MB identified collaborating as a way of contributing to class learning. FL indicated that collaborating made the assignment feel like "a real-world professional project." FL also wrote the wiki benefited the class because the project can have many contributors but one overall message. FK stated the wiki allowed the class to work together as a team.

Theme: Benefit 2—Wikis encourage collaboration.

Table 5
Topic: Sharing information

Codes: sharing, help each other, feedback
References: Oskoz & Elola, 2014; Sharp & Whaley, 2018

Student responses:

In response to Question A, respondent MZ compared the wikis to reading summaries, another online tool used in the class. "The wiki assignment was informative in the same manner the reading summaries were. It allowed us to share information that can be used as a model for building an effective communication plan in a disaster."

MZ identified sharing information as a benefit of wikis. MS saw sharing knowledge and experience by like-minded individuals as important to learning.

MJ indicated it was an easy way to find needed information. (Question C)

Theme: ***Benefit 2a—Wikis allow students to share information.***

Table 6
Topic: Engagement

Codes: engagement, participation **References:** Dixson, 2015; Yarbrough, 2018; Zgheib & Dabbagh, 2020; Sharp & Whaley, 2018; Qian & Erik, 2012
Student responses: Respondent FM felt the wiki got everyone involved. This was particularly important since the class was online (Question A).
Theme: ***Benefit 2b—Wikis increase student involvement and engagement.***

Table 7
Topic: Extending learning beyond the classroom

Codes: application **Reference:** Yarbrough, 2018
Student responses: In answer to Question B, respondent FL saw the practical value of wikis, which has application in the workplace where people cooperate together on a document. "I think the wiki was a good way to see how crisis communications plans are created and what they look like. There is a lot of needed information, and it is all very different, but necessary. Many people will be involved in a crisis communication plan; the wiki was a cool way of simulating that with the class."
Theme: ***Benefit 3—Wikis provide practical skills that can be used in the workplace.***

Table 8
Topic: Production of content

Codes: production **Reference:** Biasutti, 2017
Student responses: For Question B, respondent FS wrote about choice of topic for the wiki. "I understand that not everyone can be a specialist in their different areas of expertise, but it is amazing to see what others know about or what they gravitate towards." MD found the "other categories" important but felt the topic he chose was "redundant." Generally, people who read the other wikis found them useful in writing their own contributions and in understanding crisis communications (Question C). MR wrote, "I read several of the other student's wikis and found them useful as additional perspectives to give me some ideas on how to expand the information I also provided." FL indicated, "I did read the contributions of the other students and used the information to get a feel for how they viewed the project and the type of information they submitted. I tried to add information that had not already been stated. Some of my classmates seemed to have experience with crisis communication plans and their input was very clear and valuable to the piece as a whole."
Theme: ***Benefit 3a—Wikis help students develop their own content.***

Table 9
Topic: Wikis used for production

Codes: production, application
References: Biasutti, 2017; Yarbrough, 2018

Student responses:

"The class wiki, which I was able to read, contribute to, and edit, helped me understand crisis communication plans much better," wrote MJE in response to Question B. "I was able to see what others were learning about the plans and implement my own research all under the same document which was very efficient and useful."

Theme: ***Benefit 3b—Wikis can be used efficiently to develop documents.***

Table 10
Topic: Learning how to do wikis

Codes: skills, structure,
References: Infeld & Adams, 2013; Sharp & Whaley, 2018

Student responses:

As a response to Question A, respondent MF wrote that wikis were new to him, but as soon as others started adding information, he knew what to do and the wiki made sense to him.

In answer to Question B, FM indicated, "It was very helpful to me because this was the first class I've taken involving emergency planning/preparedness so this was all so new to me and being able to have others contribute to mine and see others plans as well helped me see where I could improve and how to think differently that would help me become a better planner and communicator."

MZ stated, "It helped me understand a little more in what subjects one might need to think about when developing a communication plan."

MJ wrote, "It was new and … it made us work harder in a good way."

Theme: ***Challenge 1—Help students learn a new skill using wikis.***

Table 11
Topic: Skill building

Codes: skills
Reference: Sharp & Whaley, 2018

Student responses:

Respondent FJ saw the wiki as "another tool" that "did not provide anything except some new method of sharing to learn." In response to Question B, she stated that "the amount of time it took to learn how to use a new system to share information took away from the importance of how to conduct crisis communications."

In speaking generally about the class, MS stated, "The only problem I ran into while in this course was the wiki page. The wiki page just didn't feel too user friendly for me, and had a hard time getting my portion in there."

One person (in answering Question C) found wikis hard to understand and two others felt other approaches would have been more effective for learning. FJA indicated that she read other

people's work but found the information hard to understand. "I … was not sure how to translate [it] to a communication plan."

MF would have preferred a discussion over doing the wiki. "In my opinion, I found the class wiki to be a bit messy compared to just having this assignment become a regular discussion."

In response to Question E, FJA stated, "I do not think wiki is something that most students find friendly. I think the idea is good but it's too much information to scroll through without guidance."

Theme: ***Challenge 2—Focus on wikis as a skill not just a content tool.***

Table 12
Topic: Purpose

Codes: hesitancy, relevance, value, prior training
References: Rott & Weber, 2013; Infeld & Adams, 2013; Sharp & Whaley, 2018, Page & Reynolds, 2015

Student responses:

Only two people made changes to other student work. In response to Question D, respondent FS indicated, "I made a few changes, but I wish that I would have made more changes and got to understand the system." MJE indicated that most of what he edited in the document was grammatical errors. Twelve students indicated they did not make changes.

In response to Question B, FS wrote, "I loved using the class wiki. At first, I was hesitant about it because I didn't want to have to post work right next to another person's work or in the middle of it. However, as it unfolded, I loved the opportunity to see what other people thought on my topic that I shared or even completely opposite things.

To Question C, MB indicated, "There can be critical disagreements and discussions about posts, but the editing and changing nature of a wiki is too free flowing for my personal preference."

Other people either thought there was nothing to change or felt inadequate to make changes. FL wrote in responding to Question D, "I felt like all of my classmates provided very thorough and accurate information. I did not notice any spelling or grammar errors, otherwise I would have edited them."

MF indicated he felt "it was not appropriate to edit other people's work besides my own, but there could have been a few adjustments made here and there." FK wrote, "I don't think anyone wants to edit someone else's work."

MB indicated he did not change or edit the work of other students, because "it is clear when students actually put in an effort and when they did not." He added that "students trying to contribute helped the wiki as a whole, but the students who simply contributed for a grade really didn't leave quality enough content to even add to."

In response to Question E, MZ wrote that he felt people should be left to decide if they will edit other wiki contributions. MR stated, "I personally don't know that I would actually want to edit another student's wiki that is published based on their personal perspective and I wouldn't feel right modifying that."

Theme: ***Challenge 3—Help students see the value of doing revisions.***

Table 13
Topic: Incentives

Codes: incentives, value
References: Sharp & Whaley, 2018; No references for incentives

Student responses:

Only four students gave positive suggestions in response to Question E. They suggested extra credit or making editing a part of an assignment. Six responded negatively.

Respondent FL stated, "I think students are highly incentivized through points and extra credit to bolster their grade. I think offering points for extra feedback and comments would work well." MJ agreed that giving extra credit might get people to edit or change wikis.

FS wrote, "With school, I believe that the best incentive is grades. If there is some sort of extra credit, I would have done it."

FMA stated that she would edit other's work only if it was required as part of the assignment.

Theme: ***Challenge 4—Provide students incentives for doing revisions.***

Table 14
Topic: Attitude

Codes: satisfaction, motivation, forums
References: Stoddard, Chan & Liu, 2016; Infeld & Adams, 2013; Biasutti, 2017; Sharp & Whaley, 2018

Student responses:

Two students made negative comments to Question A. FJ indicated the wiki did not contribute to her learning. FMA found the wiki assignment no different than other assignments in the class.

In response to Question B, four people indicated they did not find the wiki useful. MF wrote, "There was a lot to learn from what everyone shared, but I didn't find this to be very effective." FJA indicated that the wiki was "not particularly" helpful, because "it was too overwhelming for me personally." As a response to question E, MB stated that he would rather do discussions because "the lack of effort makes a course wiki a difficult thing."

In response to Question C, MW wrote, "For me I used other sources even though I probably should have looked at the class wiki more often." Although he did not use them as resources, he thought they would have helped.

A number of people did not look at other people's wikis or looked at them minimally.

Theme: ***Challenge 5—Help students gain a positive attitude about wikis.***

Discussion

For most students, the wiki assignment in the emergency services course was their first exposure to creating and editing wikis. Their experience with wikis likely came as consumers of Wikipedia and other wiki websites (Page & Reynolds, 2015). While students had not studied or read a lot about wikis, in their responses to questions, they were able to identify some of the same benefits and challenges pointed out in the literature. Themes are very closely related to each other and show a crossover of information.

Table 2 lists the themes which emerged from student responses to questions about their experience with wikis. The questions students responded to are listed in the far-right column.

Table 15
Benefit and Challenge Themes Matched to Questions

Benefit or Challenge #	Theme	Question
Benefit 1	Wikis provide information that leads to learning and knowledge acquisition.	A, B
Benefit 1a	Wikis provide many viewpoints.	A
Benefit 2	Wikis encourage collaboration.	A
Benefit 2a	Wikis allow students to share information.	A
Benefit 2b	Wikis increase student involvement and engagement.	A
Benefit 3	Wikis are a useful skill to take into the workplace.	B
Benefit 3a	Wikis help students develop their own content.	B, C
Benefit 3b	Wikis can be used efficiently to develop documents.	B
Challenge 1	Help students learn a new skill using wikis.	A, B
Challenge 2	Focus on wikis as a skill not just a content tool.	B, C, E
Challenge 3	Help students see the value in doing revisions.	B, C, D, E
Challenge 4	Provide students incentives for doing revisions.	E
Challenge 5	Help students gain a positive attitude about wikis.	A, B, C, D, E

In this study, learning and knowledge acquisition were identified as benefits as was collaboration (Oskoz and Elola, 2014; Hewege & Perera, 2013; Yarbrough, 2018). Collaboration appears to be closely tied to learning. Li and Chu (2018) found collaborating through wikis positively impacted learning. Students in this study indicated that "working together students have more incentive to learn" and they gain better understanding by looking at the work of other students. Looking at various points of view helped increase knowledge, one student wrote. Learning improved by understanding information from "many different angles."

A major disadvantage of online education, according to some scholars (Kirkwood & Price, 2013), is that students study alone. Collaboration in online courses using wikis and other social media allows students to "work together as a team." Sharing information was seen as a benefit of wikis. One student wrote, "The wiki assignment … allowed us to share information that can be used as a model for building an effective communication plan in a disaster."

As some students pointed out, wikis are a good way to "extend learning beyond the classroom" (Yarbrough, 2018) into the workplace. The wiki assignment allowed the students "to see how crisis communications plans are created and what they looked like." The assignment felt like "a real-world professional project," wrote a student. Wikis apply easily to the workplace because they help students develop their own content and can be used efficiently to develop documents.

Students found it hard to learn to use wikis; they also found the amount of information overwhelming and sometimes hard to understand. Infeld and Adams (2013) used Wikipedia as the platform for student submissions. They found they had to be explicit in describing how the exercise was relevant to the study topic in order to convince students of the value of using wikis. Orientation is important in using wikis for teaching. Before the assignment students need to learn the purpose and how of using wikis. During the assignment, it is also necessary to monitor student progress. While this is harder online, it is equally important as it is in a face-to-face class.

While many students saw the value of the wiki and extolled its virtues as a learning tool, few of them used it to its full extent by adding to or revising other student work. Rott and Weber (2013) found in their early efforts using wikis that students did well in composing and sharing information but were hesitant in critiquing or changing the work of other people. This is a finding of this study as well. Some students were hesitant to revise the work of other students. Students need reasons for editing and revising the work of other students. Instructors should help students see the value of doing revisions as not only a way to help other students, but also improve the document. Assignment instructions and wiki training should point out that other students benefit and appreciate help with writing and content. In addition, points as part of the assignment or extra credit should be given for editing others' work. The editing process must also be easy for the students to use and provide an editing history. Wiki software, Google Docs, and now most learning management systems provide for easy editing and editing histories.

Some students did not look at other people's work or did so minimally. Four people indicated that they did not find the wiki useful. Some saw learning to use wikis as inhibiting their learning about crisis communications plans. They viewed the wiki as a means to an end as opposed to being an end in itself. These problems could possibly be overcome by providing training about how to do wikis and by emphasizing the value of wikis in an orientation. Area of study and learning style may be factors in negative attitudes toward wikis in this study. Chu et al. (2017) found significant differences in motivation and knowledge management among students in language studies, information management, and engineering. Students in information management had the best attitude because of previous learning experiences and technical background. Park et al. (2010) recommended taking learning style into consideration when developing wiki assignments. To accommodate learning style, video and audio material as well as written instructions could be used in training and orientations. In addition, to overcome these barriers, prior to the project, students need to be convinced that using wikis to learn and write documents is a worthwhile endeavor.

One student suggested he preferred discussion forums to wikis. Sharp and Whaley (2018) found students preferred wikis over discussion forums, because they allowed not only comments, but also adding to student responses. Biasutti (2017) compared the usage of forums and wikis in online teaching, showing that discussions promoted inferencing, evaluating, organizing, and supporting while wikis encouraged mainly processes of producing and developing. We recommend using both strategies in online courses.

Conclusion

This study confirms much of the research on using wikis in the online learning environment. Wikis get students engaged in the learning process. Wikis also encourage student collaboration in knowledge acquisition, suggesting that process may be as important to learning as are the outcomes. The benefits of using wikis for learning are equally important as the final document.

The notion that collaboration leads to learning is reason enough to suggest that instructors and course developers should consider using wikis in online courses. Nevertheless, wikis require students to learn a new skill and step out of the comfort of the more traditional online modalities—paper writing and discussion forums. Students need to be persuaded of the value of using wikis. Students need to be oriented to the purpose and benefits of using the strategy. This is particularly challenging in the online environment, where students learn by doing. If it does not appear to be related to the topic of their studies, they may resist learning a new instructional approach. In addition, students need to receive instructions about how to use wikis. Also, the software used must make editing the wiki easy and they need to have incentives built into the assignment to make revisions.

While this study appropriately used qualitative methods, it is limited by its sample size (17) and the fact that it only examines one case. The methodology used in this study could be replicated to include more cases and a larger number of participants. In addition, a comparative study of wiki software platforms would be helpful to instructors looking to use wiki in online learning. Also, more information is needed about how to incentivize and motivate students who are using wikis in online courses.

References

Abdelmalak, M. M. M. (2014). Web 2.0 technologies and building online learning communities: Students' perspectives. *Online Learning, 19*(2). http://dx.doi.org/10.24059/olj.v19i2.413

Archambault, P. M., Bilodeau, A., Gagnon, M.-P., Aubin, K., Lavoie, A., Lapointe, J., Poitras, J., Croteau, S., Pham-Dinh, M., & Légaré, F. (2012). Health care professionals' beliefs about using wiki-based reminders to promote best practices in trauma care. *Journal of Medical Internet Research*, *14*(2), e49. https://doi-org.ezproxy.uvu.edu/10.2196/jmir.1983

Bengtsson, M. (2016). How to plan and perform a qualitative study using content analysis. *NursingPlus Open*, *2*, 8–14. https://doi.org/10.1016/j.npls.2016.01.001

Biasutti, M. (2017). A comparative analysis of forums and wikis as tools for online collaborative learning. *Computers & Education, 111*, 158–171.

Bolisani, E., & Scarso, E. (2016). Factors affecting the use of wiki to manage knowledge in a small company. *Journal of Knowledge Management*, *20*(3), 423–443. https://doi-org.ezproxy.uvu.edu/10.1108/JKM-05-2015-020

Castleberry, A., & Nolen, A. (2018). Thematic analysis of qualitative research data: Is it as easy as it sounds? *Currents in Pharmacy Teaching and Learning*, *10*, 807–815.

Chu, S. W., Zhang, Y., Chen, K., Chan, C. K., Lee, C. Y., Zou, E., & Lau, W. (2017). The effectiveness of wikis for project-based learning in different disciplines in higher education. *The Internet and Higher Education, 33*, 49–60.

Dixson, Marcia D. (2015). Measuring student engagement in the online course: The online student engagement scale (OSE). *Online Learning*, *19*(4), 143–157.

Ertmer, P.A., Newby, T. J., Liu, W., Tomory, A., Yu, J. H., & Lee, Y. M. (2011). Students' confidence and perceived value for participating in cross-cultural wiki-based collaborations. *Educational Technology Research and Development, 59*(2), 213–228.

Evans, M. J., & Moore, J. S. (2011). A collaborative, wiki-based organic chemistry project incorporating free chemistry software on the web. *Journal of Chemical Education, 88*(6), 764–768.

Grace, T. (2009). Wikis as a knowledge management tool. *Journal of Knowledge Management, 13*(4), 64–74. https://doi-org.ezproxy.uvu.edu/10.1108/13673270910971833

Hasan, H. M., & Pfaff, C. C. (2006). *The Wiki: An environment to revolutionise employees' interaction with corporate knowledge* (pp. 377–380). ACM Press. http://ro.uow.edu.au/cgi/viewcontent.cgi?article=3191&context=commpapers

He, W., & Yang, L. (2016). Using wikis in team collaboration: A media capability perspective. *Information & Management*, *53*(7), 846–856. https://doi-org.ezproxy.uvu.edu/10.1016/j.im.2016.06.009

Hewege, C. R., & Perera, L. C. R. (2013). Pedagogical significance of wikis: Towards gaining effective learning outcomes. *Journal of International Education in Business*, *6*(1), 51–70.

Howe, J. (2008). *Crowdsourcing: Why the power of the crowd is driving the future of business.* Crown Publishing Group.

Hu, Q., & Johnston, E. (2012). Using a wiki-based course design to create a student-centered learning environment: strategies and lessons. *Journal of Public Affairs Education, 18*(3), 493–512.

Hubble, L. (2011). Study strategies & student engagement using wikis: Collaborative note taking with the Cornell method. *Online Learning Consortium*. https://secure.onlinelearningconsortium.org/effective_practices/study-strategies-student-engagement-using-wikis-collaborative-note-taking-cornel

Infeld, D. L., & Adams, W. C. (2013). Wikipedia as a tool for teaching policy analysis and improving public policy content online. *Journal of Public Affairs Education, 3*, 445.

Kannaley, K., Mehta, S., Yelton, B., & Friedman, D. B. (2019). Thematic analysis of blog narratives written by people with Alzheimer's disease and other dementias and care partners. *Dementia: The International Journal of Social Research and Practice*, *18*(7–8), 3071–3090.

Kirkwood, A., & Price, L. (2013). Examining some assumptions and limitations of research on the effects of emerging technologies for teaching and learning in higher education. *British Journal of Educational Technology, 44*(4), 536–543.

Leal, F., Veloso, B. M., Malheiro, B., González-Vélez, H., & Burguillo, J. C. (2019). Scalable modelling and recommendation using wiki-based crowdsourced repositories. *Electronic Commerce Research & Applications, 33*, 100817.

Li, X., & Chu, S. K. W. (2018). Using design-based research methodology to develop a pedagogy for teaching and learning of Chinese writing with wiki among Chinese upper primary school students. *Computers & Education, 126*, 359–375.

Marx, S. (2008). Rich data. In L. M. Given (Ed.), *The sage encyclopedia of qualitative research methods* (p. 795).

Morse, J. M. (2015). "Data were saturated..." *Qualitative Health Research*, *25*(5), 587–588. https://doi.org/10.1177/1049732315576699

Ojala, M. (2008). Business Research 2.0. *Online*, *32*(2), 45–47.

Oskoz, A., & Elola, I. (2014). Promoting foreign language collaborative writing through the use of web 2.0 tools and tasks. In M. González-Lloret & L. Ortega (Eds.), *Technology-mediated TBLT: Researching technology and tasks* (pp. 115–147). Benjamins.

Page, K. L., & Reynolds, N. (2015). Learning from a wiki way of learning. *Studies in Higher Education, 40*(6), 988–1013.

Palomo-Duarte, M., Dodero, J. M., García-Domínguez, A., Neira-Ayuso, P., Sales-Montes, N., Medina-Bulo, I., Palomo-Lozano, F., Castro-Cabrera, C., Rodríguez-Posada, E. J., & Balderas, A. (2014). Scalability of assessments of wiki-based learning experiences in higher education. *Computers in Human Behavior, 31*, 638–650.

Park, C. L., Crocker, C., Nussey, J., Springate, J., & Hutchings, D. (2010). Evaluation of a teaching tool—wiki—in online graduate education. *Journal of Information Systems Education, 21*(3), 313–321.

Pew Internet and American Life Report. (2011). *Wikipedia, past and present*. https://www.pewinternet.org/wp-content/uploads/sites/9/media/Files/Reports/2011/PIP_Wikipedia.pdf

Qian, H., & Erik, J. (2012). Using a wiki-based course design to create a student-centered learning environment: Strategies and lessons. *Journal of Public Affairs Education, 3*, 493.

Rothman, L. (2016, January 15). *Wikipedia at 15: How the concept of a Wiki was invented*. Time. http://time.com/4177280/wiki-history-wikipedia/

Rott, S., & Weber, E. D. (2013). Preparing students to use wiki software as a collaborative learning tool. *CALICO Journal, 2*, 179.

Roussinos, D., & Jimoyiannis, A. (2013). Analysis of students' participation patterns and learning presence in a wiki-based project. *Educational Media International, 50*(4), 306–324.

Sener, J. (2019). CJENCYCLOPEDIA.COM: Online encylopedia of criminal justice. *Online Learning Consortium.* https://secure.onlinelearningconsortium.org/effective_practices/cjencyclopediacom-online-encyclopedia-criminal-justice

Sharp, L. A., & Whaley, B. (2018). Wikis as online collaborative learning experiences: "A different kind of brainstorming." *Adult Learning, 29*(3), 83–93. https://doi.org/10.1177/1045159518761095

Shih, W. C., Tseng, S. S., & Yang, C. T. (2008). Wiki-based rapid prototyping for teaching-material design in e-Learning grids. *Computers & Education, 51*(3), 1037–1057.

Stoddart, A., Chan, J. Y.-Y., & Liu, G.-Z. (2016). Enhancing successful outcomes of wiki-based collaborative writing: a state-of-the-art review of facilitation frameworks. *Interactive Learning Environments, 24*(1), 142–157. https://doi.org/10.1080/10494820.2013.825810

Sykes, J. M., Oskoz, A., & Thorne, S. L. (2008). Web 2.0, synthetic immersive environments, and mobile resources for Language Education. *CALICO Journal, 25*(3), 528–546. http://www.jstor.org/stable/calicojournal.25.3.528

Trocky, N. M. & Buckley, K. M. (2016). Evaluating the impact of wikis on student learning outcomes: An integrative review. *Journal of Professional Nursing, 32*, 364–376. https://doi:10.1016/j.profnurs.2016.01.007

Wickler, G., Tate, A., & Hansberger, J. (2013). Using shared procedural knowledge for virtual collaboration support in emergency response. *IEEE Intelligent Systems, 28*(4), 9–17.

Woolley, S., & Ludwig-Hardman, S. (2000). Online learning communities: Vehicles for collaboration in Online Learning Environments. In J. Bourdeau & R. Heller (Eds.), *Proceedings of ED-MEDIA 2000—World Conference on Educational Multimedia, Hypermedia & Telecommunications* (pp. 1835–1836). Association for the Advancement of Computing in Education (AACE). https://www.learntechlib.org/primary/p/16623/

Yarbrough, J. R. (2018). Wiki based dynamic quizzes: A bridge between online students and instructors? *Journal of Instructional Pedagogies*, *20*.

Zgheib, G., & Dabbagh, N. (2020). Social media learning activities (SMLA): Implications for design. *Online Learning, 24*(1). http://dx.doi.org/10.24059/olj.v24i1.1967

Zou, B., Wang, D., & Xing, M. (2016). Collaborative tasks in wiki-based environment in EFL learning. *Computer Assisted Language Learning, 29*(5), 1000–1016. https://doi:10.1080/09588221.2015.1121878

Examining Student Reported Interaction and Satisfaction in Higher Education Administration Graduate Seminar-Style Blended Courses

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Abstract
The purpose of this case study was to examine how a professional graduate program in higher education administration developed seminar-style courses in a blended format. Blended courses involved two extended in-person weekend sessions with synchronous online sessions, and other asynchronous coursework in between. This study explored the importance of interaction, student satisfaction, and motivation to student success. Data were collected through student surveys and faculty interviews from 11 courses within the same graduate degree program at a private, highly selective research university from spring 2016 through spring 2018. Class size was the biggest factor relating to student interaction. This study also found synchronous online discussions had a greater impact than other learning activities and that satisfaction and interaction had a slight increase over time as students and instructors became more comfortable with the format.

Keywords: blended learning, graduate, seminar-style, community of inquiry, interaction

Thurber, D. & Trautvetter, L. (2020). Examining student reported interaction and satisfaction in higher education administration graduate seminar-style blended courses. *Online Learning, 24*(3), 184-202. https://doi.org/10.24059/olj.v24i3.2102

Examining Student Reported Interaction and Satisfaction in Higher Education Administration Graduate Seminar-Style Blended Courses

Despite the growth in adoption of blended learning, most research and practice in higher education to date has focused on introductory-level coursework, often couched in the need to expand access and engagement at a large scale. Little research has examined blended learning within graduate, seminar-style courses focused on small classes and intimate peer-to-peer and peer-to-instructor interactions. These small, seminar-style courses have been a staple of higher education graduate programs for nearly as long as there have been institutions of higher education,

but while other courses have evolved to many delivery methods and formats, the graduate seminar has remained mostly the same. The purpose of this case study was to examine how a professional graduate program in higher education administration at a private research university addressed this gap in developing seminar-style courses in a blended format. Like many blended and online learning initiatives, these blended courses were adopted to support students who desired an alternative format, either due to hardships involving location and scheduling or preferences for learning style and ability status. For this program, the 11 blended courses were structured with two extended in-person weekend sessions (eight hours on either a Saturday or Sunday), four to six two-hour synchronous online sessions, and other asynchronous coursework in between.

Recognizing the importance of student interaction through discussion and collaboration in graduate, seminar-style courses, this study asked specifically: How can graduate, seminar-style courses offered in a blended format within a higher education administration program promote quality student satisfaction, motivation, and interaction among peers and instructors?

To address this question, this paper starts by examining the relevant literature on student interaction and blended format courses as well as the relationships between satisfaction, motivation, and interaction. Then, the paper discusses the survey and interview data collection methods employed to examine student reported interaction and satisfaction before reporting the results and discussing the implications of those results. Ultimately, by undertaking this study, these results might help inform the design and delivery of graduate, seminar-style courses in a blended format at other universities and programs and aid to understand how these courses could be designed to support student interaction and satisfaction.

Review of Relevant Literature

This study focused on interaction and satisfaction as two key, closely-linked indicators of success for graduate, seminar-style courses in a higher education administration program. The following review of literature first covers how interaction has been shown to relate to student success, followed second by an examination of how student satisfaction is tied to both interaction and student success, and third by looking at the relationship between student motivation, satisfaction, and interaction.

Interaction as an Indicator of Student Success

The study of peer and instructor interactions in education predates online learning. Significant research from when researchers began to study interaction has shown that social, emotional, and cognitive interactions contribute to satisfaction and better learning outcomes, regardless of setting (e.g., Vygotsky, 1978; Wells, 1999). With the rise of online and blended learning, research has expanded and evolved conceptions of interaction to incorporate nonverbal and asynchronous communication as well as in-person and synchronous online communication (e.g., Garrison & Arbaugh, 2007; Gunawardena, 1995). As a result, early distance educators defined four types of interactions: (1) learner-teacher, (2) learner-content, (3) learner-learner, and (4) learner-interface (Hillman, Willis, & Gunawardena, 1994). Building off of this early understanding of online student interaction, the Community of Inquiry framework (CoI) developed a more complex conceptualization of interactions in online and blended environments (Garrison, Anderson & Archer, 2000). See Figure 1 for a visualization of the framework.

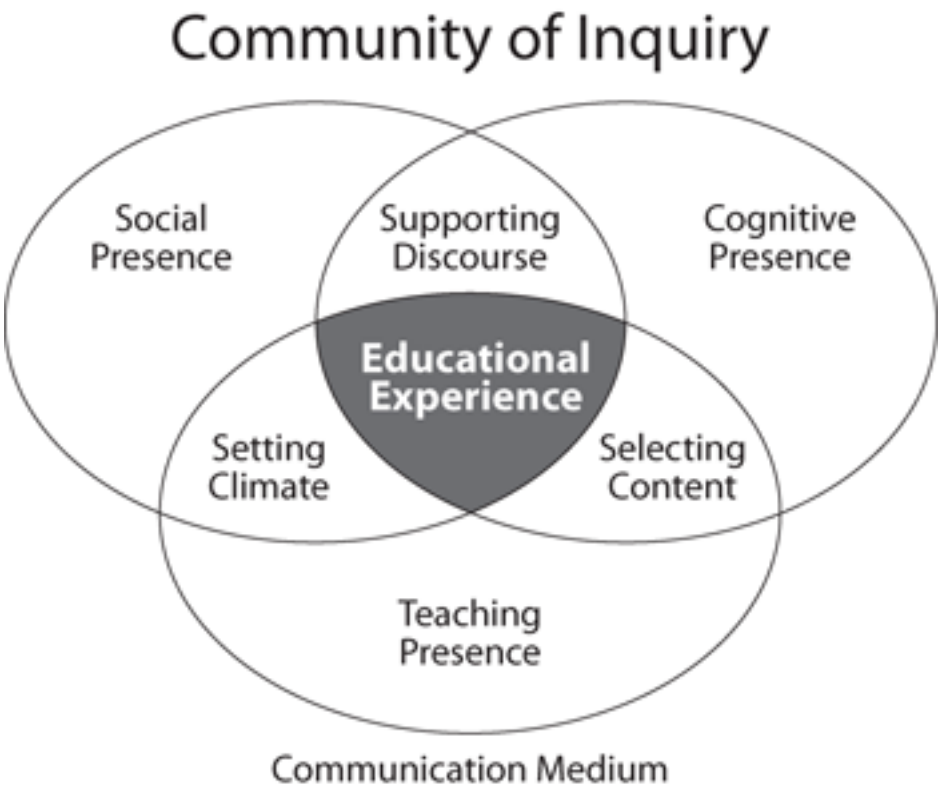

Figure 1. A Community of Inquiry framework (Garrison, Anderson & Archer, 2000).

The CoI framework consists of three interrelated parts: (1) social presence, (2) cognitive presence, and (3) teaching presence (Garrison, 2017). Social presence is "the ability of participants to identify with a group, communicate openly in a trusting environment, and develop personal and affective relationships progressively by way of projecting their individual personalities" (Garrison, 2017, p. 25). Cognitive presence is defined generally as "the extent to which learners are able to construct and confirm meaning through sustained reflection and discourse in a critical community of inquiry" (Garrison, Anderson, & Archer, 2001, p. 11). Finally, teaching presence is "the design, facilitation and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (Anderson, Liam, Garrison, & Archer, 2001, p. 5).

The CoI framework has been used and validated countless times since its initial proposal (Kineshanko, Arthur, Garrison, & Graham, 2016). Blended learning, in particular, has received increased attention for its effectiveness in encouraging greater student interaction with peers, instructors, and content (Garrison, 2017). This, in turn, has led several studies to conclude that blended learning exceeded outcomes of both face-to-face and online instruction. In a metacognitive analysis by the U.S. Department of Education examining 99 studies that contrasted online or blended learning with face-to-face instruction, the key finding was that "instruction combining online and face-to-face elements had a larger advantage relative to purely face-to-face instruction than did purely online instruction" (Means, Toyama, Murphy, Bakia & Jones, 2009, p. xv). This important finding is further supported in smaller class sizes based on a study that examined blended learning in small liberal arts colleges against historical data of traditional format

courses and found that the blended course performance was superior (Kolowich, 2012). These findings provide compelling evidence that blended learning courses focused on interaction result in higher student success outcomes compared to either in-person or fully online courses. The next area of literature will focus on another key part of the research question for this study: the relationship of student satisfaction to interaction and student success.

Relationship of Student Satisfaction on Interaction and Student Success

While interaction has been shown to relate to overall student success, it has also consistently been related to student satisfaction (e.g., Ali & Ahmed, 2011; Kuo, Walker, Schroder, & Belland, 2014; Lee, 2012). Several studies to date have argued the CoI framework is an important determinant of student satisfaction as well as perceived learning (Akyol & Garrison, 2008; Arbaugh et al., 2008; Shea, Li, Swan, & Pickett, 2005). This follows closely with other research on online learning that indicates a strong predictive relationship between interaction and student satisfaction (Jung Choi, Lim & Leem, 2002; Bolliger & Martindale, 2004). For example, Jung et al. (2002) found undergraduate students in a collaborative interaction group perceived higher satisfaction than those who were not, while Bolliger and Martindale (2004) found interaction between learners and instructors was the most important factor impacting student satisfaction in a sample of graduate students enrolled in online instructional technology courses. Finally, in a large meta-analysis of studies focused on social presence, Richardson, Maeda, Lv, and Caskurlu (2017) found there was a moderately large positive average correlation between social presence and satisfaction as well as between social presence and perceived learning across all of the studies they examined.

Satisfaction, in turn, has been linked to positive outcomes for higher education in student success (Chang & Smith, 2008; Noel-Levitz 2011) and student retention (Debourgh, 1999; Ali & Ahmad, 2011). As such, just like interaction, student satisfaction has been consistently tied to overall student success and is an important metric by which to measure the efficacy of a course. The final area of literature looks at one more complicating factor for student interaction and success: the motivation of students to take a course in a blended format and that impact on their interaction and satisfaction.

Impact of Motivation on Interaction and Student Satisfaction

One question that problematizes any understanding of student interaction, satisfaction, and success relates to motivation—both intrinsic and extrinsic—within a course or subject matter. A number of researchers have examined the impact of motivation on learning (e.g., Deci, Koestner, & Ryan, 1999; Deci & Ryan, 2002; Lepper, 1988). While common sense might suggest that motivation improves learning, researchers have noted the importance of examining external versus internal motivation on the degree of learning achieved (Deci et al., 1999; Deci & Ryan, 2002). To this end, self-determination theory in psychological research provides the most widely used and nuanced perspective on the examination of intrinsic and extrinsic motivation on learning and well-being (Deci & Ryan, 2002).

Self-determination theory and its related subdisciplines propose a framework for developing intrinsic motivation based on the degree to which an activity provides the basic psychological needs of autonomy, competence, and relatedness. Self-determination theory thus suggests that if students are motivated to participate in a course whether through events, conditions, or other personal factors, they will gain more from that experience and if they are

disinterested in a course, including based on the format of that course, then they will be less motivated to engage (Deci & Ryan, 2002).

Based on this understanding of motivation, several studies have discussed how the themes of online experience and subject matter of a course may result in variations of how students perceived their cognitive presence and skills expectations (e.g., Arbaugh, Bangert, & Cleveland-Innes, 2010; Oustz, 2006). A study of 1,500 undergraduate and graduate students at two institutions determined that students were more likely to achieve their expectations for social, cognitive, and teaching presence in courses related to academic disciplines that encouraged problem-solving, interaction discussions, and group projects (Arbaugh, Bangert, & Cleveland-Innes, 2010). Oustz (2006) also confirmed the relevance of the CoI framework for disciplines in which collaboration and communities of practice are support tools for students in fulfilling the course objectives. In both instances, however, there was also a positive correlation of students' interest in the course material (i.e., focus of their degree) to their satisfaction and achievement of learning goals (Arbaugh et al., 2010; Oustz, 2006). Lee et al. (2011) also noted students' expectations regarding the degree of faculty support varied based on students' prior online learning experience and their sense of self-efficacy related to the course's collaboration activities. In their meta-analysis of recent research into social presence, Richardson et al. (2017) also suggested that factors related to the online and hybrid course setting including course length, discipline area, and size of the course had a moderating effect on the correlation between interaction and satisfaction. These factors were all significantly related to student motivation within the course (Richardson et al., 2017).

Overall, these studies suggest students' levels of experience and interest with a course subject and format impacted their interaction. The results also suggest the role of cognitive, social, and teaching presences may be individualized for students and be based on the subject matter taught, motivations of students in taking a course in a different format, and the experience of students with that format, thereby requiring faculty to understand students' experiences and requirements early in the learning process.

Based on this existing literature describing the relationship between interaction, satisfaction, and student motivation on student success, this study seeks to extend these existing studies in the design and delivery of graduate, seminar-style blended courses using the methods detailed in the next section.

Methods

Data were collected from 11 courses within the same professional graduate degree program at a private research university from spring 2016 through spring 2018. The courses varied in size, instructor, topic area, and activities/tools used; however, all courses followed the same blended format and were supported and facilitated by the same instructional designers. The course topics included: introduction to higher education, college student development theories, teaching and learning in higher education, coaching and developing leadership, budgeting and finance in higher education, and community colleges. Some courses were iterations of the same course from one year to the next with the same faculty teaching the courses. Key context factors of the 11 courses are described in Table 1. Courses are presented in chronological order of when they were taught.

Table 1
Background and Context of Blended Format Courses Examined

Course	***Quarter***	***# of Instructors***	***# of TAs***	***In-Person Hours***	***Online Sync Hours***	***# of Students***
Course 1	SP16	1	-	20	8.5	17
Course 2	SU16	1	1	18	10	16
Course 3	FA16	1	-	18	10	12
Course 4	WI16	2	-	15	12	41
Course 5	SP17	2	-	16	12	13
Course *6*	SP17	1	1	16	10.5	28
Course *7*	SU17	1	1	16	10	15
Course *8*	SU17	1	-	16	12	13
Course *9*	FA17	1	-	16	12	10
Course *10*	SP18	1	-	16	12	18
Course *11*	SP18	1	-	16	12	7

After each blended format course, students were asked to provide feedback using a survey instrument based on a survey developed and validated by Vaughan, Cleveland-Innes, and Garrison (2013) for evaluating the CoI framework. The survey asked students to rate each course on how it compared to other courses they had taken based on Likert-scale questions. More specifically, the survey asked students to rate their amount and quality of interactions with peers and instructors and their overall satisfaction. Students were also asked to rate the helpfulness of learning activities, course formats, and tools utilized within each course toward their overall learning. These questions were all designed to assess the students' perceptions of the teaching, social, and content presences described in the CoI framework (Garrison, Anderson & Archer, 2000). The survey had an average 64 percent response rate across all courses, but varied greatly from course to course with the lowest response rate at 38 percent for course five and the highest response rate at 92 percent for course three. Because of this variation and the overall small population and sample sizes represented, results fall within a margin of error ranging from 9 percent to 36 percent at a 95 percent confidence level. This is a limitation of this study as no statistically significant results or correlations can be derived from the survey results. A similar study with greater statistical validity could result in more generalizability of the findings to other contexts; however, as a case study in one attempt at blended learning in graduate, seminar-style courses, the results can still be reported and interpreted qualitatively to get a richer understanding into the student experience within the program as it relates to the format of the courses, motivation to pursue these courses, and their perceptions of the development of a community of inquiry.

To enhance the qualitative understanding of blended learning in this context, course instructors and teacher assistants (TAs) were solicited for feedback during an informal interview at the end of each online course session and, in most cases, at the end of the course completion.

With the focus again on the CoI framework, instructors were asked specifically to reflect on how students engaged within the class sessions with their peers, with them as instructors, and with the content. These thoughts were recorded and used to inform course design and implementation of improvements as well as get a better sense of the instructors' impressions on their students' satisfaction with the course and perceptions of student learning and interaction. All but one courses' faculty participated in informal interviews regarding their experience with the course, the design process, and their suggestions for improvements. The results from the student surveys and instructor interviews are reported in detail in the following section.

Results

Results from the surveys provided the bulk of the understanding for this study but were reinforced by feedback from instructors and the instructional designer. The results reported here are organized around three themes: overall satisfaction and interaction, course format and activities, and student motivation.

Overall Satisfaction and Interaction

Given the main foci of this study around interaction and satisfaction as key indicators of success, one of the main factors examined was student reported quantity (amount) and quality of interaction with both peers and instructors as well as overall satisfaction for each course in this study. Figure 2 shows the averages from the student survey on these three factors.

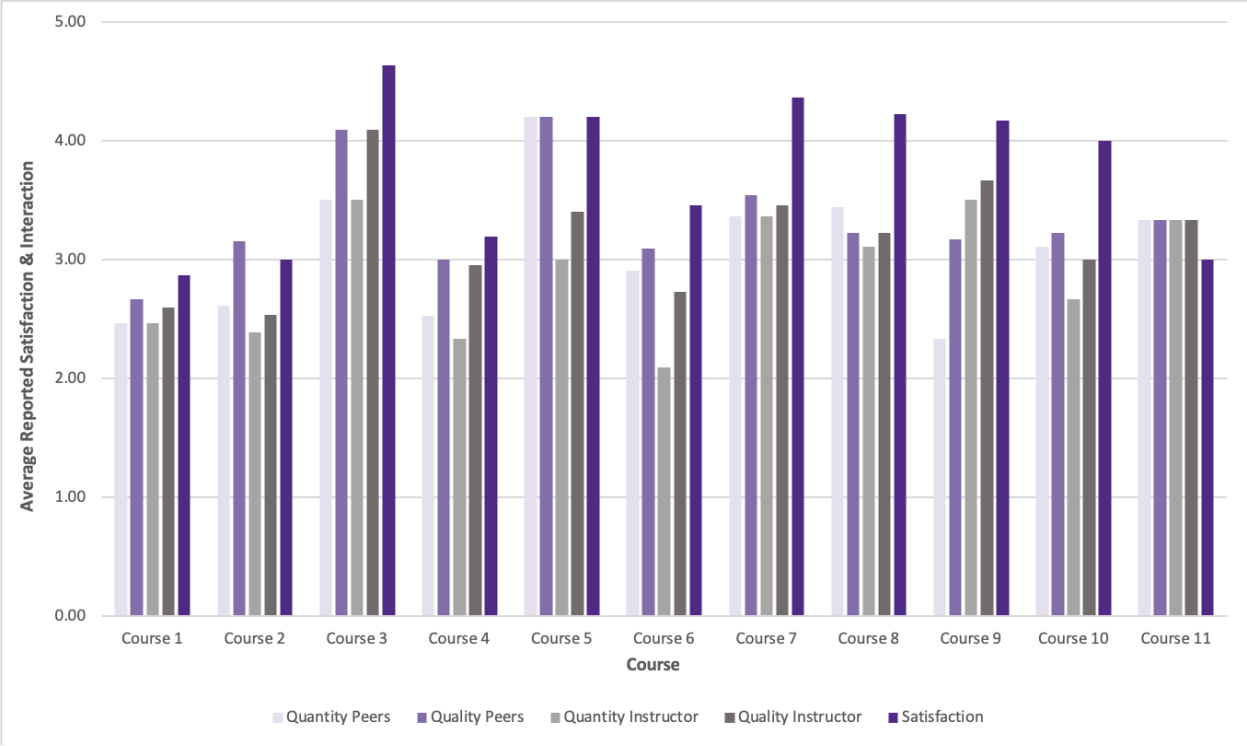

Figure 2. Average reported quantity/quality of interaction and satisfaction.

In this graph, averages were calculated from a Likert scale from 1 to 5, where 5 indicates higher/better interaction and 1 indicates lower/worse interaction than in other courses. Satisfaction was also based on a Likert scale from 5 (extremely satisfied) to 1 (extremely dissatisfied). In

chronological order of when it was offered, this graph shows the quantity and quality of interaction with peers in shades of light purple, while the quantity and quality of interaction with instructors in shades of gray. The overall satisfaction is reported for each course in dark purple. Any bar above 3.0 would indicate an average overall rating of "high" or "very high" quantity/quality of interaction and "satisfied" or "very satisfied" with the overall course. This overall view shows fairly wide variance across courses in both interaction and satisfaction, but individual factors reported next provide more nuance.

Class Size. While many variables remained consistent across all 11 courses examined, including the format, instructional time, redesign process, and demographics of students taking the courses, one factor that changed regularly was the class size. To understand this potential impact on the student ratings of interaction and satisfaction, data were further explained by a comparison between quality of interactions with peers and instructors and class size, as shown in Figure 3, which organizes the data by class size (indicated by the line) from smallest to largest.

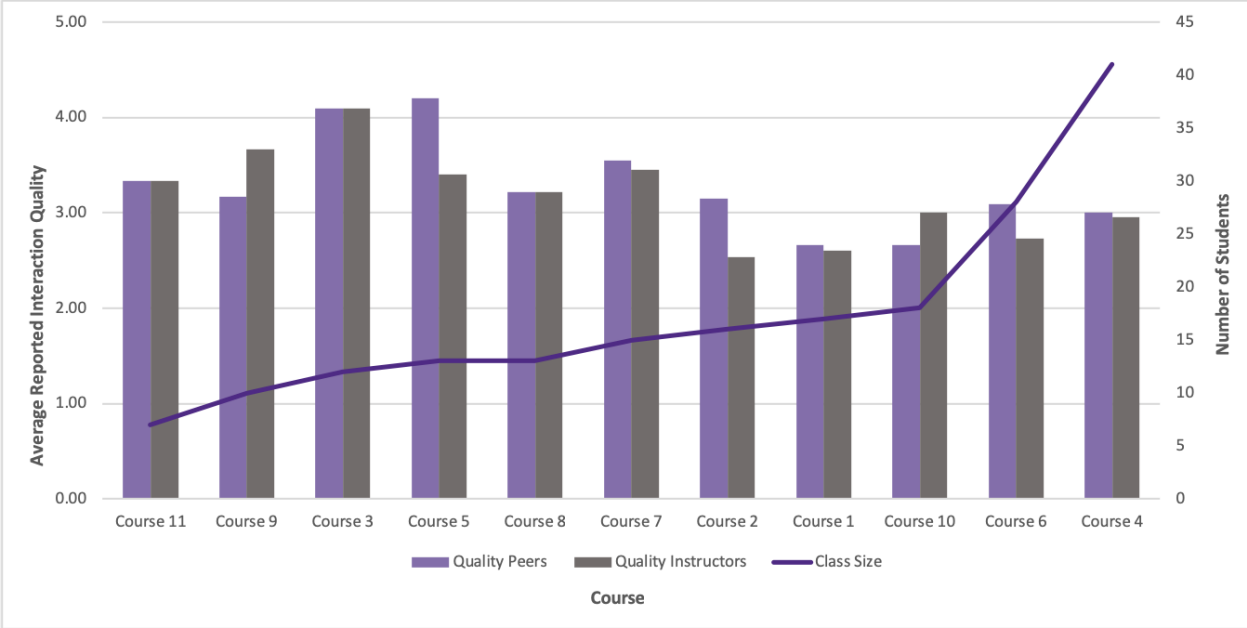

Figure 3. Average rated quality of interaction with peers and instructors for each course, compared with class size (organized by class size from smallest to largest).

Figure 3 shows a slight inverse in the relationship between reported quality of interaction (indicated by the bars) between both peers and instructors and the class size (indicated by the line). As the class size increased toward the right side of the graph, quality of interaction with both peers and instructors decreased.

TAs and Multiple Instructors. Another factor which varied across many of the courses was the size and composition of the instructional team. Three courses had a T) present for all class sessions and participating in the online course Learning Management System and two of the courses had two instructors instead of only one. While virtually no variation was seen between these courses with student interaction, some variation was observed for student perceptions of the quantity and quality of interaction with instructors as shown in Figure 4.

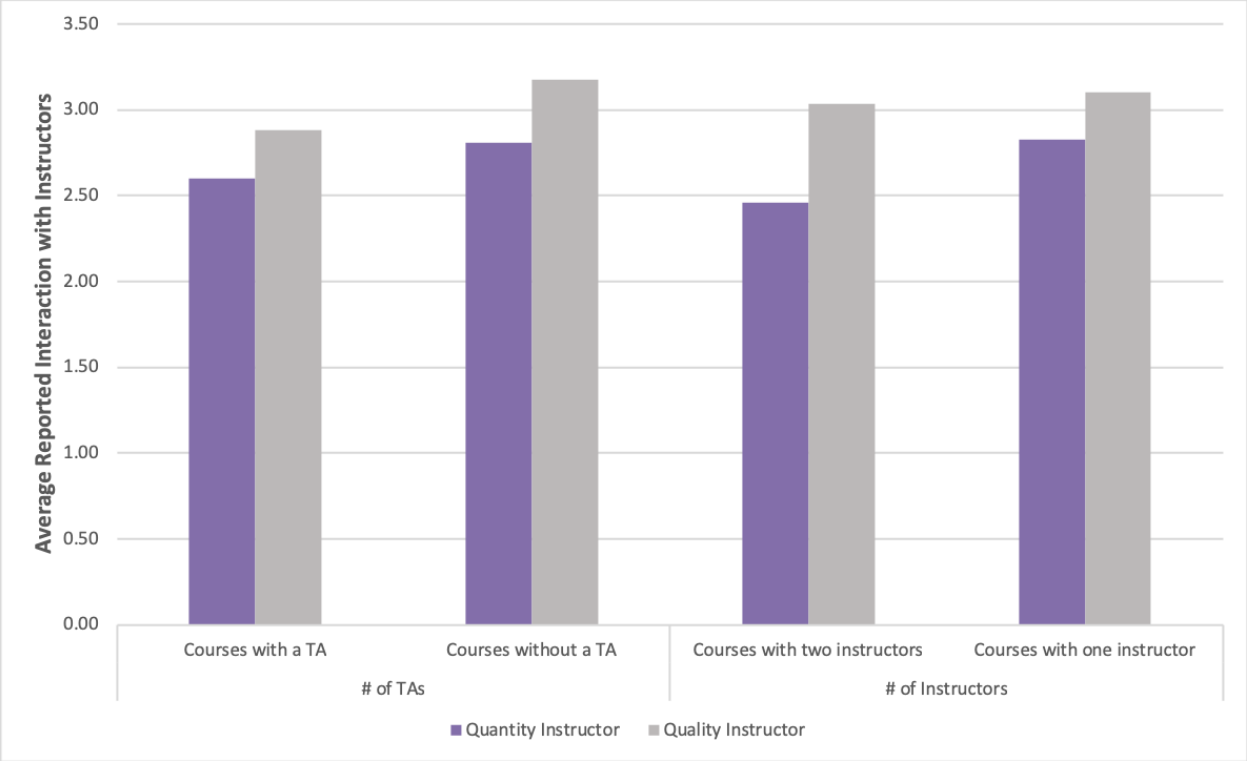

Figure 4. Average rated quantity and quality of interaction instructors based on whether a course had a TA (left) or multiple instructors (right).

As Figure 4 shows, there was a slight increase in both the quantity and quality of interactions for courses which did not have a TA. There was also a slight increase in the quantity of interactions with courses which had only one instructor, but virtually no difference in quality of interaction.

Course Format and Activities

Another factor that varied across the courses examined was the amount of time devoted to in-person versus online instruction. Figure 5 shows average student ratings of helpfulness to their learning for the different course formats (i.e., in-person or online) on a Likert scale from 5 (very helpful) to 1 (very unhelpful).

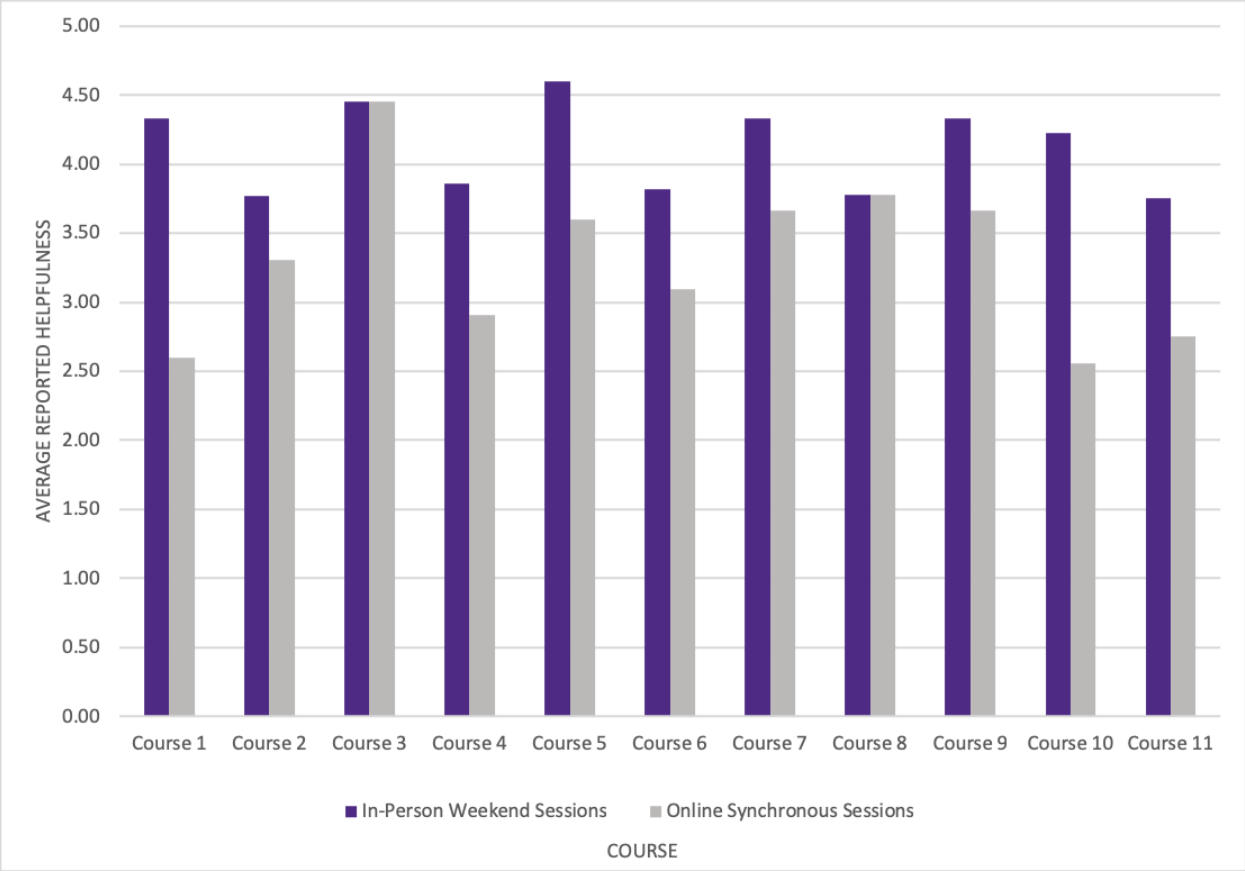

Figure 5. Average rated helpfulness of course formats by course. Helpfulness was rated on a 5-point scale, with 1 being "Not at all helpful" and a 5 being "Extremely helpful".

Courses offered earlier (courses one through three), all had a higher proportion of in-person instructional time (average 18.66 hours in-person and 9.50 hours online) as compared to courses starting with Course 4 through Course 11 (average 15.88 hours in-person and 11.56 hours online).

Most courses also used a variety of tools and activities to support their instruction, and particularly student interaction. Using the same scale for helpfulness to their learning, Figure 6 shows reported feedback on tools and activities. Only tools and activities which were used in at least two different courses with different instructors were included. This was done to minimize the impact of course-specific variables, such as *how* tools or activities were incorporated, class size, and how instructor(s) provided feedback.

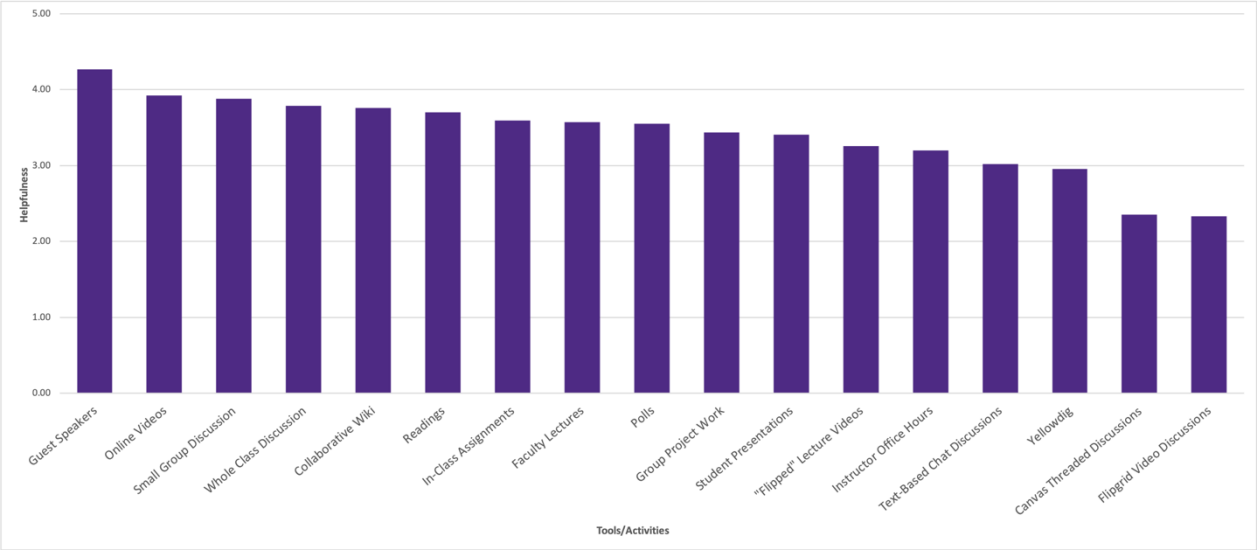

Figure 6. Helpfulness rating of all activities and tools used in blended format courses ranked in descending order. Note that not all activities/tools were used in every course and activities/tools used in only one course were omitted.

While Figure 6 is organized in descending order from average rated helpfulness, an average of three would indicate an average response of "helpful" or better. As such only a few activities—namely Yellowdig (a social-media style discussion board tool), Flipgrid video discussions, and Canvas Threaded Discussions—were rated as not helpful on average. This graph shows that all of the most highly rated tools and activities were focused around synchronous class sessions and included guest speakers, online videos, small group, and whole-class discussion.

Students also provided qualitative feedback on tools and activities used in courses. Most importantly, a large number of students discussed the importance of small group discussions. One student, for example, said: "I enjoyed the smaller breakout sessions (virtual or live) as they allowed for in-depth conversations and examination of the content/issues from the course." The instructional designers reiterated this point as well, noting that the methods for implementing different tools and activities such as how Yellowdig was used differently within separate courses had an impact on students' interaction with the material, the instructors, and each other.

Student Motivation

Finally, to examine the question of student motivations for participating in a blended format course and their satisfaction, researchers asked students to provide the reasons they chose to take the course in the blended format. Students were given the option to select any number of choices from a list of seven choices or a freeform "other" option. These results as related to overall course satisfaction are shown in Figure 7.

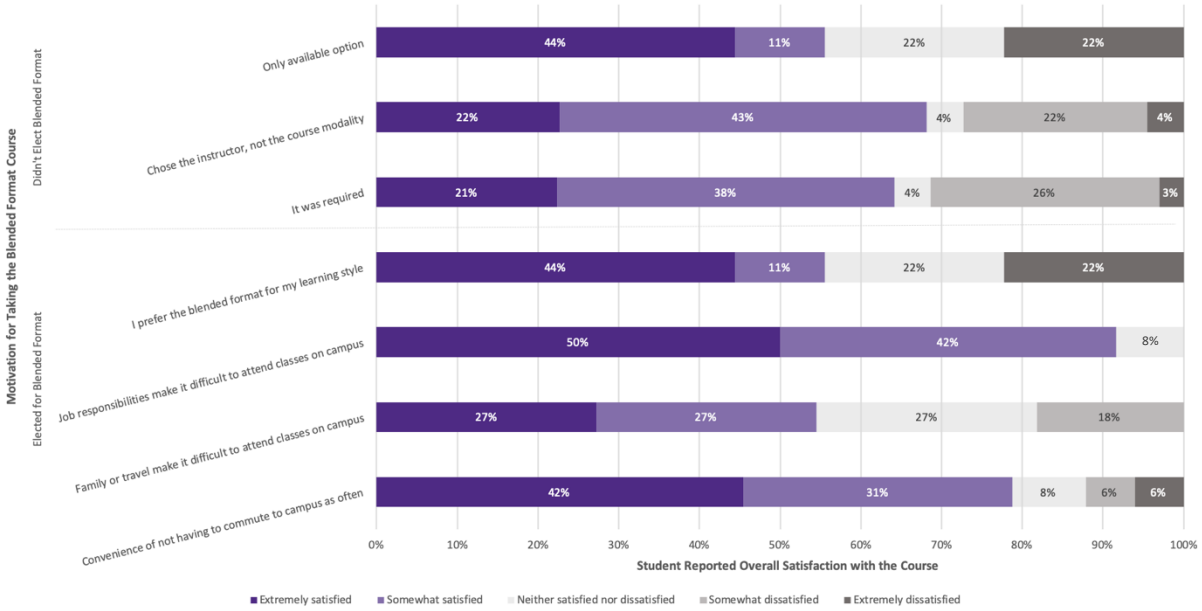

Figure 7. Student motivations for taking a course compared to their overall satisfaction with that course. Motivations are divided into two categories for either elected or didn't elect to take the blended format.

Figure 7 shows the data further subdivided by whether the answer indicated the student elected to take the course in a blended format or were required to take that format. Three of the seven choices were considered options that students took the course *despite* the blended format while the remaining four were considered reasons that students *elected for* the blended format. For example, if students responded with "It was required" or "Only available option," then they were grouped together on the top half of the graph for *didn't* elect for the blended format. Students who were grouped together because they *did* elect to take the blended format included those who answered "I prefer the blended format for my learning style" and "Family or travel make it difficult to attend classes on campus." For each reason indicated for taking the blended format course, the overall satisfaction as a Likert scale is reported along the horizontal bar from "Extremely satisfied" (5) on the left to "Extremely dissatisfied" (1) on the right.

The results of this study around overall satisfaction, course format and activities, and student motivation are discussed in detail in the following section.

Discussion

The objective of this study was to focus on assessing student satisfaction and interaction as key determinants of student success. Ultimately, the process of determining any clear relationship between different factors in a setting as complex as education and interaction or satisfaction is fraught with difficulty. It is impossible in this study, for example, to understand the likely outsized impact on the quality and quantity of interaction imposed by different faculty members, different groups of individual students, or the university environment within which these classes were situated. However, examining the data does provide some insight into factors which potentially impacted the interaction and satisfaction of students within graduate, seminar-style

courses, a type of course that was not distinguished or reported on in most literature of blended learning. The discussion of the results is organized around the same themes as the data results: overall satisfaction and interaction, course format and activities, and student motivation.

Overall Satisfaction and Interaction

Based on the data examined for this study, class size was the biggest factor relating to student interaction. Quality of student and instructor interaction was higher in courses that had fewer than 15 students (Courses 3, 5, 6, 7, 9, and 11). However, while smaller class sizes, particularly those with no more than 15 students had higher quality interaction, little difference was seen in this study between classes with 16 students, 28 students, or even 41 students. Little prior research has examined the impact of class size on blended courses and what has been done to study both traditional and online higher education courses find mixed results. Some research, for example, suggests that modest increases (10%) have negligible effect on student outcomes (Bettinger et al., 2017) while others suggest small classes (under 15) see increases in peer interaction over medium (15–30) and large (>30) classes (Arslanyilmaz et al., 2016). It is also likely that smaller classes would increase students' ability to form a community of inquiry through increased meaningful interaction with peers and instructors. The results from this study appear to be consistent with these previous findings in that smaller class sizes saw increased interaction and satisfaction, but additional research would be warranted to understand the variance in larger class sizes on interaction and satisfaction.

While the survey data was not a large enough sample size determine statistical significance, the variation in quantity and quality of interaction with instructors based on the presence of a TA was another interesting finding. Little to no prior research has investigated the impact of a TA on the CoI framework, but the results of this study suggest that a TA *detracts* from teacher presence within this style of blended-format course. One possible explanation for this effect supported by open-ended survey results and the interviews with faculty and TAs is that the TA takes on some of the responsibility of interacting with students online and answering questions by phone or email. On the face, this might improve overall communication with students; however, based on the results from this study, students appear to not see interactions with TAs as synonymous with those of instructors. In this way, adding a TA causes the instructor to appear more distant to students within the course and therefore detracts from teaching presence. However, the quality of interaction was increased slightly within this study when there were multiple instructors in a course. Given the existing lack of research in this area, more research is needed to explore the impact of TAs and multiple instructors on teaching presence within the CoI framework across a greater variety of programs and course formats.

Course Format and Activities

As for program format, students rated in-person weekend sessions highly across all courses for helpfulness to their overall learning. This supports previous CoI framework research into the advantages of blended learning over fully online courses (Garrison, 2017). However, exactly how much time is devoted to in-person class sessions before seeing an impact on interaction is unclear. Based on Figure 5, little variation in reported helpfulness exists across courses even though the number of hours spent in-person decreased over time (see Table 1). There was, therefore, no apparent relationship between the amount of time spent in class online versus in-person on student reported interaction or satisfaction, but the variation in instructional hours in-person and online across the 11 courses examined was minimal and the sample size overall was not large enough to

perform any more robust analysis. More research could help to determine if there is an "ideal blend" of instructional time between in-person and online class sessions to promote interaction and boost satisfaction in graduate seminar-style courses.

The data suggest synchronous online discussions had a greater impact than other learning activities. Guest speakers, small group discussions, and whole-class discussions—all online synchronous activities—were rated three of the four most helpful tools/activities. Asynchronous discussion boards regardless of the tool used were not only rated as the three least helpful tools but were also the only three that were rated as unhelpful on average. This finding is in contrast to existing research on the CoI framework related to online and blended learning, which supports the use of online discussion boards for promoting social and cognitive presence and student interaction (Akyol & Garrison, 2008, 2011; Swan, Garrison & Richardson, 2009). One possible explanation suggested by some of the students in the open-ended survey results is how the discussion-based nature of the graduate, seminar-style courses in this study impacted both the synchronous and asynchronous discussions. Students used to graduate seminar-style courses in-person may be more likely to engage in similar ways in online sessions. The courses in this study also all utilized synchronous online class sessions, which generally focused heavily on promoting interaction during that time. Students in other courses—whether fully online or blended but without required synchronous online class sessions—likely rely more heavily on asynchronous discussion board formats for their interaction as their primary method of communication with peers and instructors, thus making those forms of communication more important for peer and instructor interaction in the CoI framework.

Closer examination of the discussion board activities also helped to offer a more nuanced understanding of student-reported helpfulness. For example, Yellowdig, a social media style discussion tool, was used in both Course 2 and Course 3, but students in Course 3 rated the tool as more helpful (across both iterations). The two important differences in implementation were: (1) in Course 3, the instructor referenced the Yellowdig board during each synchronous class session, often having students share their favorite takeaways from the Yellowdig discussion, and (2) the directions for how students should participate in the discussion were more explicit. The benefit of integrating the asynchronous discussion into synchronous class sessions mirrors closely the findings of previous CoI research on blended learning, which shows that *how* tools are used (particularly across different course formats) is more important than *which* tools are used (Picciano & Dziuban, 2007; Vaughan, Cleveland-Innes, & Garrison, 2013).

Overall, however, this study's results suggest that the traditional activities conducted during in-person class sessions had the greatest impact on student interaction and overall satisfaction with the course, even when these activities were conducted during synchronous online sessions. The course format took advantage of synchronous class sessions to promote interaction rather than relying on asynchronous tools such as threaded discussion boards for student interaction. While this finding is not following directly with the most common findings from previous CoI research, the result is still closely tied to the core principles of the CoI framework, namely that the focus is on providing opportunity for students to have meaningful interaction with their peers and instructors (Garrison, Anderson, & Archer, 2001).

The data also suggest a modest increase in satisfaction over time. Though there is no definite reason for this increase in satisfaction, reports from faculty and TA interviews suggest this is likely the result of improved guidance provided by instructional designers based on experiences from previous courses. This increase may also relate to previous literature, which suggests the

importance of students' increased familiarity with taking courses in a blended format on their ability to engage and participate in those courses (Lee et al., 2011).

Student Motivation

Finally, concerning students' motivations for taking a course in a blended format, there is no strong connection between a desire to take a course in the blended format and student satisfaction with that course. For example, students who answered "I prefer the blended format for my learning style" also had some of the highest percentages of dissatisfaction with the course. Alternatively, students who indicated they "chose the instructor, not the course modality" had some of the highest overall satisfaction rates with courses. This finding would seem to contradict earlier findings from Arbough et al. (2010) and Oustz (2006) who found positive correlations between students' interest in taking the course and their achievement, but the findings do suggest that some motivational factors may have a stronger impact than others. For example, while they might not have preferred the blended format, students who wanted to take a course based on the instructor despite it being in a blended format still learned a lot from that course. In addition, students who indicated that "job responsibilities make it difficult to attend classes on campus" and "convenience of not having to commute to campus as often" were their reasons for taking courses in a blended format had the highest overall satisfaction with the courses. This finding makes sense when considered from the perspective of self-determination theory. Since students will be more satisfied if the course or program aligns to their personal motivations such as flexibility, it makes sense that students who preferred the blended format because it fit into their schedule had the highest overall satisfaction (Deci & Ryan, 2002). As such, these practical considerations may have the strongest overall impact on student motivations and thus interaction within those courses. This finding strongly supports the common conception of online and blended providing greater access to nontraditional learners such as those who are working full time, have children, or do not live close to a campus with good programs (Ubell, 2017).

Limitations

Of course, this study has some limitations. Primarily, the study is of a limited scope and small sample size. This creates a limitation on the ability to determine statistical significance for any of the specific factors discussed. As a case study involving one institution and one department offering graduate, seminar-style courses in a blended format, it is also limited in its generalizability. While the qualitative understandings derived from this study can be instructive in helping other programs and courses decide on what is important in creating or improving their graduate, seminar-style, blended format course offerings, none of the findings from this study can be considered statistically significant of a broader trend. Further research is also needed to explore the influence of the instructors on the learning environment, the types of students taking blended format courses, and the impact different types of asynchronous tools and activities can have on interaction. These would be next steps to research.

Conclusions

Ultimately though, the findings from this study suggest a number of implications for understanding the CoI and student motivation in blended learning courses. When creating graduate seminar-style courses in a blended format, class size has an outsized impact on student interaction and satisfaction with an optimal size at fewer than 16 students. Courses with greater than 16 students begin to have an impact on students' ability to participate meaningfully in synchronous discussions and for the instructor to manage class dynamics through synchronous online communication tools such as Adobe Connect or Zoom. While this is not a new finding in the field of blended learning, the outsized impact class size has for graduate, seminar-style courses in a blended format specifically has not previously been established. Second, a TA seems to have a negative impact on student perceptions of teacher presence. Given this, it is important to be careful when deciding to use a TA and make sure that the instructor remains engaged and present within the course online when using a TA. Instead of using a TA, having a co-instructor for larger class sizes might be a better choice to promote higher quality instructor presence. This is an interesting, new finding related to the CoI framework and warrants additional study to determine if this trend holds across other formats and types of courses. Third, it is important to provide opportunities for students to engage with peers and instructors in real-time, both in-person and online. Synchronous forms of communication and discussion are the most highly rated by students for supporting their learning and for their overall satisfaction within courses. This is also related to the optimal class size in that these opportunities for synchronous communication are supported by smaller classes. When the focus is on real-time interaction, discussion boards and other asynchronous communication may be less important than in other types of online class settings. This finding represents an important departure from more traditional online course formats which rely heavily on asynchronous discussion boards to promote student and teacher interaction but remains consistent with the principles of the CoI framework. As such, it suggests an expansion of our understand for how to develop a community of inquiry in blended courses based on the format and style of the course. Fourth, blended format courses should be adopted based on genuine needs and desires of students so that students are motivated to take the courses in a blended format because of added access or convenience over an in-person alternative. In general, students who preferred the format because of convenience factors such as difficulty traveling to campus or busy schedules for work and family preferred the blended format over any other reason for taking a blended format course, including students who reported preferring the format for their learning style. This, then, represents an important confirmation that self-determination theory holds consistent for students when choosing to take blended-format, graduate, seminar-style courses.

Ultimately, this case study sought to further understand best practices for implementing blended format, seminar-style courses in a professional graduate degree program by looking specifically at student interaction, satisfaction, and motivation. These findings do suggest a number of considerations which may be unique to graduate, seminar-style courses and should be studied in other context and with larger sample sizes to determine if they remain consistent, but they also suggest that given the right conditions, format, and motivations, blended learning can be an effective delivery method for graduate, seminar-style courses.

References

Akyol, Z., & Garrison, D. R. (2008). The development of a community of inquiry over time in an online course: Understanding the progression and integration of social, cognitive and teaching presence. *Journal of Asynchronous Learning Networks*, *12*, 3–22.

Akyol, Z., & Garrison, D. R. (2011). Understanding cognitive presence in an online and blended community of inquiry: Assessing outcomes and processes for deep approaches to learning. *British Journal of Educational Technology*, *42*(2), 233–250.

Ali, A., & Ahmad, I. (2011). Key factors for determining students' satisfaction in distance learning courses: A study of Allama Iqbal Open University. *Contemporary Educational Technology*, *2*(2), 118–134.

Anderson, T., Liam, R., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, *5*.

Arbaugh, J. Ben, Bangert, A., & Cleveland-Innes, M. (2010). Subject matter effects and the community of inquiry (CoI) framework: An exploratory study. *The Internet and Higher Education*, *13*(1–2), 37–44.

Arbaugh, J. B., Cleveland-Innes, M., Diaz, S. R., Garrison, D. R., Ice, P., Richardson, J. C., & Swan, K. P. (2008). Developing a community of inquiry instrument: Testing a measure of the community of inquiry framework using a multi-institutional sample. *The Internet and Higher Education*, *11*(3), 133–136.

Parks-Stamm, E. J., Zafonte, M., and Palenque, S. M. (2017), The effects of instructor participation and class size on student participation in an online class discussion forum. *British Journal of Educational Technology*, *48*, 1250–1259. https://doi.org/10.1111/bjet.12512

Bettinger, E., Doss, C., Loeb, S., Rogers, A., & Taylor, E. (2017). The effects of class size in online college courses: Experimental evidence. *Economics of Education Review*, *58*, 68–85. https://doi.org/10.1016/j.econedurev.2017.03.006

Bolliger, D. U., & Martindale, T. (2004). Key factors for determining student satisfaction in online courses. *International Journal on E-learning*, *3*(1), 61–68.

Deci, E. L., Koestner, R., & Ryan, R. M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin*, *125*(6), 627–668.

Deci, E. L., & Ryan, R. M. (2002). *Handbook of self-determination research*. University Rochester Press.

DeBourgh, G. A. (1999). Technology is the tool, teaching is the task: Student satisfaction in distance learning. In J. Price, J. Willis, D. Willis, M. Jost & S. Boger-Mehall (Eds.), *Proceedings of SITE 1999—Society for Information Technology & Teacher Education International Conference* (pp. 131–137). Association for the Advancement of Computing in Education.

Garrison, R. D., Anderson, T., & Archer, W. (2000). "*CoI Framework*." CoI. Retrieved November 7, 2018, from https://coi.athabascau.ca/coi-model/

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education*, *15*(1), 7–23.

Garrison, D. R., & Arbaugh, J. B. (2007). Researching the community of inquiry framework: Review, issues, and future directions. *The Internet and Higher Education*, *10*(3), 157–172.

Garrison, D. R., & Archer, W. (2000). *A transactional perspective on teaching and learning: A framework for adult and higher education*. Elsevier Science, Inc.

Garrison, D. R. (2017). *E-learning in the 21st century: A community of inquiry framework for research and practice* (3rd ed.). Rutledge.

Gunawardena, C. (1995). Social presence theory and implications of interaction and collaborative learning in computer conferencing. *International Journal of Educational Telecommunications*, *1*(2–3), 147–166. doi:10.1111/j.1541-0420.2011.01694.x

Hillman, D. C. A., Willis, D. J., & Gunawardena, C. N. (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.

Jung, I., Choi, S., Lim, C., & Leem, J. (2002). Effects of different types of interaction on learning achievement, satisfaction and participation in web-based instruction. *Innovations in Education and Teaching International*, *39*(2), 153–162.

Kineshanko, M., Arthur, P., Garrison, R., & Graham, C. (2016). *A thematic synthesis of Community of Inquiry research 2000 to 2014* [Unpublished Doctoral Dissertation]. Athabasca University.

Kolowich, S. (2012, June 29). *Online learning and liberal arts colleges*. Inside Higher Education. www.insidehighereducation/news/2012/06/29/liberal-arts-college-explore-uses-blended-online-learning

Kuo, Y. C., Walker, A. E., Schroder, K. E. E., & Belland, B. R. (2014). Interaction, internet self-efficacy, and self-regulated learning as predictors of student satisfaction in online education courses. *Internet and Higher Education*, *20*, 35–50. doi: 10.1016/j.iheduc.2013.10.001

Lee, J. (2012). Patterns of interaction and participation in a large online course: Strategies for fostering sustainable discussion. *Journal of Educational Technology & Society*, *15*(1), 260.

Lee, S. J., Srinivasan, S., Trail, T., Lewis, D., & Lopez, S. (2011). Examining the relationship among student perception of support, course satisfaction, and learning outcomes in online learning. *Internet and Higher Education*, *14*(3), 158–163.

Lepper, M. R. (1988). Motivational considerations in the study of instruction. *Cognition and Instruction*, *5*(4), 289–309.

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*. U.S. Department of Education. www2.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf

Ouzts, K. (2006). Sense of community in online courses. *Quarterly Review of Distance Education*, 7(3).

Picciano, A. G., & Dziuban, C. D. (Eds.). (2007). *Blended learning research perspectives* (Vol. 1). The Sloan Consortium. doi: 10.1017/CBO9781107415324.004

Richardson, J. C., Maeda, Y., Lv, J., & Caskurlu, S. (2017). Social presence in relation to students' satisfaction and learning in the online environment: A meta-analysis. *Computers in Human Behavior*, *71*, 402–417. doi:10.1016/J.CHB.2017.02.001

Shea, P., Li, C. S., Swan, K., & Pickett, A. (2005). Developing learning community in online asynchronous college courses: The role of teaching presence. *Journal of Asynchronous Learning Networks*, *9*(4), 59–82.

Swan, K., Garrison, D. R., & Richardson, J. C. (2009). A constructivist approach to online learning: The community of inquiry framework. In C. Payne (Ed.), *Information technology and constructivism in higher education: Progressive learning frameworks* (pp. 43–57). IGI Global.

Ubell, R. (2017). *Perspectives on digital learning*. Routledge.

Vaughan, N. D., Cleveland-Innes, M., & Garrison, D. R. (2013). *Teaching in blended learning environments: Creating and sustaining communities of inquiry.* Athabasca University Press.

Blended Learning in STEM and Non-STEM Courses: How do Student Performance and Perceptions Compare?

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Abstract
Examined in this study is the question of whether students in STEM courses perform better and have more positive perceptions than students in non-STEM courses, when both are offered in the blended format. As part of a blended learning initiative, 6 STEM and 8 non-STEM university courses were redesigned using the blended format. Students (n = 318) were surveyed on perceptions of their blended experience and courses grades were compared. Results indicated that STEM students performed significantly higher than non-STEM students; however, STEM students did not perceive their courses as positively as non-STEM students. The conclusion was that focusing blended learning course redesign in STEM fields in higher education may be advantageous, although more research is needed to confirm the findings and to investigate why student perceptions were relatively low for STEM students.

Keywords: STEM and non-STEM, blended learning, hybrid learning, student performance, student perceptions

Owston, R., York, D.N., Malhotra, T., & Sitthiworachart, J. (2020). Blended learning in STEM and non-STEM courses: How do student performance and perceptions compare? *Online Learning, 24*(3), 203-221. https://doi.org/10.24059/olj.v24i3.2151

Blended Learning in STEM and Non-STEM Courses: How Do Student Performance and Perceptions Compare?

There is widespread recognition that undergraduate STEM (Science, Technology, Mathematics, and Engineering) pedagogy needs reform, yet there is a scarcity of literature on what instructional practices can bring about the necessary changes (Dolan, Lepage, Peacock, Simmons, Sweeder, & Wieman, 2016). A promising approach to transforming STEM instruction is blended learning, an instructional model that combines face-to-face instruction with online activities. Researchers have shown that across the higher education curriculum more broadly, students in blended courses appear to perform better and have lower dropout rates than traditional lecture approaches or fully online learning (Moskal, Dziuban, & Hartman, 2013). Moreover, there is emerging evidence that STEM students may be able to benefit more from the affordances of blended learning than non-STEM students as compared to face-to-face learning (Vo, Zhu, & Diep,

2017). As blended learning increasingly becomes the "new normal" in higher education (Dziuban, Graham, Moskal, Norberg, & Sicilia, 2018), the intriguing question arises of whether students in STEM courses perform significantly better than those in non-STEM courses, when both are offered in the blended format. A related question is whether there are differences in perceptions between students in blended STEM and blended non-STEM courses. This question is of relevance because there is evidence that student perceptions of blended courses relate positively to performance (Owston, York, & Murtha, 2013), and because no research has been reported that compares students' perceptions of blended courses across both disciplinary fields. Therefore, in this study, we compare blended STEM and blended non-STEM courses on student performance and perceptions of learning in a blended course. Before considering the literature on performance and perceptions, two key concepts in this study, blended learning and STEM, need to be clarified.

Blended learning is not a well-defined concept. There is consensus in the literature that, at a minimum, blended learning is the combination of face-to-face and online instruction (Graham, 2006). Beyond that, conceptions of blended learning differ. The U.S. Department of Education defines it merely as the substitution of some in-class time with online time (Parsad & Lewis, 2008), whereas the former Sloan Consortium (now the Online Learning Consortium) is more precise by specifying that between 30% and 79% of in-class time is substituted by online time (Allen & Seaman, 2003). Means, Toyama, Murphy, and Baki (2013) found, in their extensively cited work, that many of the studies chosen for inclusion in their meta-analytic comparison of blended and face-to-face modalities reported that more time was often spent in blended courses than in the traditional face-to-face versions. The latter tends to happen when instructors add an online component to their traditional course, sometimes resulting in what has been called "a course and a half" syndrome (Garrison & Vaughan, 2008, p. 202). To avoid this difficulty, the authors argue that blended learning requires a fundamental redesign of a course, in which decisions are made about which mode is best suited to achieve specific student learning outcomes, without prior consideration of the proportion of time to be spent in either mode. Such a redesign often results in what Graham (2006) calls a transformational blend where "learners construct knowledge through dynamic interactions" (p. 13). According to Graham, more common in higher education, however, are enabling blends that result in greater access to or flexibility in learning by providing essentially the same learning opportunities as the traditional version of a course but through different modalities, or blends that only modestly enhance the learning experience by creating additional online resources or experiences.

There is no clear consensus on the definition of STEM either. The term came into prominence at the beginning of the twenty-first century, when there was a fear in the U.S. that the country was not producing enough science, technology, engineering, and mathematics graduates to remain competitive in the global economy (Breiner, Harkness, Johnson, & Koehler, 2012). Use of the term then rapidly spread around the world as other nations began setting STEM education as a priority. The concern in the U.S. led to calls for improving K12 science and mathematics education and increasing the number of college and university graduates in the STEM fields. An area of disagreement in the literature is which subdisciplines STEM encompasses. Some researchers and government reports restrict STEM to include only the four defining fields of study. For example, in reporting U.S. postsecondary STEM enrollment, Chen (2009) limited the definition to mathematics, natural sciences (including physical sciences and biological/agricultural sciences), engineering/engineering technologies, and computer/information sciences. On the other hand, in addition to these four core disciplines, the U.S. National Science Foundation uses a broader definition that recognizes life sciences (e.g., health professions/related clinical sciences,

rehabilitation/therapeutic services, and nursing) and some social sciences (e.g., anthropology, economics, psychology, and sociology) as part of STEM (Green, 2007). Also in dispute is whether STEM is a multidisciplinary field where the four disciplines work together, yet retain their distinct disciplinary identity, or whether STEM is a new interdisciplinary or transdisciplinary field that emerges in between or beyond individual disciplinary commitments (Shanahan, Burke, & Francis, 2016). Moreover, Breiner et al. (2012) found that even university faculty involved in multiple STEM projects and research centers did not have a common understanding of the meaning of the rubric. Despite the general lack of agreement on the meaning of STEM, research into approaches that foster improvements in STEM teaching and learning are clearly desirable (Brown, 2012).

Conceptual Framework

Our study is framed by the literature on learner performance in blended courses in higher education, as well as their perceptions of learning in the blended model. These two fields are reviewed next with particular reference to STEM education.

Performance in Blended Courses Overall

There is substantive evidence in the literature that, on the whole, students in blended courses tend to modestly outperform their counterparts in traditional face-to-face courses. Evidence of this comes from ongoing seminal research carried out at the University of Central Florida involving nearly one million students (Moskal et al., 2013). This research indicates that across many different disciplines, students in blended courses have a higher success rate and lower withdrawal rate than those in nonblended courses. Six major meta-analyses of higher education research published between 2005 and 2018 also support this contention (Bernard, Borokhovski, Schmid, Tamim, & Abrami, 2014; Çirak Kurt, Yildirim, & Cücük, 2018; Means et al., 2013; Spanjers et al., 2015; Vo et al., 2017; Zhao, Lei, Yan, Lai, & Tan, 2005). Taken together the meta-analyses comprised a total of 583 individual effect sizes and with a median effect size of $g^+ = 0.37$ favoring blended learning, ranging from a low of 0.33 (Bernard et al., 2014) to high of 1.04 (Çirak Kurt et al., 2018). This median effect size suggests that 60% of students in traditional courses were below the mean of blended learning students, and it would be categorized by Cohen (1988) as between a small- and medium-sized effect.

Performance in Blended STEM Courses

With respect to blended learning in STEM courses, Vo et al.'s (2017) major study of 51 effect sizes found that blended STEM courses had an effect size that was over twice the magnitude of non-STEM courses when compared to traditional classroom-based courses (STEM $g^+ = 0.496$, non-STEM $g^+ = 0.210$). Vo and colleagues suggest that the difference between the two fields may be due to the more hierarchical structure of knowledge in STEM disciplines, which makes those disciplines more amenable to the linear nature of commonly used learning management systems. The advent of more advanced technological tools to support STEM, such as virtual labs and simulations, than non-STEM learning is another reason given. Additionally, the researchers suggest that because non-STEM pedagogy relies more heavily on dialog, non-STEM instructors have to make more significant adjustments to their pedagogical practice than STEM instructors, as there is a greater need for them to be present in and to facilitate online discussions.

We examined the studies with the two highest effect sizes (Melton, Bland, & Chopak-Foss, 2009; Day & Foley, 2006) and the two lowest (Choi, 2013; Schunn & Patchan, 2009) included in Vo et al.'s (2017) meta-analysis, to distinguish what may explain the differences in performance

outcomes of the four studies. Table 1 provides an overview of the four studies. All four were carefully designed and executed studies that took place over an entire semester in different STEM disciplines. Online activities of all four centered on video recordings of lecture content, although the studies with the two highest effect size studies reported having online activities designed to engage students with the videos rather passively viewing them. All four studies devoted in-class time to discuss the videos and take part in other kinds of active classroom learning. The most striking difference between the high and low studies appears to be the reduction of face-to-face time in lieu of online activities—the two highest had a 50% reduction, while in the Choi (2013) study there was no reduction in face-to-face time (Schunn & Patchan, 2009, did not report any alteration of time). There is some evidence in the literature that performance tends to be higher in courses with as much as 50% or greater time online (Bernard et al., 2014; Means et al., 2013; Owston, York, & Malhotra, 2018; Zhao et al., 2005). We concluded that the greater amount of time online, as well as more structured and interactive online activities, might be the explanation for the differences between the high and low studies effect size studies in Vo et al.'s meta-analysis.

Several more recent studies also favored blended learning over traditional classroom instruction in STEM disciplines. Evident in these studies is the importance not only of content being available online, but the opportunity for immediate feedback on the content, either in class or online. For example, Bazelais and Doleck (2018) found that students in a blended college-level physics course significantly outperformed their peers in a traditional lecture course. The students in the blended section viewed web-based videos and followed up with discussions about the content with peers in the classroom. Hill, Chidambaram, and Summers (2017) compared students in a computer networking course that blended face-to-face classes with online lectures and discussion to a traditional version. They found the blended students achieved very significantly higher than the traditional group. Thai, De Wever, and Valcke (2017) examined performance of students in an invertebrates course in three modes: traditional, fully online, and blended. The fully online section had web-based lectures, online guided questions, and delayed feedback from the instructor. The blended courses were offered in two ways: the first was in-class lectures with online guided questions and delayed feedback on the questions from the instructor; the second had web-based lectures with guided questions in the classroom and immediate instructor feedback. Although the study was conducted over only 6 weeks with a relatively small sample ($N = 90$), the latter group significantly outperformed the fully online and traditional groups with large effect sizes. There were no significant differences between the two blended conditions; however, the first blended condition was significantly higher than fully online learning but no different than traditional learning. The study highlights the importance of having significant content available online (e.g., web-based lectures) and the importance of immediate feedback to consolidate student learning. In contrast, a study by Goode, Lamoreaux, Atchison, Jeffress, Lynch, and Sheehan (2018) found that students in a blended psychology statistics course performed significantly lower than face-to-face counterparts, although the effect size was negligible. Of interest in this study was that blended students spent 50% of class time only viewing online videos without interacting with peers or the instructor. To this point, Castaño-Muñoz, Duart, & Sancho-Vinuesa (2014) found in a large-scale study that one of the main reasons why students perform better in blended courses is because of online interaction with peers and instructors, rather than only passively viewing content.

Table 1

Comparison of Factors in Studies with Highest and Lowest Effect Sizes in Vo et al. (2017)

Factors	Most significant effect size studies		Least significant effect size studies	
	Melton et al. (2009)	Day & Foley (2006)	Choi (2013)	Schunn & Patchan (2009)
Sample size	251	46	73	81
Effect size	2.879	1.160	-.117	-.705
Research design	Pre-post; quasi-experimental; random selection of 3 blended and 1 traditional section	Matched control and blended classes	Random assignment to control and blended class	Partial random assignment to control or blended class
Discipline	General health	Human-computer interaction	Software engineering	Philosophy: Logic & Proofs
Reduction in face-to-face time	50%	Approximately 50%	None	Not reported
Online activities	Narrated PowerPoint presentations with corresponding note sheets, homework assignment, a quiz each week, and online discussions	Web-based lectures with slides and compulsory synthesis questions	Self-study of videos of course content	Not reported
In-class activities in blended section(s)	Brief lectures, discussions, group projects, presentations	Online lectures discussed in class.	Discussions, software development, and more feedback than control group	Not reported
Duration of course	One semester	15 weeks	15 weeks	One semester
Instructors	Different instructors	Same instructor for control and treatment groups	Not reported if the same or different instructors were used	Not reported if the same or different instructors used

Perceptions of Blended Courses Overall

Annual surveys of the EDUCAUSE Center for Applied Research consistently indicate that, on the whole, a large majority of students prefer to learn using a combination of online technology and face-to-face classes: about three-quarters prefer learning in both modes, while the remaining students are about equally split between preferring to learn only online, only face-to-face, or have no preference (Brooks, 2016). Other studies have found similar levels of preference for learning in the blended mode (Dziuban, Hartman, Juge, Moskal, & Sorg, 2006; Owston, Garrison, & Cook,

2006, Vargas-Madriz & Nocente, 2016). Spanjer et al.'s (2015) meta-analysis of 30 individual studies found a smaller, yet significant, preference among students for blended learning ($g^+ = .11$, $p < .05$). Among the reasons cited in the literature for students' favorable perceptions of blended learning are: flexibility, convenience, and reduced travel time, while retaining some face-to-face interaction (Moskal et al., 2013; Owston et al. 2013); more clarity in course expectations (Lim, Morris, & Kupritz, 2007); a feeling of intimacy and connection with the instructor through watching online videos (Vargas-Madriz & Nocente, 2016); higher perceptions of teaching effectiveness and course meeting expectations (Forte & Root, 2011); and readily adapting successful learning strategies in traditional courses to blended courses (Kumrow, 2007). Research also suggests that upper-year students are more engaged with blended learning than first-year students (Vargas-Madriz & Nocente, 2016), and that high-achievers view it more positively than low-achievers (Owston et al., 2013). However, undergraduate students generally favor blended learning more than graduate students (Castle & McGuire, 2010).

Perceptions of Blended STEM Courses

We could not find any published research comparing perceptions of students in blended STEM courses to those in blended non-STEM courses—one of the areas in which our research focuses—yet there is research that examines views of students in blended STEM courses with those in traditional lecture-based STEM courses. Similar to the general literature on student preferences for blended learning, this literature also suggests that STEM students prefer blended learning over traditional learning. For example: in science, Bazelais and Doleck (2018) found very high satisfaction (95%) in their blended physics course; in technology, Uzun and Senturk (2010) reported significant positive attitudes in computer usage course for teachers; in engineering, Rahman (2017) found that student satisfaction in a blended fluid mechanics course increased by 18% compared to the traditional version; and in mathematics, and Owston, Sinclair, and Wideman (2008) reported improved attitudes towards the mathematics and science by teachers who participated in a blended professional development program. Other studies in STEM disciplines indicate similar positive student perceptions of blended learning: Melton et al. (2009) in health; Gundlach, Richards, Nelson, and Levesque-Bristol (2015) in statistics; and Lian and He (2013) in biology.

Hence, there is a substantial body of evidence of students favoring blended learning over traditional learning in both non-STEM as well as STEM disciplines. Whether students have different preferences when studying in blended courses in one disciplinary area over the other disciplinary area is unclear.

Research Questions

As just outlined, there is a substantial body of research that examines student performance and perceptions of learning in blended STEM and blended non-STEM courses relative to face-to-face courses. None of this research directly addresses the question of how performance and perceptions compare when *both disciplinary fields are taught in the blended mode*. Thus, we chose to address this gap by investigating the following two questions:

1. How does student performance in STEM and non-STEM courses compare when both are taught in the blended mode?
2. How do student perceptions of blended learning in STEM and non-STEM courses compare when both are taught in the blended mode?

Methods

Setting

We investigated the above research questions at a large urban university in Canada with a very diverse student population. Prior to the beginning of the study, the university embarked on a major academic innovation initiative, an aspect of which was to provide funding to faculty to incentivize them to redesign their courses using the blended format. The 14 courses examined in this study were the first group of redesigned blended courses. An examination of the course descriptions indicated that six had a significant preponderance of STEM content to be classified as such using Green's (2007) more inclusive criterion, whereas the remaining eight were unambiguously non-STEM. The six STEM courses were: kinesiology (two courses), nursing (three courses), and psychology (one course). The eight non-STEM courses were: administrative studies (two courses), and one course each of anthropology, history, English, modes of reasoning, geography, and political science.

Course Design

Prior to the study all courses were offered in a traditional lecture format with no online component. All participating faculty received assistance in redesigning their course from the university's teaching and learning center and the instructional technology support team. The assistance was provided by a combination of workshops for all instructors and individual consultation and review of course designs. Biggs (2014) process of constructive alignment guided course design was used. By following this process, faculty and instructional designers attempted to create course learning objectives and activities that engaged students in higher level learning as much as practicable, and to ensure that the assessment procedures aligned with objectives and activities.

Table 2 provides a comparative overview of the key characteristics of the redesigned STEM and non-STEM courses. Instruction in both STEM and non-STEM blended courses was dominated by face-to-face teaching (50–70%). This teaching primarily involved the combination of traditional lectures led by the instructor and small-group seminars or tutorials facilitated by graduate teaching assistants. Students spent the remaining 30% to 50% of the time working online in the Moodle learning management system at a time and place that was convenient for them. Within Moodle students were provided with a variety of learning activities, such as group discussions, opinion polls, knowledge quizzes, collaborative wiki writing, and real-time chat. They could also access course learning resources and, in some cases, recorded lectures.

Both STEM and non-STEM courses employed online discussion forums. Students were typically assigned to discussion subgroups to respond to course-related questions and problems. Those discussions often represented an exchange of ideas, opinions, and solutions, and students were assessed on their ability to participate and contribute to the collaborative discourse.

Assessment procedures were typical of what one might expect in the two different disciplinary areas. STEM instructors focused primarily assessing student learning of the facts, principles, and concepts of the discipline, including the application and synthesis of this learning. On the other hand, assessment schemes for non-STEM courses were built around making connections and application of knowledge through critical and creative thinking. Examples of those assessments included individual and collaborative assignments that allowed students to synthesize knowledge, reflect on their experiences, write an essay response, or an opposing opinion on a controversial issue. The final course grade in both disciplines comprised of a combination of assignments, tests, and a final exam.

Table 2

Summary of Blended Learning Conditions in STEM and Non-STEM Courses

Blended learning conditions	STEM courses (*n* = 6)	Non-STEM courses (*n* = 8)
Subject areas	Kinesiology (2), nursing (3), and psychology	Administrative studies (2), anthropology, history, English, modes of reasoning, geography, and political science
Course duration	13 weeks	13 weeks
In-class activities	Lectures/seminars (50-70% course time), lecture recordings (or lecture slides with notes) posted to Moodle	Lectures/seminars (60–70% course time), lecture recordings (or lecture slides with notes) posted to Moodle
Online activities	Interactive activities such as discussions, polls, quizzes, wiki, and chat (30–50%)	Interactive activities such as discussions, polls, quizzes, wiki, and chat (30–50%)
Instructional design approaches	Participatory, collaborative learning together with self-directed asynchronous learning activities	Active learning and problem-based learning together with self-directed asynchronous learning activities
Grade assessments	Quizzes, midterm tests, and final exams that assessed foundational knowledge and to some extent application of concepts. From 10%–50% of assessments administered online, including individual assignment submissions. Median grade weighting for online discussions was 7%.	Essays, case studies, observations, reflections, collaborative assignments, and final exams that assessed application of concepts more than foundational knowledge. From 30% to 35% of assessments administered online, including individual assignment submissions. Median grade weighting for online discussions was 15%.

Procedure

The university's human subjects research ethics review committee approved the study. All 14 faculty members agreed to allow their students to participate. Students were informed that their course would be offered in a blended format through each department's mini-calendar. Moreover, when they enrolled in their course, they had to select a unique section code that designated a course as blended. How well students took note of these two warnings is not known.

A member of the research team visited each classroom toward the end of the course to explain the study and seek students' voluntary and anonymous participation. All students in attendance agreed to take part. Students were given a paper questionnaire with bubble answer

sheets to assess their perceptions of their learning experience in a blended class as compared to traditional courses they had taken. The questionnaire was adapted from Owston et al. (2013) who reported a Cronbach's alpha of 0.908. It consisted of 13 questions that used a 5-point Likert-style scale (Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree), with 1 representing Strongly Disagree and 5 representing Strongly Agree. We obtained 300 complete questionnaire response sets (STEM n = 155, non-STEM n = 145). At the end of the questionnaire students were asked to provide open-ended written comments about their experiences in their blended course. A total of 145 sets (STEM n = 111, non-STEM n = 34) of written responses were obtained and transcribed.

Student performance was defined in this study as final course grade. A total of 318 grade sets (STEM n = 161, non-STEM n = 157) were obtained from the registrar's office. A grade set consisted of a student's final grade and cumulative grade point average (GPA). Grades were based on a 10-point scale ranging from 9 representing A+ (exceptional) to 0 representing F (failed).

Data Analysis

To address the first research question about performance, a one-way ANCOVA design was used with final course grade (GRADE) as the dependent variable, the cumulative grade point average (GPA) as the covariate, and discipline (STEM vs. non-STEM) as the independent variable. For this analysis and the analyses below, two-tailed significance tests were used.

We addressed the second question about perceptions with a convergent mixed-methods design that merged the questionnaire Likert scale results (quantitative) with the open-ended student comments (qualitative) (Creswell & Plano Clark, 2018). The purpose was to obtain a better understanding of why STEM and non-STEM students may have perceived their experiences differently than would have been possible with either quantitative or qualitative data alone. For the quantitative analysis, a one-way MANOVA design was used with the 13 questions as dependent variables and discipline (STEM and non-STEM) as the independent variable. Follow up univariate F tests were then carried out to determine if there were any significant differences between the two groups on any of the questions. The MANOVA design was used to avoid cumulative type I error that can occur if multiple univariate F tests were conducted first. For the qualitative analysis, the transcribed open-ended responses were coded using the themes of the 13 questions as categories. Summary statistics were then generated on the frequency of occurrence of the categories for STEM and non-STEM student responses.

Results

Research Question 1 Student Performance

The estimated marginal mean of the STEM students was 6.85, SE = .090, and the estimated marginal mean of the non-STEM students was 6.46, SE = .091. This difference was significant, $F(1, 317) = 8.92$, MS = 10.97, p = .003, thus the STEM students outperformed the non-STEM students. The partial eta squared effect size obtained by SPSS was $\eta^2 = .028$, which when converted to the more common Cohen's d is 0.340. A value of d between 0.2 and 0.5 is generally considered to be a small effect. Our finding is marginally smaller than the median effect size of 0.37 favoring blended learning calculated by Owston, York, and Malhotra (2019) across six separate meta-analytic studies, in which performance in blended and lecture courses was compared.

Research Question 2 Student Perceptions

Quantitative Analysis. A significant difference was found between STEM and non-STEM students on their perceptions of blended learning, Wilks' Lambda $\Lambda = 4.63$, $p < .001$, partial eta squared $\eta^2 = .174$. Follow up ANOVA tests for each of the 13 questions indicated that non-STEM students rated questions significantly higher (i.e., more favorably) than STEM students on all but three items. Effect sizes for the questions on which non-STEM students scored significantly higher ranged from small to medium as indicated by partial eta squared, with the largest effect being for Q8, which concerned the online and face-to-face components enhancing each other ($\eta^2 = .088$), and the smallest for Q7 about taking another blended course in the future ($\eta^2 = .024$). (These two effect sizes are equivalent to $d = .621$ and $d = .314$ respectively.) The non-significant results were for Q1 (Improved understanding), Q12 (Overwhelmed), and Q13 (More time and effort). Provided in Table 3 is an abridged version of each question and a summary of the analysis.

Table 3

Follow-up ANOVA Analyses for Survey Question

	Dependent Variable	Mean STEM	Mean Non-STEM	*F*	Sig.	η^2
Q1	This course has improved my understanding of key concepts	3.52	3.74	3.742	.054	.012
Q2	Amount of my interaction with the instructor increased	2.81	3.35	18.074	.000*	.057
Q3	Quality of my interaction with the instructor was better	2.96	3.47	16.830	.000*	.053
Q4	I feel connected with other students	2.66	3.26	20.945	.000*	.066
Q5	Quality of my interaction with other students was better	2.80	2.80	19.663	.000*	.062
Q6	I am satisfied with this course	3.61	4.14	22.992	.000*	.072
Q7	I would take another blended course in the future	3.63	4.01	7.216	.008*	.024
Q8	Online and F2F components enhanced each other.	3.22	3.88	28.611	.000*	.088
Q9	I am more engaged in this course	3.05	3.55	13.186	.000*	.042
Q10	I am likely to ask questions in this course	2.95	3.56	26.875	.000*	.083
Q11	Amount of my interaction with other students increased	2.75	3.44	24.910	.000*	.077
Q12	I am overwhelmed with information and resources	2.69	2.65	.099	.754	.000
Q13	This course required more time and effort	2.86	2.97	.629	.428	.002

*$p < .05$

Qualitative Analysis

The goal of the qualitative analysis for research question two was to see if the open-ended comments on the questionnaire could illuminate our quantitative finding that non-STEM student perceptions were more favorable overall than STEM student perceptions on the Likert items. Because students were free to comment on any aspect of their course meant that some topics covered by the questionnaire were addressed more often than others and some additional issues were introduced. We first report on the comments related to questions with the largest and smallest effect size where the means were significantly different, as these are most relevant for assessing whether the quantitative differences were supported by student comments. Then we report on the three items where no significant difference was found, to see if the qualitative data indicate any differences between the two student groups. We conclude by summarizing student comments on an emergent theme that was not directly related to any of the 13 questions.

Largest and Smallest Effect Sizes. With respect to the item with the largest effect size Q8 (Online and face-to-face components enhanced each other), ample qualitative evidence was found to support our quantitative finding. A total of 33 comments of the total 145 comments obtained were made on this topic. Of these, 15 (45%) were negative comments from STEM students and only 4 (12%) were negative from non-STEM students. Of the 14 remaining positive comments, only 4 (12%) came from STEM students, while 10 (30%) came from non-STEM students. The negative comments from STEM students typically focused on a dislike of the online component, including the discussion forums and the work required to participate in them. Said one STEM student: "I think the online forums are very time consuming and hard to follow. I find in-class discussions much more helpful." Positive comments from non-STEM students generally suggested that they were able to learn better because of the mix of the online and face-to-face components. For example, a non-STEM student said: "I really liked this course. The layout in-class/online has been very useful and helpful in my overall learning for its first time since coming here [to the university] I am able to get A's and B's [grades]."

As for Q7 (Taking another blended course) where the smallest effect size was found for significantly different means, only 4 comments were made on this topic. Of these, 2 were negative from STEM students and 2 were positive from non-STEM students, which provided very limited evidence to support the quantitative finding for this item. Online isolation was cited by the two STEM students for not wanting to take another blended course. Said one of these students: "This class (online portion) felt isolating. I would do a blended course again but would prefer to avoid it." Whereas the two non-STEM students said they would take a blended course again because of the inherent advantages of the model. One of them said: "Course was amazing. I actually enjoyed not having to come to class every week and being able to save money. The online video lectures were just as effective as in class lectures. Definitely would take a blended course like this again."

Non-significant Items. STEM students gave more negative comments than non-STEM students on topics related to the three non-significant items: Q1 (Improved understanding), Q12 (Overwhelmed), and Q13 (More time and effort). This suggests that, even though the null hypothesis could not be rejected, STEM students were generally less positive on these items as well. By coincidence with Q8, 33 responses were also coded for Q1. Of these, 17 (52%) were negative comments from STEM students and only 7 (21%) were negative from non-STEM students. Of the 9 remaining positive comments, 5 (15%) came from STEM students and 4 (12%) came from non-STEM students. The STEM students' comments focused for the most part on their preference to learn from face-to-face instruction rather than on a dislike of online work. One STEM

student said: "I learned the most from hearing my professor speak and via the presentations. I also prefer learning from my professor in class." Another STEM student commented: "I feel that the course needed more face-to-face class time to really understand the course material." The positive comments were about students' ability to learn better because of online lectures and the flexibility of the blended mode. For example, a STEM student said succinctly: "Enjoyed flexibility and availability to watch/listen to lectures;" a non-STEM student commented: "Overall this course is good for me and the face-to-face classes blended with online have made this course worthwhile for me."

Eight STEM and no non-STEM students commented on the topic of being overwhelmed with the course (Q12). Students cited the amount of online materials and the discussion forums as being burdensome. A very illuminating yet typical comment was:

> Online discussions are overwhelming. Due to the number of students enrolled, it's very difficult to keep up with a discussion that has over 50 posts. There should at least be a time limit so discussions do not go on forever. It's also difficult to keep up with all the articles and videos being posted. You literally have to check Moodle multiple times a day.

This comment suggests that either the instructor had not anticipated the online workload of students or that the student misunderstood the expectations for the online component.

For the third non-significant question, Q13 about the course requiring more time and effort, 11 STEM students commented on the topic with all of them agreeing that it does. Again, students (8 STEM and 3 non-STEM) were critical about the online workload. Stated one STEM student: "I felt that there was too much time away from class. Having to follow discussions online became difficult because there was so much to follow and navigate through." A non-STEM concurred: "I strongly disagree with this type of learning. It is quite hard and [more] difficult than normal classes. I would like [only] face-to-face classes along with a recording of the lecture."

The same trend of non-STEM students being more positive held for the 8 remaining questions, however very stark differences were found on two of them. The first was Q9 (More engaged in this course) which had a total of 39 comments. Of these 34 (87%) were from STEM students, with 25 (74%) being negative and 9 (26%) being positive. Most STEM students felt that they just could not get engaged in the online portions of their blended course, regardless of whether it was viewing lecture recordings or participating in online forums, and they favored traditional lectures more. One STEM student summed this up by stating:

> I found that I was hard for me to pay attention when online and often couldn't commit to listen to the whole thing or anything at all. I would rather be in class because then I pay more attention and feel more engaged even though the commute is a waste of time; the experience in class is worthwhile.

Another one said: "I think the online forms (sic) are very time consuming and hard to follow. I find in-class discussions much more helpful." Ambivalence was expressed by a STEM who was able to benefit from online learning, but still preferred lectures:

> I did like the online portions of the class. I'm a shy person so I didn't usually participate in class. It allowed me to participate in discussions. However, I did feel that I did not learn a lot through the online portion. I learn more through face-to-face lectures. My suggestion is to have more face-to-face lectures than online lectures.

Only 5 comments were made by non-STEM students, 3 negative and 2 positive. The negative

comments echoed the same sentiments as the STEM students. The two positive students were also ambivalent, reflecting engagement in the online components, but expressing concern about having too many online activities.

The second area with a large difference in the number of comments was Q5 (Quality of interaction with other students). A total of 23 comments were made with 16 (80%) being negative comments from STEM students and 2 (9%) from non-STEM students. STEM students did not find the online portion conducive to interaction. Stated one of them: "I felt that many students made unnecessary comments due to the participation mark online, thus the quality of the conversations suffered." Another wrote: "I strongly did not like the online discussion forum and the fact that we had to post 4 times on it per week. I did not learn much at all from the online forums and they were a waste of time." This was in sharp contrast to a one other STEM student who expressed a minority positive viewpoint: "I am enthusiastic about learning about opinions of other students in the course during online discussions."

Emergent theme. Lastly, one theme was found that was not directly related to the 13 Likert questions—a specific dislike for learning in the blended mode. A total of 36 of the 145 students who commented expressed this view. Consistent with the findings above, STEM students were the majority, with 28 of the 36 (78%) commenting and only 8 (22) non-STEM students commenting on this theme. Students were blunt in many of their comments, such as these two STEM students who did not provide a reason for their opinions: "I am not a big fan of blended courses;" "I did not like the fact that this course was blended." Several STEM and non-STEM students were more specific why they did not like blended courses stating that it was either because of the extra workload or that they simply can learn better in person. Two STEM students expressed the view held by others as well about not liking hybrid nature of blended courses but being happy with either fully face-to-face or fully online: "Hated this class format with in-class and online discussion. Do one or the other;" "I find that I learn better when a course is delivered in one format rather than some as an in-class lecture and some online. However, I learn best when I can learn independently [online]." This finding underscores the fact that not all students are going to be satisfied learning in the blended mode.

Discussion

In this study, we compared student performance, as measured by final course grade, and perceptions of their experience learning in a blended environment in six STEM and eight non-STEM blended courses. We found that STEM students out-performed non-STEM students on final course grade after adjusting for prior academic attainment using GPA as a covariate. The resulting effect size of $d = 0.37$ was relatively small yet still pedagogically meaningful. It implies that 64 % of the STEM students were above the mean of the non-STEM students. This effect occurred despite the well-recognized phenomenon that students tend to be graded harder in STEM courses (Kokkelenberg & Sinha, 2010). Moreover, our findings are consistent with research comparing student performance in blended and traditional lecture formats across a variety of disciplines, which suggests that, on the whole, students perform better under blended conditions with a small to medium effect size (Bernard et al., 2014; Means et al., 2013; Moskal et al., 2013; Spanjers et al., 2015). Moreover, the results support the conclusion of Vo et al. (2017) who that found both STEM and non-STEM students in blended courses perform better than students in traditional courses, although STEM students benefit most from blended courses.

As for possible explanations for our findings about performance, Castaño-Muñoz et al. (2014) suggest that higher quantity and quality of interaction is the chief explanation of why blended students perform better than students in traditional classes. Our study does not support this hypothesis as STEM students scored significantly lower on the four questions dealing with the quality and quantity of interaction with fellow students and the instructor (Q2, Q3, Q5, and Q11). Thus, we are left to conclude that it may well be the more linear, hierarchical structure of knowledge in STEM disciplines (Donald, 2002) that may make them more readily adaptable to the online component of blended courses. Additionally, because STEM students tend to be more linear thinkers, they would likely be more comfortable to learn online, and the linear structure of the learning management system may be better able to support them in their learning (Vo et al. 2017).

What is surprising about our findings is that even though STEM students performed better, they perceived their blended courses less positively than non-STEM students. STEM students' responses to our questionnaire were significantly lower than non-STEM students on all but three questions, and on those three questions there were no significant differences between the groups. Our qualitative analysis of student open-ended comments supported the questionnaire results showing that non-STEM students were more positive. Moreover, even on the three questions where no significant differences were found, comments suggested that non-STEM students were more positive in terms of blended learning improving their understanding (Q1), being less overwhelmed by course work (Q12), and their course not requiring more time and effort (Q13). These findings contradict Owston et al. (2013) who found that perceptions of blended learning are positively related to performance. We have not found any published research that has directly compared STEM and non-STEM students' perceptions when both disciplines are taught in the blended mode; however, as discussed earlier, students in both STEM and non-STEM disciplines perceive blended courses more positively overall than their counterparts in traditional courses (Bazelais & Doleck, 2018; Dziuban et al., 2006; Melton et al. 2009; Spanjers et al., 2015).

The reason why STEM students were less positive about blended learning despite their higher performance is not clear. The highest effect sizes in favour of non-STEM students were found for Q8 (Online and F2F components enhanced each other) and Q10 (I am likely to ask questions in this course), both of which deal with interaction. One explanation for this finding may be more that the non-STEM students enjoyed the opportunity for their voices to be recognized in class and online, even though this opportunity did not translate into higher performance. Alternatively, it may be that STEM students felt less positive because they lacked connection with their peers and their instructor.

Our study was not without limitations, however. This was quasi-experimental study in which the researchers were not able intervene to ensure that STEM and non-STEM students received identical blended learning experiences other than subject matter content. Courses were taught in a variety of academic specialties within these two disciplines by different instructors in different academic departmental contexts. Although we did not observe any substantive differences in the overall organization and delivery of the courses, they may have occurred. Nevertheless, there was no evidence to suggest that variations in course design and implementation within disciplines was any different than between disciplines. A second limitation is that we used the more comprehensive definition of STEM given by the National Science Foundation (Green, 2007) that includes life sciences and some social sciences. Different results may have been obtained if the study was restricted to the traditional four core STEM disciplines.

Conclusions

Our findings about performance imply that when embarking on blended learning course redesign initiatives, institutions may be wise to focus their initial efforts on the STEM fields. This finding comes at an opportune time as many universities are placing greater attention on STEM education and planning on spending more in these areas to improve instruction (Lederman, 2019). Thus, institutions may be able improve student learning outcomes, while at the same time, provide students with more flexibility in their programs of study through blended learning. Nonetheless, more research is needed to confirm our finding about performance by comparing blended courses in other STEM and non-STEM disciplines, to determine to what extent the finding is dependent on the classification of disciplines. In other words, if research focused only on blended courses in the core STEM disciplines rather than the more inclusive interpretation of STEM that we used, would the same findings be obtained? If not, are there particular STEM disciplines (e.g., mathematics) that may be more suitable for blended learning than others?

We are concerned that perceptions of STEM students were found to be less positive than their non-STEM counterparts. This finding is relatively robust as we had both quantitative and qualitative evidence to support the conclusion; nonetheless, research needs to be undertaken in other settings to validate this finding. A detailed analysis of interaction among students and between instructor and students would help shed light on this issue, as richer discussions are more likely to occur in non-STEM disciplines at the undergraduate level than in STEM disciplines by the very nature of the subject matter. This analysis should occur in both the online and face-to-face classes. Researchers may also wish to consider conducting focus groups or interviews to explore students' perceptions of learning in their disciplines. Such research would provide guidance to educators when designing both blended STEM and non-STEM courses.

References

Allen, I. E., & Seaman, J. (2003). *Sizing the opportunity: The quality and extent of online education in the United States, 2002 and 2003*. The Sloan Consortium. https://files.eric.ed.gov/fulltext/ED530060.pdf

Bazelais, P., & Doleck, T., (2018). Blended learning and traditional learning: A comparative study of college mechanics courses. *Education and Information Technologies*, *24*(1), 1–12. https://doi.org/10.1007/s10639-018-9748-9

Bernard, R. M., Borokhovski, E., Schmid, R. F., Tamim, R. M., & Abrami, P. C. (2014). A meta-analysis of blended learning and technology use in higher education: From the general to the applied. *Journal of Computing in Higher Education*, *26*(1), 87–122. https://doi.org/10.1007/s12528-013-9077-3

Biggs, J. (2014). Constructive alignment in university teaching. In P. Kandlbinder (Ed.), *HERDSA Review of Higher Education Vol. 1* (pp. 5–22). HERDSA.

Breiner, J. M., Harkness, S. S., Johnson, C. C., & Koehler, C. M. (2012). What is STEM? A discussion about conceptions of STEM in education and partnerships. *School Science and Mathematics*, *112*(1), 3–11. https://doi.org/10.1111/j.1949-8594.2011.00109.x

Brooks, D. C. (2016). *ECAR study of undergraduate students and information technology 2016*. ECAR. https://library.educause.edu/resources/2016/6/~/media/files/library/2016/10/ers1605.pdf

Brown, J. (2012). The current status of STEM education research. *Journal of STEM Education: Innovations and Research*, *13*(5), 7–11. https://eric.ed.gov/?id=EJ996400

Castaño-Muñoz, J., Duart, J. M., & Sancho-Vinuesa, T. (2014). The Internet in face-to-face higher education: Can interactive learning improve academic achievement? *British Journal of Educational Technology, 45*(1), 149–159. https://doi.org/10.1111/bjet.12007

Castle, S. R., & McGuire, C. J. (2010). An analysis of student self-assessment of online, blended, and face-to-face learning environments: Implications for sustainable education delivery. *International Education Studies, 3*(3), 36–40. https://doi.org/10.5539/ies.v3n3p36

Chen, X. (2009). *Students who study science, technology, engineering, and mathematics (STEM) in postsecondary education*. National Center for Education Statistics. https://nces.ed.gov/pubs2009/2009161.pdf

Choi, E. M. (2013). Applying inverted classroom to software engineering education. *International Journal of e-Education, e-Business, e-Management and e-Learning, 3*(2), 121–125. https://doi.org/10.7763/IJEEEE.2013.V3.205

Çirak Kurt, S., Yildirim, İ., & Cücük, E. (2018). The effects of blended learning on student achievement: A meta-analysis study. *Hacettepe University Journal of Education*, 1–27. http://doi.org/10.16986/HUJE.2017034685

Cohen, J. (1988). *Statistical power analyses for the social sciences* (2nd ed.). Lawrence Erlbaum.

Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). Sage.

Day, J. A., & Foley, J. D. (2006). Evaluating a web lecture intervention in a human-computer interaction course. *IEEE Transactions on Education, 49*(4), 420–431. http://doi.org/10.1109/TE.2006.879792

Dolan, E. L., Lepage, G. P., Peacock, S. M., Simmons, E. H., Sweeder, R., & Wieman, C. (2016*). Improving undergraduate STEM education at research universities: A collection of case studies*. Research Corporation for Science Advancement. https://www.aau.edu/sites/default/files/STEM%20Initiative%20Images/RCSA2016%20(4).pdf

Donald, J. G. (2002). *Learning to think: Disciplinary perspectives.* Jossey-Bass.

Dziuban, C., Graham, C. R., Moskal, P. D., Norberg, A., & Sicilia, N. (2018). Blended learning: The new normal and emerging technologies. *International Journal of Educational Technology in Higher Education*, *15*(3), 1–16. https://doi.org/10.1186/s41239-017-0087-5

Dziuban, C., Hartman, J., Juge, F., Moskal, P., & Sorg, S. (2006). Blended learning enters the mainstream. In C. J. Bonk and C.R. Graham (Eds.), *Handbook of blended learning: Global perspectives, local designs* (pp. 195–206). Pfeiffer.

Forte, J. A., & Root, V. (2011). To ITV or not to ITV: A comparison of hybrid and web-enhanced approaches to teaching a macro-course in human behavior in the social environment. *Journal of Human Behavior in the Social Environment, 21*(1), 82–96. https://doi.org/10.1080/10911359.2011.535732

Garrison, R. D., & Vaughan, N. D. (2008). *Blended learning in higher education: Framework, principles, and guidelines.* Jossey-Bass.

Graham, C. R. (2006). Blended learning systems: Definition, current trends, and future directions. In C. J. Bonk and C.R. Graham (Eds.), *Handbook of blended learning: Global perspectives, local designs* (pp. 3–21). Pfeiffer.

Green, M., (2007). *Science and Engineering Degrees: 1966–2004 (NSF 07-307).* National Science Foundation. https://cse.sc.edu/~buell/References/FederalReports/nsf07307degreesawarded.pdf

Goode, C. T., Lamoreaux, M., Atchison, K. J., Jeffress, E. C., Lynch, H. L., & Sheehan, E. (2018). Quantitative skills, critical thinking, and writing mechanics in blended versus face-to-face versions of a research methods and statistics course. *Teaching of Psychology*, *45*(2), 124–131. https://doi.org/10.1177/0098628318762873

Gundlach, E., Richards, K. A. R., Nelson, D., & Levesque-Bristol, C. (2015). A comparison of student attitudes, statistical reasoning, performance, and perceptions for web-augmented traditional, fully online, and flipped sections of a statistical literacy class. *Journal of Statistics Education, 23*(1), 48–54. https://doi.org/10.1080/10691898.2015.11889723

Hattie, J. (2009). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Routledge.

Herbert, C., Velan, G. M., Pryor, W. M., & Kumar, R. K. (2017). A model for the use of blended learning in large group teaching sessions. *BMC Medical Education, 17*(197), 1–16. https://doi.org/10.1186/s12909-017-1057-2

Hill, T., Chidambaram, L., & Summers, J. D. (2017). Playing 'catch up' with blended learning: Performance impacts of augmenting classroom instruction with online learning. *Behaviour & Information Technology, 36*(1), 54–62. https://doi.org/10.1080/0144929X.2016.1189964

Kokkelenberg, E. C., & Sinha, E. (2010). Who succeeds in STEM studies? An analysis of Binghamton University undergraduate students. *Economics of Education Review*, *29*(6), 935–946. https://doi.org/10.1016/j.econedurev.2010.06.016

Kumrow, D. E. (2007). Evidence-based strategies of graduate students to achieve success in a hybrid web-based course. *Journal of Nursing Education, 46*(3), 140–145.

Lederman, D. (2019, March 8). The mood brightens: A survey of presidents. *Inside Higher Ed*. https://www.insidehighered.com/news/survey/2019-survey-college-and-university-presidents

Lian, J., & He, F. (2013). Improved performance of students instructed in a hybrid PBL format. *Biochemistry and Molecular Biology Education, 41*(1), 5–10. https://doi.org/10.1002/bmb.20666

Lim, D. H., Morris, M. L., & Kupritz, V. W. (2007). Online vs. blended learning: Differences in instructional outcomes and learner satisfaction. *Journal of Asynchronous Learning Networks, 11*(2), 27–42. https://files.eric.ed.gov/fulltext/EJ842695.pdf

Means, B., Toyama, Y., Murphy, R., & Baki, M. (2013). The effectiveness of online and blended learning: A meta-analysis of the empirical literature. *Teachers College Record*, *115*(3), 1–47. http://www.academia.edu/download/43209482/%20study__online_and_blended_learning.pdf

Melton, B. F., Bland, H. W., & Chopak-Foss, J. (2009). Achievement and satisfaction in blended learning versus traditional general health course designs. *International Journal for the Scholarship of Teaching and Learning, 3*(1), 1–13. https://digitalcommons.georgiasouthern.edu/cgi/viewcontent.cgi?article=1155&context=ij-sotl

Moskal, P., Dziuban, C., & Hartman, J. (2013). Blended learning: A dangerous idea? *The Internet and Higher Education*, *18*, 15–23. https://doi.org/10.1016/j.iheduc.2012.12.001

Owston, R. (2013). Blended learning policy and implementation: Introduction to the special issue. *Internet and Higher Education, 18*(1), 1–3. https://doi.org/10.1016/j.iheduc.2013.03.002

Owston, R. D., Garrison, D. R., & Cook, K. (2006). Blended learning at Canadian universities: Issues and practices. In C. J. Bonk, & C. R. Graham (Eds.), *The handbook of blended learning: Global perspectives, local designs* (pp. 338–350). Pfeiffer.

Owston, R. D., Sinclair, M., & Wideman, H. (2008). Blended learning for professional development: An evaluation of a program for middle school mathematics and science teachers. *Teachers College Record*, *110*(5), 1033–1064. https://pdfs.semanticscholar.org/817c/56d5888e88ab769f96b6514bba173597293e.pdf

Owston, R., York, D., & Malhotra, T. (2019). Blended learning in large enrolment courses: Student perceptions across four different instructional models. *Australasian Journal of Educational Technology*, *35*(5), 29–45. https://doi.org/10.14742/ajet.4310

Owston, R., York, D., & Murtha, S. (2013). Student perceptions and achievement in a university blended learning strategic initiative. *Internet and Higher Education, 18*, 38–46. https://doi.org/10.1016/j.iheduc.2012.12.003

Parsad, B., & Lewis, L. (2008). Distance education at degree-granting postsecondary institutions: 2006–07. *National Center for Education Statistics*. https://nces.ed.gov/pubs2009/2009044.pdf

Rahman, A. (2017). A blended learning approach to teach fluid mechanics in engineering. *European Journal of Engineering Education*, *42*(3), 252–259. https://doi.org/10.1080/03043797.2016.1153044

Schunn, C. D., & Patchan, M. (2009). *An evaluation of accelerated learning in the CMU open learning initiative course Logic & Proofs.* Learning Research and Development Center, University of Pittsburgh. http://caae.phil.cmu.edu/projects/apros/overview/documents/landp_report.pdf

Shanahan, M., Burke, L. E. C., & Francis, K. (2016). Using a boundary object perspective to reconsider the meaning of STEM in Canadian context. *Canadian Journal of Science, Mathematics and Technology Education*, *16*(2), 129–139. https://doi.org/10.1080/14926156.2016.1166296

Spanjers, I. A., Könings, K. D., Leppink, J., Verstegen, D. M., de Jong, N., Czabanowska, K., & Van Merriënboer, J. J. (2015). The promised land of blended learning: Quizzes as a moderator. *Educational Research Review*, *15*, 59–74. https://doi.org/10.1016/j.edurev.2015.05.001

Thai, N. T. T., De Wever, B., & Valcke, M. (2017). The impact of a flipped classroom design on learning performance in higher education: Looking for the best "blend" of lectures and guiding questions with feedback. *Computers & Education*, *107*, 113–126. https://doi.org/10.1016/j.compedu.2017.01.003

Uzun, A., & Senturk, A. (2010). Blending makes the difference: Comparison of blended and traditional instruction on students' performance and attitudes in computer literacy. *Contemporary Educational Technology*, *1*(3), 196–207. http://www.cedtech.net/articles/13/131.pdf

Vargas-Madriz, F., & Nocente, N. (2016). Student engagement and satisfaction between different undergraduate blended learning courses. In *Proceedings of E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2016* (pp. 1443–1448). Association for the Advancement of Computing in Education.

Vo, H. M., Zhu, C., & Diep, N. A. (2017). The effect of blended learning on student performance at course-level in higher education: A meta-analysis. *Studies in Educational Evaluation*, *53*, 17–28. https://doi.org/10.1016/j.stueduc.2017.01.002

Zhao, Y., Lei, J., Yan, B., Lai, C., & Tan, H. S. (2005). What makes the difference? A practical analysis of research on the effectiveness of distance education. *Teachers College Record, 107*(8), 1836–1884.

Optimizing the Technological Design of a Blended Synchronous Learning Environment

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Abstract
Blended synchronous learning has the potential to increase students' co-presence and improve upon the flexibility and accessibility of course offerings if designed well. This method of instruction, however, has yet to realize that potential. This exploratory study used qualitative methods to iteratively design, assess, and refine the technological design of a blended synchronous learning environment to improve the learner experience. Across three iterations, a combination of qualitative data collection and analysis procedures were used to examine the influence of design decisions on the experiences of the students and the instructor. The findings resulted in a set of design recommendations that can serve as a guide for future research on the technological design of blended synchronous learning environments.

Keywords: blended synchronous learning, web conferencing, qualitative case study, co-presence

Angelone, L., Warner, Z., & Zydney, J.M. (2020). Optimizing the technological design of a blended synchronous learning environment. *Online Learning, 24*(3), 222-240. https://doi.org/10.24059/olj.v24i3.2180

Optimizing the Technological Design of a Blended Synchronous Learning Environment

Blended synchronous learning, also referred to as hybrid synchronous instruction (Romero-Hall & Vicentini, 2017), HyFlex course design (Para & Abdelmalak, 2016), synchronous hybrid learning (Butz & Stupnisky, 2016), and synchronous online teaching (Park & Bonk, 2007) integrates online and face-to-face instruction to create learning environments where students can attend in-person or from a distance simultaneously. This type of learning environment has been used more frequently in higher education to accommodate student desires for both flexibility and personal connection (Bower, Delgarno, Kennedy, Lee, & Kenney, 2015), and now that universities are trying to accommodate for socially distanced classrooms the use of this environment is surging. For decades, distance learning provided the necessary flexibility for students to pursue higher

education in a variety of ways (Moore, 2013). However, students learning online often miss the personal connections made in the classroom. Blended synchronous learning is a potential solution to this problem, but questions remain about how to best leverage technology in a way that creates a seamless experience where learners near and far can connect.

The term co-presence is used to describe the feeling of being together in virtual environments (Bulu, 2012). In order to create a seamless blended synchronous experience where co-presence can thrive, the technological design must be carefully considered as technological issues are a common problem in this type of environment (Cunningham, 2014; White, Ramirez, Smith, & Plonowski, 2010; Wang, Huang, & Quek, 2018; Bower et al., 2015). The evolution of web conferencing tools designed to allow for online meetings between individuals in separate locations may support co-presence in blended synchronous learning environments by mitigating the technological issues experienced in the past. This study sought to explore the optimal technological design of a blended synchronous learning environment leveraging a web-conferencing platform by examining the impact of design decisions on co-presence across multiple iterations.

Background

The technological design is crucial for setting the foundation for learning and social interaction within blended synchronous learning (Wang & Huang, 2018). Two goals of the technological design are to create a seamless learning experience and a sense of co-presence among learners, which for the purposes of this study includes the instructor.

Seamless Learning Experiences in Blended Synchronous Learning

One focus of the technological design in blended synchronous environments has been to determine how to create a seamless learning experience to connect on-campus and online learners (Bower et al., 2015). "Seamless learning refers to the seamless integration of the learning experiences across various dimensions" (Wang & Looi, 2011). Although more often discussed in the context of mobile learning, the construct of seamless learning aligns well within the context of blended synchronous learning given the varying dimensions created by different participant locations and a range of communication modes utilized. Unfortunately, creating a seamless learning experience is often unattainable because of frequent technology issues or steep learning curves associated with using the technology (Bower et al., 2015). Frequently reported technology issues when using these tools include unreliable connections (Cunningham, 2014), lag times (White et al., 2010; Wang et al., 2018), and audio issues (Bell, Sawaya, & Cain, 2014; Bower et al., 2015; Para & Abdelmalak, 2016; Park & Bonk, 2007).

The technological design can be improved by taking into consideration both design and implementation factors as recommended by Bower et al. (2015) in their blended synchronous learning design framework. For example, before the session, these researchers recommend testing the technology in advance (Bower et al., 2015). In addition to taking steps to reduce technical issues, Wang and Huang (2018) recommend that the tools and equipment be selected to provide clear visual and audio connections. Recommended strategies include using mobile devices for presentation and multiple microphones that are muted when not in use (Wang and Huang, 2018). In addition, during implementation, Bower et al. (2015) note that training participants on how to use and troubleshoot the technology has been found to help create a more seamless learning experience. Seeking technology assistance through using co-instructors (Bell et al., 2014) or teaching assistants (Cunningham, 2017; White et al., 2014) can also be helpful.

Co-Presence in Blended Synchronous Learning

Another goal for blended synchronous learning is to establish co-presence among learners. Designers have experimented with a variety of equipment, tools, and class groupings to create this feeling. Some equipment that helps to create co-presence are multi-screen projections (Szeto, 2015; Szeto & Cheng, 2016); multiple cameras that provide different views of the class (Bell et al., 2014; Wang, Quek, & Hu, 2017); and devices, such as iPads or monitors, set up to display an individual (Bell et al., 2014; Cunningham, 2014).

Some tools have affordances that can also help with creating a sense of co-presence. For example, web conferencing tools that allow for multiple modalities, such as video, audio, and text, help students contribute to the discussion in a way that is most comfortable to them (Wang & Huang, 2018). Web conferencing tools that have been reported in the literature on blended synchronous learning include Adobe Connect, Blackboard Collaborate, Centra, Google Hangouts, GoToMeeting, Skype, and Zoom. One web conferencing tool that has not been studied within the context of blended synchronous learning is WebEx. Based on testing by this study's university technology personnel, WebEx limited lag time issues compared to other tools. Thus, the current study examined the use of WebEx to support blended synchronous learning.

Finally, the class groupings themselves can sometimes help with co-presence, such as partnering on-campus and online students (Bell et al., 2014; Cunningham, 2014; Wang & Huang, 2018; Wang et al., 2017; 2018) or using small groups with a mixture of students participating on-campus and online (Bell et al., 2014; Bower et al., 2015; Park & Bonk, 2007).

Although the intention of designs leveraging these elements is to create a sense of co-presence, the actual feelings of students are often mixed. For example, many designs can feel awkward to the on-campus students who need to do things they wouldn't ordinarily do in the classroom, such as move an iPad so the online student can see better (Bell et al., 2014; Cunningham, 2014) or speak directly into a microphone (Szeto & Cheng, 2016; Wang, Quek & Hu, 2017). In some instances, these extra tasks were met with reluctance or even resentment among on-campus students (Cunningham, 2014) or made the online students feel dependent or unwanted (Bell et al., 2014; Cunningham, 2014). Some designs end up improving the presence of one group at the sacrifice of the other. For example, having each online student displayed on an individual device helped the on-campus students feel more connected to the online students, but resulted in the online students feeling more disconnected from one another (Bell et al., 2014). Some studies have noted that students tend to feel less connected with students attending in the opposite mode (Bower, Lee & Delgarno, 2017; Butz & Stupnisky, 2016).

Given these mixed results, more work is needed experimenting with the technological design to help achieve the goals of creating a seamless learning experience and a sense of co-presence. Since technology has proven to be an issue that impacts the intended goals of blended synchronous learning environments, this study focuses on how to improve the technological design to facilitate better experiences for learners.

Methods

Case Study

The current study uses a case study approach as described by Yin (2003). The unit of analysis for this case is a graduate level course designated as here or there (HoT) in which the course was mostly online with four blended synchronous sessions that students could attend in person or virtually via WebEx (Zydney, McKinney, Lindberg & Schmidt, 2019). The instructional format of the blended synchronous session was similar for all sessions. Each session began with a whole class activity or lecture, then the students met in breakout groups to have discussions about the course material, and the class ended with a whole-class debrief with one student from each group sharing what had been discussed in the small groups. The technology for each session, however, was iterated upon after collecting feedback from students. The breakout groups were facilitated by a student facilitator who used a protocol to guide the flow and timing of the discussion in order to create equity of participation, encourage different perspectives, and prompt reflection (McDonald, Zydney, Dichter & McDonald, 2012). For additional details on the pedagogical approach and how it was enhanced during the sessions, please see Zydney, Warner, and Angelone (2020).

This study focuses on the technological design of a blended synchronous environment, using an iterative approach to better understand how the design influenced the instructor and learner experience. A case study is appropriate for this study as the research question is both exploratory and contextual in nature. The research question for the current study is:

- How does the technological design of a blended synchronous learning environment influence the learner experience?

Participants

The graduate level course under study included 16 participants that consented to be a part of the study from a large midwestern university (12 females and 4 males). All 17 students in the course were informed about the research by the instructor and then a research assistant followed up to obtain consent. The participants included K-12 teachers, higher education administrators and faculty, a corporate manager, and a doctoral student. The instructor was both the principal investigator and a participant in the research, consistent with more participatory methods in which researchers are included in the research rather than presupposing that an objective distance can eliminate bias (Tolman & Brydon-Miller, 2001). No race data was collected. This project was approved by the Institutional Review Board.

The HoT format allowed participants to choose to come to campus (here) or participate virtually (there). Across the sessions, approximately half of the students chose one mode of participation and continued to use the same mode throughout. Three students participated in both modes. No students had taken a blended synchronous course before. Five students rated themselves as novice users of WebEx and two rated themselves as experts, with the remainder falling somewhere in between.

Data Collection and Analysis

Multiple data sources were utilized to enhance data credibility (Yin, 2003). Data collected included field notes of observations from each blended synchronous session, debrief sessions, survey responses, interviews with participants, and a member check. Field notes were collected

during each blended synchronous session using a template (Appendix A) based on the work of Merriam (2001). Surveys were designed by the research team to understand learner experience in the HoT sessions. Survey questions included items regarding how the students participated in the session, what supported their communication, what challenges they experienced, and suggestions to improve the HoT sessions. These surveys were used to make technological design changes over each iteration and then studied as part of the data corpus to understand instructor and learner experience. Surveys were sent to all students after each iteration by the research assistant. Thirteen students responded in the first iteration, ten in the second iteration, and four in the third iteration. The decreased participation was likely due to the voluntary nature of participating in the survey but could also be attributed to the decrease in issues experienced by the students over time. Interviews were conducted using a script (Appendix B) based on the simulated recall method (Dempsey, 2010). An instructor interview was conducted midway through the course and four student interviews (one online and three on-campus) were conducted by the research assistant after the third blended synchronous session. The instructor was included in the research as her perceptions and reflections gave insight into technological design changes that could impact learner experience. Finally, a member check was conducted by a student who had attended the blended synchronous sessions both online and on-campus.

The data was then transcribed as necessary and analyzed using an interpretive methodology as described by Erickson (1986). The research team, which included the instructor, their graduate assistant, and a consultant, reviewed the data and generated assertions using a quasi-grounded theoretical approach (Charmaz, 2006). The research team came together multiple times to validate or disprove assertions before the final analysis of the entire data corpus took place.

The following section includes a description of each iteration of the blended synchronous sessions and details the data collected and technological design decisions made as a result of the instructor and learner experience.

Results

In-the-Moment Design Decisions

First Iteration Initial Design. The initial technological design leveraged recommendations from the blended synchronous literature for creating co-presence and included design decisions regarding the equipment, tools, and classroom configuration. The initial technological design along with subsequent iterations of the design are displayed in Table 1 below.

In the first iteration, all students (both online and on-campus) logged into a WebEx training session that enabled everyone to see one another when the whole class was together. To capture the video in the room, a swivel camera connected wirelessly to a pendant worn by the instructor directed where the camera pointed. Multiscreen projection was provided through two projectors, a SMART Board, and six TV monitors at the end of each group table. One projector displayed the online participants, one projector displayed the chat, and the SMART Board/TV monitors displayed a PowerPoint presentation. Within the classroom, one central speaker microphone was set up on a rolling chair so that it could be moved closer to the on-campus students to allow online students to hear. For small group discussions, the instructor created breakout groups within the WebEx training session that she controlled. Both on-campus and online students used headsets to participate in the small group discussions and turned their microphone on when they wanted to speak.

Table 1

Technological Design Changes Across the Iterations

	Iteration 1	**Iteration 2**	**Iteration 3**
Equipment	Multiscreen projections	Multiscreen projections	Multiscreen projections
	Swivel camera	Swivel camera	Swivel camera
	Classroom speakerphone	Classroom speakerphone	Classroom speakerphone
	Individual laptop computers	Individual laptop computers	
	Individual headsets	Individual headsets	
Tools	Instructor –hosted WebEx conference tool with breakout functionality	Instructor –hosted WebEx conference tool	Instructor –hosted WebEx conference tool
		Individual student-hosted WebEx sessions for breakout groups	Individual student-hosted WebEx sessions for breakout groups
Classroom Groupings	Mixed on-campus and online students for whole class and breakout groups	Mixed online and on-campus students for whole class and breakout groups	Mixed online and on-campus students for whole class
			Separate online and on-campus students for breakout groups

First Iteration Feedback. Thirteen students responded to a survey requesting feedback after the first iteration. Positive feedback included seeing the discussion prompts on the TV monitors in the classroom, using the chat functionality in WebEx, and having on-site technology support. Most of the issues noted involved audio: 11 of the 13 students mentioned audio as a problem, frequently citing background noise and audio feedback. Other technical issues included several problems with the WebEx breakout functionality, such as the inability for students to use their webcams during small group discussions.

There were also several timing and communication issues noted. The troubleshooting process created downtime. One student commented, “The small group breakouts seemed to take a lot of time and required a lot of coordination to implement.” The instructor had difficulty communicating to the whole group during the breakout session and either had to use the text messaging system, which limited the number of characters that could be sent or had to relay information through the student facilitators. An online student cited this as an obstacle, commenting “I had to wait until a person who was there relayed the information to me.” The

instructor also had difficulty monitoring the online chat while teaching and missed some messages from students who were having difficulty.

Second Iteration Design Changes. Based on feedback from the first session, several design changes were made. Given the issues with the WebEx breakout functionality, student-hosted WebEx meeting rooms were used for the breakout sessions. Everyone joined the main WebEx training session for the whole class introduction activity and the debrief, but then logged out of the main session and joined separate meeting rooms hosted by the student facilitators. This shift enabled students to use video during the breakout, allowing them to see one another more. The introductory activity also gave everyone an additional opportunity to be on camera. The on-campus students passed the pendant that directed where the swivel camera pointed, and online students passed a virtual ball within WebEx to present. The instructor encouraged online students to use their webcam, although some students opted not to. To resolve the audio issues related to background noise caused by having the speaker microphone on the rolling chair, on-campus students sat in a tight circle around the speaker microphone during the whole-class discussions. To improve communication, the instructor logged into each student-hosted session for a short period. Students were also given a phone number to call if they had technical issues so that they were not limited to the chat. Finally, an on-campus student was assigned the role of "chat monitor" to alert the instructor if there was a chat message that required her response.

Second Iteration Feedback. Ten students responded to a survey asking for feedback on the second iteration. Positive student comments included appreciation of fewer technology issues, use of student-hosted breakout sessions, and ability to see more online students.

Although many acknowledged that there were fewer technology issues as a result of the student-hosted sessions, some students were displeased, as one wrote "Having to sign out of the class WebEx session and into a completely new session for the breakout groups was a bit of a hassle. I would prefer just doing the breakout groups through the class WebEx." In addition, there were two students who did not successfully navigate to their respective breakout session and missed the remainder of the class as a result. The instructor commented in an interview after this session that she continued to feel overwhelmed by the technology and the need to troubleshoot. Despite the improvements made to timing and communications, one student reported feeling rushed because of technology problems, and two students missed the directions that provided the phone number to call for technical issues.

Observations indicated that the most ineffective aspect of the class was the introductory whole-class activity. Passing the pendant for on-campus students and the virtual presentation ball for online students caused delays, which made the discussion feel unnatural. Moreover, on-campus students had an additional inconvenience of having to stand up when sharing due to the angle of the swivel camera, which was designed to capture the movement of an instructor standing for a presentation, as opposed to students sitting in a circle.

Third Iteration Design Changes. To improve communication, instructions were emailed and posted in several places before and during class. In order to cut down on the technical issues and reduce the number of things the instructor needed to attend to simultaneously, students were divided into groups of either all on-campus students or all online students. These class groupings made it possible to reduce the technology in the classroom because on-campus students did not need their own devices or headsets. The introductory whole-class activity was designed to remove the need to pass the pendant or virtual ball. The swivel camera was set up on a tripod to allow on-

campus students to remain seated while talking. During the debrief, on-campus students used a physical whiteboard to share their results whereas the online students shared their results orally.

Third Iteration Feedback. Because this was the last iteration of the study, students were asked to comment on their experience in the sessions as a whole. Four students responded to the final survey. Students commented that the biggest improvements over the course of the semester were fewer technology problems, better time management and flow, improved comfort with technology, and separating the students by attendance mode. Students felt that the persistent challenges over the semester were transitioning between different technologies, connectivity issues, and keeping online students engaged.

Observations indicated that there was less tension in the classroom during the third iteration. The instructor seemed more relaxed, and there were numerous instances of laughter and jokes, indicating everyone's increased comfort level. Minor technical issues were resolved quickly. The on-campus students appeared excited to use the physical whiteboards to share their ideas. Online students asked questions "seamlessly" during the introductory whole-class activity. After the session, the instructor and research assistant who observed the classroom debriefed the session and concluded that the session went as well as possible with the technology available.

Technological Design Assertions

Utilizing the data corpus, the design team iteratively reviewed the data and generated assertions (Erickson, 1986) based on common themes using a quasi-grounded theoretical approach (Charmaz, 2006). These assertions make the following claims about the data.

Technology as a Limitation. As described in the previous section, the instructor employed numerous tactics throughout the iterations to create an engaging learning environment for both on-campus and online students. Although the design decisions led to marked improvements in the learner experience after the first iteration, technology often acted as a limiting factor. For example, multiple microphones in the classroom caused audio interference and the swivel camera created unnatural delays in the discussion, both requiring additional class time to familiarize students with the equipment. Also, some students found WebEx to not be user friendly and had difficulties navigating between sessions. During her interview, Lucy[1], an on-campus student, summarized the effect technology had on her experience in saying, “I was really surprised at how technology almost interrupted it. I was so looking forward to being in virtually with everybody and I felt like the technology just wasn’t there for it.” Despite these limitations, some of the challenges may have been due to the students' lack of familiarity with the tools. Lucy also stated in her interview, “just using WebEx was a big learning curve for me.” Furthermore, students who had worked with web-conferencing tools previously showed some frustration with their classmates’ need to acclimate, as one student wrote after the first iteration, “The experience could have been much better if WebEx had been used correctly.”

Awkwardness in Merging Environments. There is an awkwardness in merging on-campus and online learning environments. Whether attending a blended synchronous environment on-campus or online, all students are experiencing a mediated classroom that requires learning how to use the technology. The mediation, while expected by the online students, appeared to be more challenging for the on-campus students who anticipated a more typical classroom experience.

[1] Pseudonyms used for all student names

On-campus students felt awkward using unnecessary technology to communicate with fellow on-campus students. In the first two iterations, online and on-campus students all wore headsets and interacted with one another through WebEx. This created an unnatural way for on-campus students seated together to communicate with one another. When asked about the challenges of the first session in a survey, one anonymous on-campus student stated that "many moving parts were sometimes difficult to navigate (when to use my headset vs. when to speak aloud)."

In trying to include online students in a more authentic way, on-campus students were often forced to mediate an experience that would not typically need any mediation. For example, passing the pendant to direct the swivel camera was seen as awkward by the on-campus students (see Figure 1). Mike, an on-campus student, remarked: "What I felt was the most ineffective part for lack of a better word… was standing in front of the class and passing the little ball around and presenting." For online students, the mediation of their experience seemed to be more expected. For example, George praised the breakout sessions during earlier iterations when on-campus students were initially frustrated. He noted: "I think you get better connections in the smaller breakout sessions than in the large group."

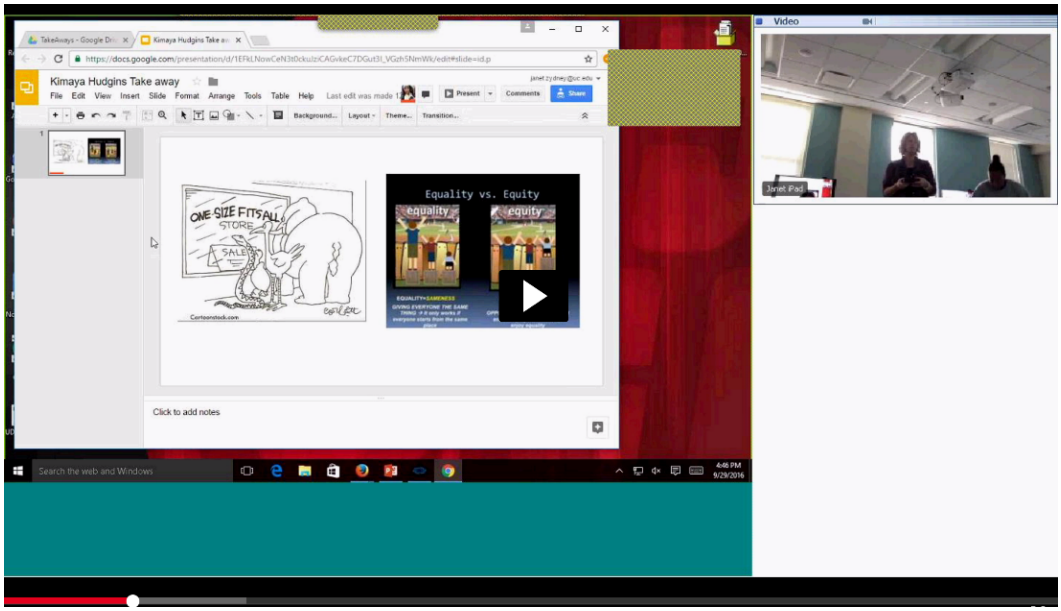

Figure 1. Screenshot from WebEx showing on-campus standing and holding a pendant to direct the swivel camera.

Experience with the technology also seemed to help eliminate some of the awkwardness of merging the environments. George, who was also a teacher in an online school, suggested that his background allowed him to more seamlessly lead and participate in sessions than those with no experience. In addition, his expectations of the blended synchronous environment were more tempered because he was familiar with the online technology. He explained, "Yeah, there's a lot going on. I mean, especially for someone if they're new. I mean, I volunteered because of the online environment and being comfortable with it."

Vulnerability of Transitions. Class momentum, and ultimately student engagement, was most vulnerable during transitions. Starting the sessions and switching between sessions was consistently an issue regardless of the approach used.

Starting the sessions proved challenging for the learners in multiple ways. First, setting up the technology required the instructor, a research assistant, and a university technician to arrive at least an hour prior to each session. Setup was so time-consuming that it often carried over into the first several minutes of scheduled class time, leading one student to comment following the second iteration, "Starting the class still seems to be difficult [and] time consuming." However, preparing the technology was not just a challenge for the instructor, as students frequently required help logging into the WebEx meeting or troubleshooting audio or video issues with their laptops. One student commented, "I cannot get to the session 15 minutes before to get everything set up."

Students shared a similar sentiment when discussing transitioning to the breakout sessions. For example, one student stated there were "significant issues" starting the breakout sessions and another added "It took us a long time to get all of the people in the breakout room. I think we lost 10 minutes." Some evidence suggested the transitions affected the students' overall experiences. For example, Mike stated, "when you have a couple [of technology issues] like that at the beginning of the session it's hard to get engaged." He added that he recalled thinking during the sessions "I'm engaged now but am I going to have another technical issue?"

Seeing is Believing. Participants had a more authentic experience when they were either face-to-face or using video. The desire for the visual was strong enough to make the case that a better simulation of the physical classroom is needed to create a seamless experience in a blended synchronous context.

This desire for visual connections varied along with the design changes involving the use of WebEx and the physical classroom configuration. After the first iteration, several students discussed their desire to see students more. For example, one anonymous student mentioned that it was a challenge that "most did not use video" during the whole-class discussions (see Figure 2), and another cited the problem of "not being able to have video during breakouts." These issues were resolved in later iterations by encouraging more online students to use their webcams during whole-class discussions and using student-hosted meeting rooms that enabled video for the breakout discussions.

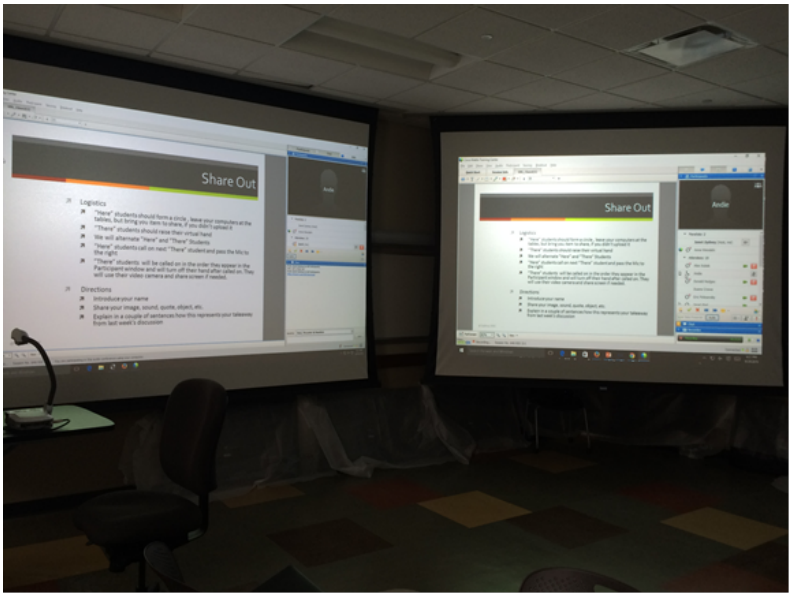

Figure 2. The projection screens in class displaying WebEx as an online student was presenting without video (top right of each screen).

Although enabling video helped to some extent, it did not fully satisfy the need for students to see and interact with one another. George discussed that he felt less connected to others as an online student, in part due to the lack of informal bonding with classmates that can happen within a physical classroom. "You don't have the in-person camaraderie I guess." However, he explained that he still felt more connected in a blended environment than a purely online class:

> I think the HoT session definitely felt a little more authentic and closer to an in-person session just by the fact that you're looking and seeing students in a classroom and you see the teacher there walking around the room. I definitely think that felt a little bit more personal than a truly online setting.

The need for physical connection was echoed by on-campus students after a design decision in the third iteration to separate the breakout groups into only online or on-campus students. For on-campus students, the removal of technology allowed them to communicate in a more natural way with one another. Annie, an on-campus student, noted, "I think we made better progress within the on-campus groups because we were able to more easily go round the table and openly discuss things and read each other's body language."

The instructor also concurred with this need for physical connections. She described an "energy" that is only present in face-to-face classroom settings where there is nonverbal feedback. However, she felt that this classroom energy can be replicated to some extent in blended synchronous environments, even for students who are not in the classroom. She explained that "there's a performance element to teaching that you... that you just lose in a purely online environment, although I think there's a stronger benefit for people that actually come onto campus for a HoT class, I feel like there is some benefit for the online students, to benefit from the energy."

Dichotomizing Students. Even in merging the online and on-campus students via a blended synchronous environment, students still saw the class as two distinct groups. The sessions were called HoT, which from the outset divided the group into "here" or "there" students. This division kept the students from feeling like a unified class and caused some confusion, distraction, and, at times, hostility.

On-campus students often felt divided from the online students. In the feedback from the first iteration, when there were technical issues, one anonymous on-campus student was quite hostile toward the online students, saying: "I feel like the communication would have been more effective if it was just between us as a small group IN THE CLASSROOM [student emphasis]. Too much distraction and time wasted with people from the outside." Even during later iterations, when more students were using video and many technical issues were resolved, Mike explained that the online students felt like guests:

> This is our class because you know you see the same people, you sit in the same seats, we're in pretty much the same groups paired to our learning capabilities... so you sort of have collaboration with these people and then the people who were online were just little black [outlines of] faces on WebEx.

Online students also felt a disconnect, particularly at times when there were technical issues with WebEx, and it was unknown to them what was going on in the classroom. George explained: "Being remote, you can't really see all the time what's happening. You kind of wonder what's going on." He further noted that by the nature of being physically present, the on-campus students seemed to be the priority:

> It may have felt like there was more discussion and focus on the in-person students than the remote or online students. Just because they're there and they can talk to them quickly and we're just kind of a name on the screen.

Whereas the on-campus student felt that the online students were outsiders or a distraction, online students felt, at times, as though they were excluded because of their virtual presence.

In the final iteration, when small groups were separated into either all on-campus or all online students, the on-campus students felt relief in being able to interact more naturally and without the possibility of technical issues. However, it further segregated the class, which was noted by Mike as problematic: "I did like the fact that the in-class people were grouped together, and the online people were grouped together. I liked that, but I miss the collaboration with the online people."

Discussion

The research team brainstormed technological design recommendations for each assertion that would improve the learner experience to better support co-presence. Each of the sections that follow describe these design recommendations in relation to this study's assertions and to findings from other researchers investigating blended synchronous learning.

Streamline Technology to Create a More Seamless Learning Experience

Creating blended synchronous learning environments inherently requires the use of technology. However, based on the experiences of the instructor and students in this study, the design recommendation for creating a more seamless experience is to intentionally select and integrate only the technology deemed necessary to support pedagogy and create co-presence between and among learners. This design recommendation relates to three assertions: (a) technology as a limitation, (b) awkwardness in merging environments, and (c) the vulnerability of transitions. Some technology issues, awkwardness, and feelings of being overwhelmed by the technology can be avoided by eliminating unnecessary technology (e.g., number of microphones) and reducing the number of transitions between whole-class discussions and small groups where technology issues were more likely to occur. Decisions to streamline technology can lead to marked improvements in the learner experience. For example, in this study, although it was necessary to use a web-conferencing tool to connect on-campus and online students, it was not a necessity for every student attending on campus to log into the tool as they did during the first and second iteration. By only having the online students log into the web conferencing tool, the interactions between students in the classroom became more seamless and there were less technological disruptions. Web conferencing tools that enable smooth transitions to breakout groups that allow for use of video are recommended for blended synchronous environments.

Challenges with technology are a common finding in studies involving blended synchronous environments (Bell et al., 2014; Bower et. al., 2015; Butz & Stupnisky, 2016; Park & Bonk, 2007). Streamlining technology addresses these issues and could reduce the time for training students in the use of the software as recommended by Bower et. al. (2015), which may not always be practical or feasible for the instructor. At this point, some degree of technological disruption is likely unavoidable given the relative novelty of blended synchronous sessions and the technology currently available. The potential of blended synchronous environments will be dependent on the continued evolution of technology that affords instructors the ability to let

pedagogy drive their decisions regarding how to use technology rather than making decisions based solely on a desire to avoid disruptions. This may also require some instructors to expand their knowledge of digital pedagogies and experiment with new approaches (Hastie, Hung, Chen & Kinshuk, 2010) or redesign activities to work in this setting (Wang & Huang, 2018; Wang et al., 2017; 2018).

Enhance Co-Presence Through Visual or Physical Connections and Inclusive Language

The second design recommendation, to enhance co-presence through visual or physical connections and inclusive language, emerged from two assertions: (a) seeing is believing and (b) dichotomizing students. Without being able to see one another, students did not feel like part of a cohesive group. Optimally, the faces of all online students should be displayed throughout the session. The use of video should be as seamless as possible and cameras that require students to pass a pendant should be avoided. Separating breakout groups into all on-campus and all online students, which seems to counter the notion of creating co-presence, allows on-campus students to communicate directly with one another rather than through a mediated technology in addition to allowing online students to have a common shared experience, decreasing frustration for all. Eliminating the language of here or there from the description of the course and providing more whole-group experiences with all on-campus and online students together can also further increase co-presence.

In a similar study, in which online students were brought into the physical classroom via Skype, Cunningham (2014) makes a case that richer media that enables cues like facial presence, gaze, and posture, allow for increased social presence. Other studies have recommended using 3D virtual reality in order to make the experience more authentic for online students (Bower et al., 2017; Wang & Huang, 2018; Wang et al., 2018). The physical/visual still matters (Barad, 2003) because it is preferred by students, so increasing both physical/visual connections as well as limiting language that divides the students can support co-presence in blended synchronous environments.

Limitations

Additional research is necessary before any definitive claims about the technological design of blended synchronous learning environments can be made. Case studies are highly contextualized and feature a small sample size. Although this method results in rich descriptions of a specific experience, the generalizability of those results is limited. The findings of this study aligned and expanded on existing research, however, and additional studies are needed to explore the suitability of WebEx in blended synchronous environments. In addition, the exploration of other web conferencing tools that may better support seamless, active learning that meets the needs of both online and on-campus students is necessary. Perhaps commercial web conferencing tools typically created for business settings will not work to create the co-presence desired by students in higher education settings. Therefore, the design of new tools created specifically for educational settings should be another focus of future research. Lastly, in addition to web-conferencing tools, how to leverage the additional technology used in the classroom needs to be systematically studied. This should include an evaluation of how different uses of camera and audio equipment impacts the learner experience and co-presence.

Conclusion

This study made several contributions to the exploration for the optimal technological design of blended synchronous environments. The findings helped to articulate the requirements for a web conferencing tool needed to support this type of learning. Technology limitations continue to be an ever-present issue in blended synchronous learning (e.g., Bell et al., 2014; Bower et al., 2015; Park & Bonk, 2007; Wang & Huang, 2018; Wang et al., 2018), however, this study found success in streamlining the use of technology and reducing the number of transitions. Findings also indicated that enabling or simulating physical connections through rich media could help create a feeling of co-presence among participants, which concurred with earlier research studies (Szeto & Cheng, 2016).

Blended synchronous learning has the potential to increase students' co-presence in support of a seamless learner experience and improve upon the flexibility and accessibility of course offerings if designed well. This case study provided recommendations for how best to design the technology of a blended synchronous learning environment and identified areas of future research that will help realize that potential.

References

Bell, J., Sawaya, S., & Cain, W. (2014). Synchromodal classes: Designing for shared learning experiences between face-to-face and online students. *International Journal of Designs for Learning*, *5*, 68–82. doi: 10.14434/ijdl.v5i1.12657

Bower, M., Dalgarno, B., Kennedy, G. E., Lee, M. J., & Kenney, J. (2015). Design and implementation factors in blended synchronous learning environments: Outcomes from a cross-case analysis. *Computers & Education*, *86*, 1–17. doi: 10.1016/j.compedu.2015.03.0060360-1315

Bower, M., Lee, M. J., & Dalgarno, B. (2017). Collaborative learning across physical and virtual worlds: Factors supporting and constraining learners in a blended reality environment. *British Journal of Educational Technology*, *48*(2), 407–430. doi: 10.1111/bjet.12435

Bulu, S. T. (2012). Place presence, social presence, co-presence, and satisfaction in virtual worlds. *Computers & Education*, *58*(1), 154–161.doi: 10.1016/j.compedu.2011.08.024

Butz, N. T., & Stupnisky, R. H. (2016). A mixed methods study of graduate students' self-determined motivation in synchronous hybrid learning environments. *The Internet and Higher Education*, *28*, 85–95. doi: 10.1016/j.iheduc.2015.10.003

Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. Sage Publications. doi: 10.3402/qhw.v1i3.4932

Cunningham, U. (2014). Teaching the disembodied: Othering and activity systems in a blended synchronous learning situation. *The International Review of Research in Open and Distributed Learning*, *15*(6), 33–51. doi: 10.19173/irrodl.v15i6.1793

Dempsey, N. P. (2010). Stimulated recall interviews in ethnography. *Qualitative Sociology, 33*(3), 349–367. doi: 10.1007/s11133-010-9157-x

Erickson, F. (1986). Qualitative methods in research on teaching. In M. Wittrock (Ed.), *Handbook of research on teaching* (3rd ed., pp. 119–161). MacMillan.

Hastie, M., Hung, I. C., Chen, N. S., & Kinshuk. (2010). A blended synchronous learning model for educational international collaboration. *Innovations in Education and Teaching International*, *47*(1), 9–24. doi: 10.1080/14703290903525812

McDonald, J.P., Zydney, J.M., Dichter, A., & McDonald, B. (2012). *Going online with protocols: New tools for teaching and learning*. NY: Teachers College Press.

Merriam, S. B. (2001). *Qualitative research and case study applications in education.* Jossey-Bass Publishers.

Moore, M. G. (2013). *Handbook of distance education*. Taylor and Francis.

Para, J. L., & Abdelmalak, M. (2016). Expanding learning opportunities for graduate students with HyFlex course design. *International Journal of Online Pedagogy and Course Design*, 6(4), 19–37. doi: 10.4018/IJOPCD.2016100102

Park, Y. J., & Bonk, C. J. (2007). Synchronous learning experiences: Distance and residential learners' perspectives in a blended graduate course. *Journal of Interactive Online Learning*, *6*(3), 245–264. http://www.ncolr.org/issues/jiol/v6/n3

Romero-Hall, E., & Vicentini, C. (2017). Examining distance learners in hybrid synchronous instruction. Successes and challenges. *Online Learning, 21*(4), 141–157. doi: 10.24059/olj.v21i4:1258

Szeto, E. (2015). Community of Inquiry as an instructional approach: What effects of teaching, social and cognitive presences are there in blended synchronous learning and teaching? *Computers & Education*, *81*, 191–201. doi: 10.1016/j.compedu.2014.10.015

Szeto, E., & Cheng, A. Y. (2016). Towards a framework of interactions in a blended synchronous learning environment: what effects are there on students' social presence experience? *Interactive Learning Environments*, *24*(3), 487–503. doi: 10.1080/10494820.2014.881391

Tolman, D. L., & Brydon-Miller, M. (2001). *From subject to subjectivities: A handbook of interpretive and participatory methods.* New York University Press.

Wang, Q., & Huang, C. (2018). Pedagogical, social and technical designs of a blended synchronous learning environment. *British Journal of Educational Technology*, *49*(3), 451–462. doi:10.1111/bjet.12558

Wang, Q., Huang, C., & Quek, C. L. (2018). Students' perspectives on the design and implementation of a blended synchronous learning environment. *Australasian Journal of Educational Technology*, *34*(1), 1–13. doi:10.14742/ajet.3404

Wong, L.-H., & Looi, C.-K. (2011). What seams do we remove in mobile assisted seamless learning? A critical review of the literature. *Computers & Education, 57*(4), 2364–2381.

Wang, Q., Quek, C. L., & Hu, X. (2017). Designing and improving a blended synchronous learning environment: An educational design research. *The International Review of Research in Open and Distributed Learning*, *18*(3), 99–118. doi: 10.19173/irrodl.v18i3.3034

White, C. P., Ramirez, R., Smith, J. G., & Plonowski, L. (2010). Simultaneous delivery of a face-to-face course to on-campus and remote off-campus students. *TechTrends*, *54*(4), 34–40. doi:10.1007/s11528-010-0418-z

Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Sage.

Zydney, J.M., McKinney, P., Lindberg, R., & Schmidt, M. (2019). Here or there instruction: Lessons learned in implementing innovative approaches to blended synchronous learning. *TechTrends*. *62*(2),123–132. doi: 10.1007/s11528-018-0344-z

Zydney, J. M. & Warner, Z. & Angelone, L. (2020). Learning through experience: Using design based research to redesign protocols for blended synchronous learning environments. *Computers & Education, 143*(103678). doi:10.1016/j.compedu.2019.103678.

Appendix A

Classroom Observation Form

Instructor Name: _____ Class Name: _____

Observer Name: _____ Date/ Time: _____

Classroom / Environment Description:
Describe the classroom layout (e.g. rows of seats, chairs in U shape, table groupings, etc.), the people present, and ambient qualities (e.g., noises, amount of light, any noticeable smells, etc.)

Directions: Record a log of events, activities, conversations that happened along with your own commentary on your thoughts and feelings.

Time	**Factual Descriptions of Events, Activities, and Conversations. Use quotation marks for direct quotes.**	**Observer Comments** (Feelings, Reactions, Insights, Interpretations, Hypotheses)

attach additional pages as needed.

Appendix B

Sample Interview Question

At this point in the semester we have had 3 HoT sessions, and I would like to know more about your experiences in each of them. Since these sessions have spanned several months, I will briefly review what took place during each session and then ask you to reflect on your experience. I may also ask you some follow-up questions along the way if there is something I think would be helpful for us to know more about, or if I want to make sure I am understanding you correctly.

1. Session 1: For the first HoT session, everyone (both on and off-campus) logged in to the WebEx training session. The instructor began by introducing the course and what protocols are used for. For the main discussion, there was central mic set up on a rolling chair which moved around to pick up everyone's voices in the classroom. For the breakout sessions, everyone used headsets to participate in the discussion and turned their microphone on when they wanted to speak. For the discussions, the instructor controlled the breakout sessions by creating groups within the training session, which she restarted once because of technical issues. The protocol that we used for the discussion was called Marvin's Model, where the group answers several questions in Go Rounds (a specific technique of a protocol where each person talks one at a time in a specific order). The Go Rounds were about using Voicethread for our asynchronous discussions, what is was like to post in a medium that was comfortable/uncomfortable, and how you can apply this experience to your teaching. The instructor controlled the PowerPoint with the questions throughout the discussion so all of the groups had to progress at relatively the same pace. The facilitators were all physically in the classroom and asked each question to the group that the instructor posed. The instructor walked around to the group facilitators to check on progress. Time warnings were sent through the WebEx message system. After the discussion was completed, one person in each group (two were online students) led share outs of what you all created to represent your discussions.

What do you recall about your experience while the session was actually taking place?

Note: HoT stands for Here or There and was the acronym used in the course for blended synchronous sessions.