

# **Introduction to the Special Issue: Best Papers Presented at the OLC Accelerate Conference on Online Learning and the Innovate 2017 Conference**

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The Online Learning Consortium (OLC) is the leading professional organization devoted to advancing quality online learning, providing professional development for administrative leaders, support service individuals and faculty, and producing high-level research and best practice publications. OLC (formerly the Alfred P. Sloan Consortium) started in the 1990s when a small community came together to promote the idea that online learning could be of great benefit to providing access to a quality education. Funded by the Alfred P. Sloan Foundation, this community embarked on a number of activities designed to promote the concept that the design and implementation of online and blended learning applications needed to be well-planned and based on sound pedagogical approaches. In 1995, a one-day meeting of grantees of the Alfred P. Sloan Foundation's *Anytime, Anyplace Learning* Program met in Philadelphia to discuss their work and share their experiences. Ninety individuals attended this first gathering. This meeting grew into an annual event for the next five years. In 2001, it was decided that the event be expanded into a full conference with a formal, peer-reviewed call for proposals and workshops, and would include exhibit areas. The University of Central Florida agreed to host the conference in Orlando in November. That was a fateful decision as the attack on the World Trade Center on 9/11 followed by the anthrax scare in Florida in October of that year severely limited the number of people willing to fly to Orlando to attend the conference. Still, three hundred and sixty participants attended to share and discuss research, effective practices, student services, and administrative support for online learning. Since 2001, the conference has grown and has evolved into the premiere event for presenting current ideas, research, and best practices in online learning.

In 2016, the Online Learning Consortium celebrated the 22nd anniversary of the International Conference on Online Learning by giving it the new name of ACCELERATE. Over 2,000 individuals attended this conference either in person or virtually. Six hundred and seventy-six proposals were submitted for presentation, of which 341 were accepted.

In April 2017, the Online Learning Consortium held its second OLC INNOVATE Conference with 2,000 in-person or virtual attendees. Five hundred and forty-one individuals submitted presentation proposals, of which 282 were accepted. The nine articles selected for this special edition represent the best of the 623 papers accepted for presentation at these two venues, as determined by the conference track chairs and editorial staff of the *Online Learning Journal*.

### **The Articles**

The nine articles in this special edition represent a wide variety of topics and issues worthy of research. The findings and conclusions add significantly to our understanding of online and blended learning. These articles also represent an excellent mix of research methods (quantitative, qualitative, and mixed-method). Doctoral students and others interested in research may find important insights into methodological techniques as used by the authors of these articles.

In *Gap Analysis: An Innovative Look at Gateway Courses and Student Retention*, William Bloemer, Scott Day and Karen Swan use examples from their work with the analyses of student records to show how one can use student type and point in their academic life to predict success in particular gateway courses. Relating predictions to observed Drop/Failure/ Withdrawal (DFW) rates can highlight courses exceeding expectations and those which fall below them, and support a more nuanced understanding of where attention is needed. They also look at whether or not actionable information can be found by looking at the general connection between DFW's and attrition for different groups of students in specific courses.

Janice Orcutt and Laurie Dringus in *Beyond Being There: Practices that Establish Presence, Engage Students and Influence Intellectual Curiosity in a Structured Online Learning Environment*, examine the decision processes employed in establishing teaching presence in a structured online environment in order to make a contribution to the body of knowledge from a practical pedagogical perspective. Using the lived experiences of instructors, this study focused on the exploration of the influence pedagogical choices had on the creation of an intellectual climate in the online context. Using semi-structured interviews as the main source of data, the study utilized the Interpretative Phenomenological Analysis (IPA) method as an analytical tool to address concerns of rigor in the qualitative interpretation of experiential data. Results of the collective case revealed student engagement and intellectual curiosity were influenced most greatly by an instructor's active interest and passion for teaching, an ability to identify the relevance of course topics to the student, and the encouragement for a shared responsibility in the learning process. The findings showed that the shared goal of learning extended beyond the stated learning objectives and expected outcomes of a course and served as a foundation in the creation of authentic relationships between instructor and students.

Jaclyn Krause, Laura Portalese, and Julie Bonner in *Student Perceptions of the Use of Multimedia for Online Course Communication*, explore student perceptions in taking both online and hybrid undergraduate project management courses. Specifically, the study sought to explore how students experienced the use of multimedia by their instructor and classmates in both online announcements and discussions, as well as whether these same students used or would be likely to use multimedia for similar communications. Student perceptions of social presence, the degree to which one is perceived as a real person in computer-mediated communication, were also examined. The results of the study indicate that while students overwhelmingly enjoyed the instructor's use of multimedia communication, they are unlikely to engage in using these technologies themselves.

In *Using Design-Based Research in Higher Education Innovation*, Cristi Ford, Darragh McNally, and Kate Ford present the design-based research approach (DBR) used by the Center for Innovation in Learning and Student Success (CILSS) at the University of Maryland, University College. They provide details on one interpretation of DBR and how it can be applied by an innovation center working within a university for program evaluation. They posit that the conceptual framework and assumptions of andragogy (Knowles, 1984) have applicable relevance to the instructional shifts that include adaptive learning in the curriculum and believe them to be the central features of the evaluation approach of adaptive learning software. To illustrate the approach, they provided the example of a recent pilot that uses the adaptive learning software Realizeit in UMUC's Principles of Accounting I course.

Jason Rhode, Stephanie Richter, Peter Gowen, Tracy Miller, and Cameron Wills in *Understanding Faculty Use of the Learning Management System*, conducted a study at a large, research-intensive public university in the Midwest that has used the same LMS for 15 years. This study used system logs and database queries to examine how faculty used the LMS. The results identified the features that were used most frequently and how usage had changed over time. In addition, the study compared the usage data for face-to-face and online courses to determine if there are differences in LMS use due to course modality. Based on these findings, it is possible to better understand the role the LMS plays in higher education and online learning, to inform development of next generation learning systems and other innovative technologies.

In *An Instructor Learning Analytics Implementation Model*, Holly McKee developed and validated a model to guide instructors in the implementation of learning analytics (LA) tools. Using design and development research methods, an implementation model was constructed and validated internally. Themes emerged falling into the categories of adoption and caution with six themes falling under adoption including: LA as evidence, reaching out, frequency, early identification/intervention, self-reflection, and align LA with pedagogical intent; and three themes falling under the category of caution including: skepticism, fear of overdependence, and question of usefulness. The model should enhance instructors' use of learning analytics by enabling them to better take advantage of available technologies to support teaching and learning in online and blended learning environments.

In *Blended Learning from Design to Evaluation: International Case Studies of Evidence-Based Practice*, Norm Vaughan, Aline Reali, Stefan Stenbom, Marieta Jansen Van Vuuren, and David MacDonald, compare and contrast faculty development programs for blended learning in four different countries in order to understand the benefits, challenges, lessons learned, and recommendations from such initiatives. The benefits identified for faculty members were that they became more reflective of their teaching practice and began to make a role adjustment from being a content provider to a designer and facilitator of learning for students. The greatest challenge appeared to be a lack of common institutional definition and understanding of blended learning as well as a lack of time and resources to support faculty in the redesign of their courses. With regards to lessons learned, each program emphasized the need for all institutional stakeholders to be involved in supporting the initiative and that blended learning does not simply imply adding digital technologies to an existing face-to-face course. The key recommendation from this study is that a faculty development program for blended learning needs to be clearly aligned with the institution's vision and mission.

Wendy Howard, Gino Perrotte, Minyoung Lee, and Jenna Frisone in *A Formative Case Evaluation for the Design of an Online Delivery Model Providing Access to Study Abroad Activities*, evaluate the effectiveness of an online delivery model for study abroad activities. Building upon the findings of an initial exploratory program using Adobe Connect web conferencing tools, this evaluative case study was the second in a series of design-based research studies intended to identify effective practices and develop recommendations to refine the model through an iterative evaluation process. Using the Online Learning Consortium's Quality Framework, each of the Five Pillars that support successful online learning (access, student satisfaction, faculty satisfaction, learning effectiveness, and scale) was evaluated through a combination of anonymous surveys, pre/post assessments, observations, and student and instructor interviews.

Last but not least, Laura Brewer, Holly Rick, and Karen A. Grondin in *Improving Digital Library Experiences and Support with Online Research Guides*, examines how the introduction of a Literature Review library guide influenced online business students' perceived value of the resource. A population of undergraduate business students (N=355) and online MBA students (N=319) were introduced to a Literature Review library guide during specific points in their programs. Students were asked to complete an online survey that included 17 closed-ended items designed to measure perceived usefulness, satisfaction and likeliness to use the guide again. The survey also included two open-ended questions asking students to discuss those elements of the guide they found most valuable and whether any features had not been included in the guide, but which they wish had been. The data collection strategy required faculty post information about the Literature Review library guide and the survey in their courses at two specified times in the course. Overall, students reported being satisfied with the resource and that they found it usable. Graduate students were more likely to report elements of the guide that supported effective search and evaluation strategies were valuable; undergraduate students tended to value the links to writing resources. Student feedback also suggested that the earlier the guide was introduced in the program, the more likely students would use the resource.

In closing, we would like to acknowledge the efforts of a number of individuals who made critical contributions to this special issue, particularly Sturdy Knight, Beth Meigs and the staff of the Online Learning journal(OLJ); Peter Shea, for his guidance as editor of OLJ; Kathy Ives, for her leadership and direction in navigating the Online Learning Consortium; and the OLC staff and program committees for their efforts and dedication in organizing the conferences at which the authors originally presented their research.

The editors of this special issue hope our readers enjoy the articles selected and welcome any comments.

# Gap Analysis: An Innovative Look at Gateway Courses and Student Retention

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## Abstract

In this paper we argue that simply identifying gateway courses in which a large number of students fail or withdraw and focusing attention on them may not always be the best use of limited resources. No matter what we do, there will always be courses with high D/F/W rates simply because of the nature of their content and the preparation of the students who must take them. However, some gateway courses defy expectations and produce fewer DFWs than might be expected while others produce more. Moreover, the timing of course taking can make a difference between success or failure for particular types of students, and failing or withdrawing from a course does not always lead to stopping out. In this paper we use examples from our work with the analyses of student records to show how one can use student type and point in their academic life to predict success in particular gateway courses. Relating predictions to observed DFW rates can highlight courses exceeding expectations and those which fall below them, and support a more nuanced understanding of where attention is needed. Further, we look at whether or not actionable information can be found by looking at whether the general connection between DFW's and attrition holds up for different groups of students in specific courses.

*Keywords: gateway courses, retention, student success*

Bloemer, W., Day, S., & Swan, K. (2017). Gap analysis: An innovative look at gateway courses and student retention. *Online Learning, 21*(3), 5-14. doi: 10.24059/olj.v21i3.1233

## Introduction

Improvement in the numbers of young Americans achieving a postsecondary degree has been a national priority for over a quarter of a century (Arnold, 1999; Shapiro, Dunder, Yuan, Harrell & Wakhungu, 2014), with little improvement seen. Indeed, a myriad of studies in the last decades of the 20th century tested the assumptions of theories concerning the reasons why students drop out of higher education institutions (Bean & Metzner, 1985; Mallette & Canrera, 1991; Munro, 1981; Tinto, 1987) to develop models of student progression.

Likewise, there is a substantial body of literature that has examined determinants of course non-completion (Juhong & Maloney, 2006; Ishtani, 2006; Jia, 2014; Montmarquette, Mahseredjian, & Houle, 2001; and Wetzel, O'Toole, & Peterson (1999), especially as regards online learning (Boston et al., 2009; Clay, Rowland, & Packard, 2008; Morris, Wu, & Finnegan, 2005; Rovai, 2003). Most recently, learning analytics are being applied to help online educators address undergraduate attrition (Baepler, & Murdoch, 2010; Barber, & Sharkey, 2012; Campbell & Oblinger, 2007).

An emerging strategy for enhancing postsecondary outcomes is to measure the patterns by which students reach and move through intermediate stages of degree completion. One of the issues identified as contributing to attrition is poor performance in gateway courses (Koch & Pistilli, 2015). The Gardner Institute (2015) has identified “gateway courses” as: foundational, credit-bearing, lower division courses, for which large numbers of students are at risk of failure and which accordingly stand as “gatekeepers” to further study and degree completion. Indeed, researchers have found that retention in these courses is strongly correlated with successful degree completion (Cabrera, Burkum & La Nasa, 2005; Herzog, 2005; Lewis & Terry, 2016; Moore & Shulock, 2009; Offenstein & Shulock, 2010). Koch and Pistilli (2015) add that “courses with high rates of unsuccessful outcomes (DFWI rates) ‘kill’ a student’s grade point average (GPA), motivation, and academic progress” (p. 3).

The problem of gateway courses is especially pernicious in online environments, and online educators are attempting to address the issue, primarily through course redesign (Education Advisory Board, 2016). At DePaul University, (n.d.), for example, course redesign focuses on approaches that will help students learn more effectively. Other strategies for improving success in gateway courses include providing extra support for faculty teaching such courses (Nogai & Kans) and/or peer support for students taking them (Arendale, 2004).

These approaches, however, often assume that all gateway courses have the same impact on all students. Our investigations indicate that this is not always the case. In this paper we ask whether all gateway courses are equally detrimental to student success and/or whether the detrimental effects of poor performance in gateway courses apply equally to all students. Answers to such questions are important so that institutional resources available for improving courses, student support and advising and placement practices can focus on those areas in which the problems are most critical.

### **Methods**

The challenge is to find the right measures to identify gateway courses, and, once identified, to apply the best “fix.” It is simple enough to sort courses in descending order of DFW rates, targeting the highest entries for redesign of the course, for changes in its staffing, or for providing student support as these are all factors that are under institutional control. This approach will often work well enough, but this single, simple measure may overlook some problem cases, or, worse yet, identify problems where none exist, causing misplaced or even damaging “fixes.”

A more careful approach to finding gateway courses would recognize that some courses are simply harder than others. There is no single standard for DFW rates that is universally applicable. There are also significant differences in students that need to be considered when looking at the effectiveness of courses. Students enter with widely different backgrounds and learning goals. Individual students change significantly over the course of their studies. The effectiveness of a course needs to be judged in the context of the students it serves. Once issues have been identified, the response needs to be tailored to those issues. Simply put, it is not reasonable to expect all courses to serve all students equally well. Efforts to do so are doomed from the start and may actually do harm. More careful matching of students and courses is necessary before other “fixes” are applied.

Finally, if retention and degree completion are the goal, the effectiveness of the course needs to include not only the DFW rates it produces, but the subsequent persistence of the students in the course whether they passed it or not. Enrollment and performance in courses needs to be tied to persistence measures as well.

### **Subjects and Setting**

The data from which our observations are drawn included all undergraduate degree-seeking students enrolled in a small, Midwestern public university over a four-year period. The academic calendar is semester based. Course grades were those awarded at the end of each term, not the final transcript grade which is occasionally different for any number of reasons. This is the grade that appears on the students' report card and is most likely to influence the student's immediate decision to continue their degree studies.

DFW rates were used to measure students' success in courses studied. An end of term grade of D or F or prior Withdrawal indicates that the student failed to complete the course successfully.

Enrollment in the next regularly scheduled term or graduation was used as a measure of persistence. This measure was chosen for two reasons. It is known that students who have a break in continuous enrollment at this institution are much less likely to graduate. Although there are exceptions, of course, most students who leave simply don't come back. Secondly, connecting individual courses to student persistence needs to be done with a short-term measure. It is hard to attribute a student's departure to a particular course if they have taken many other courses in the meantime.

For this study, the degree-seeking undergraduate student population was classified into four Student Types. First-time freshman versus transfer students was the first distinction. Within the first time freshmen group, students who did or did not enter in the Honors program were distinguished. The transfer students were further classified according to whether they were majors in online programs or on campus programs. The four Student Types, then, were Native Freshmen, Honors Freshmen, On-ground Transfers, and Online Transfers.

Students were also further classified according to stages in their academic life cycle. The first term is particularly critical for transfer students and was defined as the first stage. For freshmen, the end of the first year is a critical time, so the second term was also defined as a stage. The second year, and third year were the next two stages considered. Anything beyond the third year was considered to be the last stage. Thus the dozen regular semesters that might make up a student's trek towards a six-year degree completion were broken down into First Term, Second Term, Second Year, Third Year and Later.

### **Analyses**

To provide a better context for the interpretation of course DFW rates, a binary logistic regression was used to predict the probability that a student would post a D, F, or W grade in any specific course using all courses that the institution offered over a particular four-year period of time. The predictor variables used were the Student Type and the point in the Student Life Cycle (as defined above), plus the most significant individual predictors for each student: their prior cumulative GPA, and the fraction of previous courses in which they received D, F, or W grades. The latter factor is known to add predictive power over prior GPA alone. There do appear to be students with high GPAs who also have high W rates, perhaps to protect those GPAs. The

regression basically predicts, then, the chance that an individual student will get a DFW grade in an average course.

The regressed model makes it possible to predict the overall DFW rate for any course, or section of a course, based on the characteristics of the students who are enrolled in it. These predicted DFW rates can then be used as a benchmark against which actual course performance can be measured. Thus, these predicted DFW rates as well as the observed DFW rates were recorded for each of the courses studied, and the difference (Gap) between them calculated. Courses were then ranked according to observed DFW rates and according to the Gap between observed and predicted rates.

Context is again critically important for connecting individual courses to student persistence. The fraction of students who persist is quite different for different types of students, at different points in their degree paths. When looking at the impact of any particular event (taking a course or getting a particular grade in the course), another kind of Gap was calculated -- the difference between the persistence rate for a particular group of students in the course being examined compared to the persistence rate of students in all courses of the same type at the same point in their degree path.

While all grades posted for the students in this study were used to develop the predictive model for course DFW rates and for persistence rates, the courses that were selected for detailed analysis were chosen from a particular subset of the undergraduate general education curriculum. This particular subset of general education courses is related to the institution's specific mission and values, and is required of all undergraduate students. The structure of the requirement gives students great flexibility in term of the specific courses taken and their timing. This adds degrees of freedom in this part of the curriculum that are often not present in highly structured majors, adding placement and advising to the list as realistic options to improve retention related to these specific courses.

## Results

Table 1 shows notable cases that result from the analysis of the gap between predicted and actual DFW rates for the 34 general education courses considered here. DFW rates are given in percentage of students getting a D, F, or W in each course.

As expected, the ranking of courses based on actual and predicted DFW rates often told similar stories, as can be seen in the first three cases presented. There were also, however, some significant differences. Some courses with DFW rates high enough to trigger alarms, also had high predicted DFW rates. When the gaps between observed and predicted DFW rates were considered, the courses receded out of the alarm range. The sixth course in Table 1 moves from being in the top five problematic courses by actual DFW rate to the middle of the pack when judged by the gap. Indeed, Table 1 shows that some courses are just living up to predictions, but that in some cases, such as this one, the courses in question are performing better than expected, given the population they serve. This can be seen most clearly in the seventh course in Table 1. While in the top ten of problem courses by actual DFW rates, the gap between actual and predicted DFW rate is large and negative. It is actually performing better than expected for the student population being served. Efforts to "fix" such a course are at best misdirected and potentially even



harmful. Such a course may be worthy of further scrutiny, not to improve it, but rather to replicate its relative success with a specific problematic student population.

Rank by %DFW	%DFW	Predicted	Gap	Rank by Gap
1	30.20%	22.40%	7.90%	1
3	26.70%	19.40%	7.20%	2
2	28.00%	21.60%	6.40%	3
6	18.30%	13.90%	4.40%	4
13	13.90%	10.70%	3.20%	5
5	19.60%	20.90%	-1.30%	15
9	16.40%	22.90%	-6.50%	26
33	1.70%	12.70%	-11.00%	30
34	0.00%	14.80%	-14.80%	34

*Table 1.* Effect of Gap Analyses to Identify Gateway Courses for Notable Cases: Courses Ranked by Highest to Lowest DFW Rates and by Size of Gap (negative numbers indicate courses performing above expectation).

There are also courses with DFW rates that are not high enough to attract attention, but are much higher than would be expected for their given student population. Exploring the gap between observed and predicted DFW rates brings such courses that might otherwise be overlooked into consideration. The fifth row in Table 1 shows a course that might be overlooked using actual DFW rates. Using that gap as the measure brings it into the top 5 of courses that need to be looked at.

Finally, there are courses with extremely low DFW rates, perhaps even rates of zero, despite the fact that the predicted DFW rates for enrolled students are substantial as seen in the last two rows of Table 1. These might be particularly effective courses whose structure and methods need to be replicated. They might also be courses whose performance is more a cause for concern than celebration.

The connection between specific courses and student persistence was also examined and broken down by student type and point in academic life cycle. Again, this classification of student persistence does not produce useful information for all courses, but there are occasionally findings that are genuinely surprising and useful. Table 2 shows the results of a typical analysis of this sort. The data is presented for students who simply took this course compared with similar students who didn't take it. The same approach can be used, however, for students receiving a D, F, or W versus students passing the course or other criteria of interest. The columns in the table are being used to classify students by type. The rows break out students at various stages of their degree paths. Each cell shows the difference between the persistence of the group of students taking this course compared with those who didn't take it. A positive value indicates the percentage by which the students of interest were more likely to persist. A negative value indicates the percentage by which students were less likely to persist.

Persistence Gap	Native Freshman	Honors Freshman	On-ground Transfer	Online Transfer
first term	*	*	-18.9%	-15.0%
second term	*	*	0.3%	5.9%
second year	9.0%	4.6%	-4.0%	6.1%
third year	3.8%	2.7%	0.7%	-3.9%
later	-1.7%	0.8%	2.4%	15.4%

\* numbers are too small to make sense in this course

*Table 2.* Connecting a Course to Near Term Retention by Student Type and Level for Students Enrolled in a Particular Course.

In the case of the particular course shown in Table 2, it was found that taking the course (regardless of the grade earned) was generally associated with average persistence. When the classifications are removed, students who took this course persisted 1.2% more often than similar students who did not take it. However, Table 2 does show a real issue for transfer students taking the course in their first term, whether or not they were online. First semester transfer students were less likely to persist, by 15-20%. If transfer students took the same course in a later term, there were virtually no problems with persistence. There might be many explanations for this effect, but regardless of the reason, keeping new transfer students out of this particular course would be an obvious, and easily accomplished step toward higher retention.

Another course with average DFW rates produced surprising results when connected to a measure of short term student persistence. Students with a DFW grade in this course did not show the expected drop in persistence of about 18%, but rather persistence fell by only 2%. What might be going on in that course to account for this is not going to be found in the database, but further investigation is surely warranted as it appears that something very good was occurring in it that might be replicated in other courses. That there may be courses which serve as “guardrail” courses associated with increased student persistence is an intriguing possibility.

Along those lines, we found that the very act of enrolling in this particular kind of general education course was associated with increased persistence across student types and levels. While it is tempting to think that the curriculum is resonating well with students, the probable explanation is likely more mundane. The courses investigated fulfill an institution specific general education requirement that reflects particular institutional values. Students who intend to transfer to other institutions to complete their studies need not be concerned about them. If anything, enrollment in this group of courses is a confirmation of the students’ intentions to complete their degree here. Finding signals that reveal students’ true degree plans can also be helpful in targeting retention efforts.

### **Discussion**

Gateway courses with high DFW rates contribute directly to student attrition and are an obvious place to direct retention efforts. The identification of problem courses benefits from the inclusion, however, of some measure of the expected DFW rates for each course. The approach in the research reported here was to base expectations on student type and point in their degree path, as well as significant predictors of individual student performance. Other approaches might be more appropriate for other institutions based on local factors impacting student success.

In any case, deviations from projected DFW rates can be used to identify specific courses particularly in need of help as well as courses in which students are doing better than expected that could perhaps be mined for strategies that increase student success. Finding courses that are working well can't help but inform responses to courses that could be more effective.

Moreover, connecting specific courses to student persistence for different types of students at different points in their degree paths can be used to improve student advising and placement. When possible, the quickest, most cost-effective solution to high DFW and attrition rates may be to make sure that particular kinds of students are not attempting courses that are known to be particularly difficult for students at their current stage of academic career.

Although the results reported in this paper are clearly limited to the undergraduate population at the university studied, they also plainly suggest that the effects of gateway courses are mediated by student types and academic stages. Thoughtful examination requires, then, adjusting observed course D/F/W rates for the characteristics of the students enrolled. In doing so, it is essential to identify courses whose performance issues are real, not apparent, so that institutional resources available for improving courses, high quality student advising and placement practices can be focused on those areas in which problems actually exist.

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# **Beyond Being There: Practices that Establish Presence, Engage Students and Influence Intellectual Curiosity in a Structured Online Learning Environment**

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## **Abstract**

To fully understand teaching presence and its implications for the intellectual climate of an online classroom it is necessary to explore the phenomenon from the perspective of the instructors who experience it. Informed by the theoretical perspective of the Community of Inquiry (CoI) model, the actions, intentions and perceptions of instructors were investigated through a collective case study. The goal of this study was to examine the decision processes employed in establishing teaching presence in a structured online environment in order to make a contribution to the body of knowledge from a practical pedagogical perspective. Using the lived experiences of instructors enabled the exploration of the influence pedagogical choices had on the creation of an intellectual climate in the online context. Using semi-structured interviews as the main source of data, the study utilized the Interpretative Phenomenological Analysis (IPA) method as an analytical tool to address concerns of rigor in the qualitative interpretation of experiential data. Results of the collective case revealed student engagement and intellectual curiosity were influenced most greatly by an instructor's active interest and passion for teaching, an ability to identify the relevance of course topics to the student, and the encouragement for a shared responsibility in the learning process. The findings showed that the shared goal of learning extended beyond the stated learning objectives and expected outcomes of a course and served as a foundation in the creation of authentic relationships between instructor and students. In addressing the overarching research question of how instructors establish teaching presence and inspire intellectual curiosity in a structured teaching environment, the findings of this study contribute to knowledge related to the nature of teaching presence and its role in setting an academic climate in an online classroom.

*Keywords:* approaches, effectiveness, online community, graduate, engagement, pedagogy, faculty roles quality instruction, workflow, competencies, scholarship, facilitator, instructor experience, teaching presence

Orcutt, J.M. & Dringus, L.P. (2017). Beyond being there: Practices that establish presence, engage students and influence intellectual curiosity in a structured online learning environment. *Online Learning* 21(3), 15-35. doi: 10.24059/olj.v%vi%i.1231

## Introduction

In graduate education, instructors provide intellectual and scholarly leadership by sharing their knowledge, experience and insights as subject matter experts. In this role, they guide students through higher-order learning activities that require critical thinking, synthesis and application of knowledge (Arbaugh, 2013). The presence, availability and supportive nature of the instructor greatly influences the course climate and can generate a positive online learning experience for students (Cox-Davenport, 2014; Kaufmann, Sellnow & Frisby, 2015). Garrison, Cleveland-Innes, and Fung (2010) suggested that this link between teaching presence and learning depends on the instructor's presence and the role presence plays in establishing and facilitating a climate for discourse and collaboration. The course climate created by an instructor influences the way students learn and the extent to which collaboration is promoted (Cox-Davenport, 2014; Kaufmann et al., 2015).

Teaching presence is the mechanism that bridges the transactional distance between instructor and student in a virtual classroom where direct instruction and facilitation of discourse is achieved through various forms of interaction (Afolabi, 2016; Arbaugh & Hwang, 2006). Ekmekci (2013) and Bowden (2012) presented arguments of the responsibilities instructors hold in setting academic expectations and ensuring that standards of scholarship are upheld. Instructors can create an academic climate that increases connectedness with students and expectation of scholarship by promoting a shared sense of teaching presence (Afolabi, 2016; Ekmekci, 2013). This sense of "being there" or "being together" is experienced in different ways in the online classroom and must be intentionally created for it to be perceived and felt (Lehman & Conceição, 2010).

The essence of "presence" is not one-dimensional in that the instructor merely follows a set of prescribed actions that demonstrate availability and supportiveness in the online course. Presence is also a mindset for extending activity between student, instructor and content beyond just being there. The presence mindset includes a strategic workflow of effective practices that lead to co-construction of the intellectual climate shared by the instructor and students in the online course. The present study draws insights from the experience and perspectives of successful online instructors to illustrate how this is achieved in a structured online learning environment.

## Background

Growing pressures persist for higher education to be accountable for the achievement of learning outcomes and retention. Educators are increasingly interested in improving pedagogical strategies by implementing practices that are effective in producing student outcomes in the online environment (Ekmekci, 2013). Shea, Vickers, and Hayes (2010) recognized the importance of advancing the practice of teaching in the online environment through the systematic exploration of pedagogies employed by instructors, and recommended further study into the intentional efforts of instructors in establishing their teaching presence. For distinct pedagogies to emerge, the nature of teaching presence, the transformation of the practices instructors engage in, and the competencies required to perform the tasks of the instructor must be understood (Baran, Correia, & Thompson, 2013).

Shea et al. (2010) suggested the importance of investigating the intentional efforts instructors undertake in establishing teaching presence, particularly when and where they focus effort, in order to understand its significance to the practitioner. Pedagogical suggestions by researchers over the past decade as reported by Junk, Deringer, and Junk (2011) typically rely on



conventional practices of interaction, such as participating in discussions or holding online office hours, in the attempt to engage students as a means to achieve expected learning outcomes.

The evolution of the online technologies supporting online educational platforms has enabled interaction among instructors and students to shift from individual approaches to forms of collaborative learning (Garrison & Akyol, 2013). As this transformation has taken place technologically, the importance of teaching presence and its influence on the learning process has increased in visibility (Arbaugh, 2013). However, as the online teaching environment has advanced, instructors have not always kept pace, showing a tendency to either rely too heavily on technology to form connections with their students or to revert to conventional practices that are more suitable for physical classrooms (Baran et al., 2013; Cho & Kim, 2013; March & Lee, 2016). Those who are new to online environments are challenged with finding suitable approaches to teaching in virtual classrooms because many did not learn that way themselves (Niess & Gillow-Wiles, 2013).

### **Focus of the Study**

The study focuses on the need to understand the nature of teaching presence from an instructor's perspective and the implications of this on establishing an intellectual climate in the online classroom. The essences of teaching presence that emerge in structured online environments are unknown. While the course content is prescribed for the instructor in the structured online course, the instructor's role to inspire intellectual curiosity is not. What inspires instructors to reach beyond prescribed pedagogies and competencies that are related to teaching presence is the central focus of the study.

The Community of Inquiry (CoI) theoretical model introduced by Garrison, Anderson and Archer (1999) provides a conceptual framework for studying the online learning experience. Research related to teaching presence has had a primary focus of verifying the existence of the construct of teaching presence through text analysis of interactions (Garrison & Arbaugh, 2007). The empirical information gathered from these studies has not provided a full understanding of the experience of online instructors (Shea et al., 2010; Kidder, 2015) nor has it provided substantial guidance to instructors on how to effectively create a teaching presence that establishes a productive and efficient course climate (Duncan & Barnett, 2010), particularly when the course is designed to follow a structured and prescribed approach to the content and to delivery.

Using a collective case study approach, the experiences of online instructors were explored to ascertain the nature of teaching presence in a specific online context and gain insight on how pedagogical choices might influence the establishment of an intellectual climate appropriate to the course offering. While the phenomenon of an intellectual climate exists in both online and traditional classrooms, it is only by examining the experiences, decisions and actions of online instructors as done in this study, that an understanding of an instructor's role in establishing such a climate in the online context could be gained. A qualitative approach allowed for the in-depth exploration of instructor's experiences, intentions and perceptions as they related to establishing their presence within an online environment (Creswell, 2013).

This study utilized the teaching environment of a selected university where classes are delivered in an online environment typical of for-profit institutions, whereby course materials and learning activities follow a standardized delivery pattern independent of course content. In the standardized delivery format of the research site, all eight-week courses were designed within four two-week teaching modules. All course activities were pre-developed by a course committee

composed of instructors with industry expertise. Instructors were expected to follow the format without deviation and were not allowed to change assignments or content without approval of the committee. This course environment created a common context across all instructors in which the actions, intentions and choices of selected instructors could be isolated and examined. As a result, through the interviews about the approaches used in establishing presence in the confines of this structure, it was revealed what these instructors perceived as most important in establishing their presence and the connection with their students.

Through this study, the researchers sought to qualitatively assess the processes utilized by instructors when establishing teaching presence in order to provide insight into its influence on the creation of an intellectual climate within the online classroom (Cox-Davenport, 2010; Duncan & Barnett, 2010). The themes that emerged from the detailed examination and analysis of the experiences of the selected instructors when establishing teaching presence in a structured course environment provided a vocabulary with which to describe the shared pedagogies of instructors and served to catalog, from a temporal perspective, commonalities in actions and intent associated with setting an intellectual climate. As suggested by Shea et al. (2010), this exploration allowed for discovery of how the intentional efforts of these instructors may be linked to the intellectual climate of their classes and its influences on the learning process that enabled the collaborative or independent progress toward knowledge construction.

While the course content is prescribed for the instructor in the structured online course, the instructor's role to inspire intellectual curiosity is not prescribed. Discovering what inspired instructors to reach beyond prescribed pedagogies when establishing teaching presence was a primary goal of this study, seeking explanations or answers to questions such as: How do instructors perceive their own teaching presence practices? What does teaching presence mean to them? What practices do instructors rely on to inspire intellectual curiosity of students that reach 'beyond being there' in an online environment?

## **Literature Review**

Teaching presence is a phenomenon that exists in both physical and virtual classrooms; however, in the online learning environment teaching presence increases in importance as it provides a vital link to students who are separated by time and space from their instructors (Afolabi, 2016; Arbaugh & Hwang, 2006). The Community of Inquiry (CoI) model introduced by Garrison et al. (1999) provides a conceptual framework within which teaching presence can be seen to influence the social and cognitive processes that occur in online learning environments. As a theoretical model, the CoI defines the existence of teaching presence through the interaction that occurs between students and instructors primarily during the functions of direct instruction and facilitation of discourse. As investigations into teaching presence have evolved, the understanding of the collaborative nature of the online environment has increased and provided insight into the shared agency of the learning process (Bawa, 2016; Shea & Bidjerano, 2010). However, the role of the instructor and the necessity of the instructor's presence in the classroom to set academic expectations and inspire intellectual curiosity are critical to supporting scholarly achievement (Bowden, 2012; Ekmecki, 2013).

## **CoI Model**

Garrison et al. (1999) described e-learning in the context of a community of learners who are not bound by time or place, as with traditional classroom instruction, but who relied on computer-mediated interaction to facilitate the process of learning. Interaction in the online learning environment, not only involves the exchange of information intended to increase or reinforce knowledge development within the context of the course, it also actively encourages dialogue which leads to individual knowledge construction (Bondi, Daher, Holland, Smith, & Dam, 2016). Garrison et al. (1999, 2001) argued that it is through this interaction that a community of learning is created and sustained, and that it is within the “community of inquiry” that critical thinking is developed and learning results. It was from these foundations that the Community of Inquiry (CoI) model was formulated. This theoretical model has been prominent in online education research for the past decade.

The Community of Inquiry (CoI) model relies on the assumption that learning occurs as a function of three primary and interdependent elements: social presence, cognitive presence, and teaching presence. It is an assumption of the model that the interactions among the three forms of presence result in the establishment of a community of inquiry in which critical thinking can develop and thrive (Arbaugh, 2013). The model identifies teaching presence as a complex construct which bridges the transactional distance between instructor and student through interaction and creates an environment within which social and cognitive processes can occur (Arbaugh & Hwang, 2006; Garrison et al., 2010; Yang, Quadir, Chen, & Miao, 2016).

Integral to the CoI model is the presumed interrelationship among the three core constructs. Graphically represented by three intersecting circles, the CoI model identifies the overlap and interdependence of the three elements (Garrison & Arbaugh, 2007). At the intersection of these core constructs are three functions identified by the authors and presumed to be carried out primarily by the instructor to ensure a meaningful and successful educational experience. These functions of selecting content, supporting discourse, and setting climate are used as indicators of each presence and represent how the instructor creates the presences identified in the model (Garrison et al., 2001).

### **Teaching Presence**

The element of teaching presence has emerged as an integral part of the model with respect to its relationship with the other two elements and its influence on student satisfaction, perceived learning and sense of community (Joo, Joung, & Kim, 2013; Southcombe, Fulop, Carter, & Cavanagh, 2015). Teaching presence is the “binding agent” which directs the educational purposes for the community of learners (Garrison et al., 1999). While the authors suggested that any of the participants in the community of inquiry could participate in creating teaching presence, they noted that these activities fell primarily in the responsibilities of the instructor.

The indicator categories for teaching presence have evolved since the time this original description was proffered, however, facilitation of discourse and direct instruction are considered to be the key indicators of teaching presence during the examination of an active course environment (Garrison & Arbaugh, 2007). Both indicators focus on instructor involvement within a course, and refer to the relevance of instructor interaction with students in the context of the course but differentiate between student-led and instructor-led interaction respectively.

## **Setting Climate**

Setting climate is identified in the CoI model as a function primarily performed by the instructor which is used in establishing a productive learning environment. While selecting content and supporting discourse have been the focus of studies related to the construct of teaching presence, little has been investigated with respect to the function of setting climate and its role in establishing teaching presence.

A few recent studies have indicated the importance of the learning climate, such as the study conducted by Brock and Abel (2012) that found instructors' actions to be a significant element in creating an environment for high-level learning. However, an exploratory study by Cox-Davenport (2010) appears to be the first to investigate the climate setting function as a method of instruction used during the establishment of teaching presence within the online environment. Using a grounded theory approach, Cox-Davenport identified characteristics of activities and strategies employed by instructors while establishing their teaching presence as "climate factors". She examined which climate factors were specifically employed by instructors when setting a climate of open communication and then exploring the perceived effect of those climate factors on the development of social presence within their online courses. Cox-Davenport's findings suggested that the level of influence the instructor exerts over the creation of the educational environment in the online classroom can be attributed to strategies which enhance social presence and enable student participation.

## **The Nature of Teaching Presence**

Teaching presence has a significant effect on learning persistence and is highly related to the level of learning that occurs within an online course (Joo et al., 2013). The collaborative construction of knowledge that occurs as a result of the interaction within an online environment does not just happen, but requires the intentional and responsive intervention of an instructor (Xin, 2012). Active interaction in an online course is not automatic and requires skillful intervention by an instructor to promote a level of cognition that can become self-regulated (Cho & Kim, 2013). This is particularly important in graduate level education, where expectations of academic rigor and achievement are greater (Bowden, 2012).

It is evident that the level of presence and degree of visible involvement demonstrated by the instructor is dependent upon the teaching strategy and personal preferences of the instructor (Ravenna, 2012). However, it is also evident that the level of teaching presence can dramatically influence the quality of facilitation that leads to successful learning in asynchronous environments (Costley, 2015; Hung & Chou, 2015; Rovai, 2007). A key step in the achievement of academic expectations and scholarship is the role the instructor plays in setting the academic climate for such performance (Bowden, 2012; Ekmekci, 2013). However, there is little guidance for practitioners with respect to fulfilling this vital function related to cognitive achievement.

Instructors who are used to the immediacy of feedback and interaction experienced in face-to-face environments are concerned about how they can achieve similar outcomes in the online environment (Costley, 2015; Hung & Chou, 2015). These instructors, who are comfortable with the knowledge of how to project their presence in a physical classroom, are struggling with how to do so in a virtual environment (Baran et al., 2013; Duncan & Barnett, 2010). Baran et al. (2013) contended that change in pedagogy is needed, and that successful instructors could share insight, transfer knowledge, and explain intentions critical to practices used while teaching online. They

identified the need for further research on how instructors create their online persona, or presence, with examination of the practices, perspectives, and assumptions that support their online role.

## **Method**

### **Approach**

The case study as a research method is favored by interpretivists due to its holistic treatment of the subject phenomenon in a natural setting (Willis, 2008). The collective case study represents a repetitive application of procedures to each case selected, whereby each case selected is purposefully chosen within a bounded system to represent different perspectives of the issue being investigated (Creswell, 2013). At the research site, instructors adhered to a structured approach to course delivery whereby course design included the same components (e.g., lecture slides, discussion questions, homework assignments, research projects, and synchronous “whiteboard” sessions) following a predefined schedule each term. Analysis of faculty evaluations revealed differences in student responses associated with the construct of teaching presence such as facilitating discussions and timely and regular feedback. Conceptual questions drawn from the circumstances of the research environment helped shape the curiosity of the researcher (Stake, 1995). In particular, the variation in student reports of instructor contribution to learning created an interest in understanding differences in instructional practices within an otherwise tightly constrained online environment. This led to the formulation of a central question that created a conceptual structure for organizing the study of this case (Stake, 1995): RQ1: In a structured online environment, how do instructors establish teaching presence and inspire intellectual curiosity within the courses they teach?

This conceptual question was expanded to incorporate the instructor’s point of view, using sub-questions that highlight specific areas addressing the goals of this study: RQ2: What practices do instructors choose to employ when establishing teaching presence? RQ3: What are the intentions of instructors when determining which strategies will best help them establish teaching presence? RQ4: How do instructors perceive their decisions and practices relative to teaching presence and its influence on the intellectual climate in the classroom?

Teaching presence and the process of establishing presence within an online environment can be a complex and subtle activity undertaken by an instructor (Anderson & Dron, 2011). Qualitative research provides a means of exploring the phenomenon of teaching presence from the instructor’s point of view, allowing for in-depth discovery through an interpretive lens (Friesen, 2009). A case study approach was selected for this exploration of the phenomenon of teaching presence due to its ability to help develop an in-depth understanding of the practices (how) and intentions (why) of the instructors (Yin, 2014).

Utilizing a case study approach, the research questions were addressed as the participants revealed what teaching presence meant to them and described the processes they adopted to establish presence in their online classrooms. This collective case study provided a context specific exploration of the topic, allowing the researcher to draw cross-case conclusions that highlight commonalities among the individual instructors interviewed, strengthening the findings of the study (Yin, 2014). To provide a more rigorous approach to analysis, an experiential qualitative method called Interpretative Phenomenological Analysis (IPA) developed by Smith, Flowers, and Larkin (2009) was used as a means to increase the credibility of the study’s findings.

## **Boundaries of the Case**

Binding the case helped ensure the study remained within a reasonable scope (Baxter & Jack, 2008). Defining the boundaries of this case relied on setting selection criteria that made it possible to identify instructors who were seemingly more effective at creating a successful learning environment than their counterparts, specifically as it applied to contributing to learning and facilitating learning activities. Utilizing student evaluation data supplied from the research site helped accomplish this, with the general boundaries of the case originally defined as: (1) instructors employed during a defined period (2010 – 2012); (2) instructors rated highly in their contribution to learning, and (3) instructors rated highly in facilitating learning activities (e.g., discussion thread participation). Instructors who fell outside the boundaries of the case were not eligible to be participants.

## **Participant Selection**

Purposeful sampling is typically employed in case study to utilize a group of people who can best inform the researcher about the research problem, rather than securing a probability sample which enables statistical inferences to a population (Creswell, 2013). Achieving homogeneity in the sample cases was an objective of the participant selection process for this study, as the intent of the study was to draw from the experiences and insights of successful instructors. The shared experience of working within the same structured academic program at the specific school provided the first level of homogeneity in the sample. Homogeneity for the purposes of this study was also measured from the ratings of instructors in the criteria identified as boundaries of the case that served as selection criteria, similar to the study conducted by Baran et al. (2013). An average performance score from student evaluations was calculated using the institution's values as the criteria for success to determine the final set of eligible participants in the study. The analysis essentially confirmed six candidates as strong subjects for the study, revealing their exceptional performance across all categories of evaluation, exceeding the average performance score in each category evaluated. As a result of this final analysis, the group of instructors selected for the collective case study were assigned pseudonyms: Davina, Dominik, Karissa, Leighton, Pavia, and Yosef. The two instructors selected as potential pilot case study subjects were Ludwig and Simon.

## **Data Collection**

Data collection in case study research is extensive and draws from multiple sources of information for the purposes of data accuracy, validity and reliability (Yin, 2014). In-depth semi-structured interviews were used as the primary source of data. However, student evaluation data provided by the institution were used to produce convergent evidence of the activities reported by the instructors in the interviews and served as a means of triangulation, providing support for the accuracy and interpretation of the information collected (Stake, 2006).

The in-depth interview techniques used in data collection supported the exploration of instructor's intentions, actions, and perceptions when establishing their presence in the online course environment. The goal of the semi-structured interview in this study was to elicit meaningful and descriptive first-person accounts of the experiences and intentions of the participants (Smith et al., 2009). Following an interview approach recommended by Seidman (2006) the in-depth phenomenological interviews were conducted in three distinct parts exploring in sequence: (1) their personal history related to online education, (2) their experiences as online instructors, and (3) reflection on the meaning of their experiences.

## Data Analysis

Case study research has not been codified, and as a result, the rigor of analysis performed has been the subject of scrutiny even though it is recognized as a distinctive form of empirical research (Yin, 2014). Due to this concern for rigor, a structured approach to the analysis of the qualitative data is often sought. Interpretative Phenomenological Analysis (IPA), a method introduced in the mid-1990s to understand experiences of particular groups of people within specific socio-cultural contexts, was identified as the analytical method used for this study. IPA provides a process to analyze qualitative data when seeking to understand the first-person perspective of lived experiences from the third person position (Smith et al., 2009).

Interpretative Phenomenological Analysis (IPA) is an experiential qualitative research method that provides a systematic approach to interpreting first person accounts of experiences (Smith et al., 2009). This approach is not a predictive evaluation tool, but rather a pragmatic method used to describe, explain and interpret patterns and themes that emerge from the narratives resulting from in-depth interviews. Following the IPA protocol, the researcher individually analyzed each case thoroughly prior to performing the cross-case analysis. For each case the researcher completed the following five steps of the IPA method as outlined by Smith et al. (2009): (1) reading and re-reading interview transcripts, (2) initial noting comprised of an exhaustive three part procedure of commenting which includes (a) descriptive interpretation, (b) observation of linguistic usage, and (c) notation of conceptual questions that arise during interpretation, (3) development of emergent themes, (4) identification of connections across emergent themes, and (5) bracketing and journaling personal reflections before moving to the next case.

During the process of content analysis, the researcher was challenged to transform the data collected for each case into informational codes that helped categorize the data (Chenail, 2012). The NVivo software provided the researcher with substantial capability in performing this step of the protocol. By importing the notated transcript files from the three interview sessions for each case independently, the source data could be categorized using the node functionality within the software. Following the IPA method, the comments and notes were methodically analyzed to produce a set of themes or nodes in chronological order, based on how they emerged in the interview.

The final stage of analysis in a collective case is to look for patterns of themes across cases. The approach of analysis suggested in the IPA method is to align the themes of each case in a tabular fashion to visually identify recurrent or major themes across cases (Smith, et al., 2009). Using this approach to analysis, a theme was required to have been present in the results of more than half of the cases, or four out of the six subject cases, in order to be considered recurrent. The first author utilized the data collected from the six subject cases for the analysis of the collective case. In addition to looking for points of convergence and commonality in themes, this step of analysis also allowed the researcher to identify areas of divergence and individuality. It is from this final analysis the findings of the study are derived and the final report was produced.

## Results

The first author utilized the data collected from the six subject cases for the analysis of the collective case, providing a view of the collective case as a singular entity, rather than a compilation of individual reports. The results for the collective case were compiled to report patterns in narrative themes and identification of recurrent themes related to practices and intentions associated with establishing presence. While each of the participants' personal accounts are highly individual, there were themes in responses that were identified from the narrative summaries.

Using temporal references to associate specific actions to the phases of course delivery, the collective case analysis revealed the similarities and differences among the individual activities undertaken by the six subjects when establishing teaching presence. The tabulation method of identifying patterns across cases confirmed the recurrent actions reported at a collective level and are displayed in Table 1. Of the recurrent actions identified, those unanimously reported by all participants were considered as primary actions taken while establishing presence and annotated as PRI in Table 1.

	<i>Davina</i>	<i>Dominik</i>	<i>Karissa</i>	<i>Leighton</i>	<i>Pavia</i>	<i>Yosef</i>	<i>Recurrent</i>
<b><i>Actions in Preparation for Course</i></b>							
Content Review	Yes	Yes	Yes	Yes	Yes	Yes	Yes (6) PRI
Develop Instructional Plan	Yes	Yes	Yes	Yes	Yes	Yes	Yes (6) PRI
Topic Familiarization	Yes	Yes	Yes	Yes		Yes	Yes (5)
Supplement Course Material	Yes	Yes		Yes		Yes	Yes (4)
Check Course Schedules	Yes			Yes	Yes	Yes	Yes (4)
Check Technology	Yes		Yes	Yes	Yes		Yes (4)
<b><i>Actions in Preview Period</i></b>							
Form Authentic Relationships	Yes	Yes	Yes	Yes	Yes	Yes	Yes (6) PRI
Send/Post Welcome Letter	Yes	Yes	Yes	Yes	Yes	Yes	Yes (6) PRI
Initiate Interactions	Yes	Yes		Yes	Yes	Yes	Yes (5)
Note Attendance and Participation	Yes	Yes	Yes		Yes		Yes (4)
Post Announcements	Yes		Yes	Yes	Yes		Yes (4)
Build Rapport	Yes	Yes		Yes		Yes	Yes (4)
Available for Support / Assistance		Yes	Yes	Yes		Yes	Yes (4)
<b><i>Actions During First Week</i></b>							
Available for Support / Assistance	Yes	Yes	Yes	Yes	Yes	Yes	Yes (6) PRI
Initiate Interactions	Yes	Yes	Yes	Yes	Yes	Yes	Yes (6) PRI
Set Expectations	Yes	Yes	Yes		Yes	Yes	Yes (5)
Build Rapport		Yes	Yes	Yes	Yes	Yes	Yes (5)
Shared Responsibility for Learning		Yes	Yes	Yes		Yes	Yes (4)
Note Attendance and Participation	Yes		Yes	Yes	Yes		Yes (4)

Table 1. Collective Case: Recurrent Themes in Establishing Teaching Presence (Temporal Context)

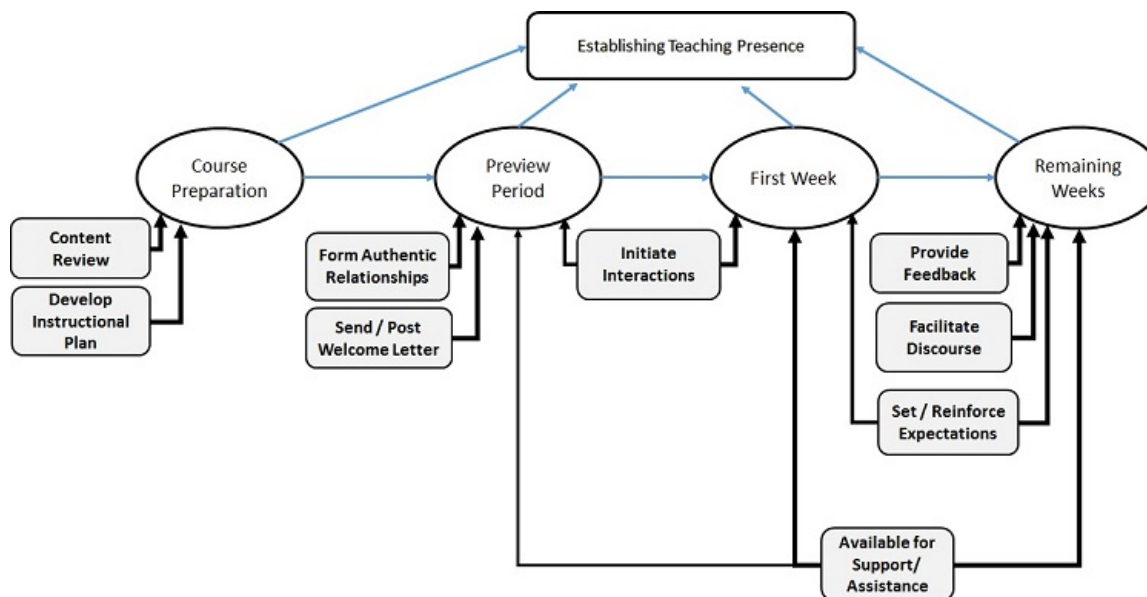


<i>Actions in Remaining Weeks</i>							
Available for Support / Assistance	Yes	Yes	Yes	Yes	Yes	Yes	Yes (6) PRI
Facilitate Discourse	Yes	Yes	Yes	Yes	Yes	Yes	Yes (6) PRI
Provide Substantive and Constructive Feedback	Yes	Yes	Yes	Yes	Yes	Yes	Yes (6) PRI
Reinforce Expectations	Yes	Yes	Yes	Yes	Yes	Yes	Yes (6) PRI
Post Announcements	Yes		Yes		Yes	Yes	Yes (4)
Shared Responsibility for Learning		Yes	Yes	Yes		Yes	Yes (4)

*Table 1 (cont).* Collective Case: Recurrent Themes in Establishing Teaching Presence (Temporal Context)

\*PRI denotes primary action

A visual representation was constructed to provide a contextualized understanding of the sequence of actions taken to establish presence within the temporal framework of the course. Figure 1 provides this representation, showing those themes (shaded) that were considered primary actions (PRI) for each of the phases of course delivery.



*Figure 1.* Contextual representation of primary actions (PRI) in establishing teaching presence.

The interviews provided insight with respect to the intentions of the instructors as they revealed the reasons behind the actions taken when establishing teaching presence. For example, the following are excerpts of quotes by instructors (as presented in Orcutt, 2016):

Participant Dominik (instructor) "... to establish a relationship with the students, respect the students, respect the fact that they may know things, about things that you the instructor don't know that can be helpful in the class, and that the instructor can walk away with some insight that they had not considered. But to me the biggest thing is to respect the students. Don't try to be the overbearing authority." (Orcutt, 2016, p.120).

Participant Leighton (instructor) "... it's trying to get to know the student, get to know their work life experiences ... the other thing that I emphasize is that the connection I have with the students is more than the four modules that we're together, I really want to know this person, I really want to as a professional stay in touch and continue to help in ways that would benefit their career..."(Orcutt, 2016, p.151).

The analysis of the collective case revealed three primary intentions as recurrent themes underlying the actions of the instructors: (a) to ensure engagement and interaction that supported learning, (b) to connect with students in authentic ways, and (c) to serve as a resource to share experiences and knowledge that guides learning.

To understand which of the actions of instructors supported and fulfilled these intentions, a cluster analysis based on word similarity within the themes was performed with the merged data to identify relationships between the actions taken in establishing presence and the identified intentions. Figure 2 provides a visual representation of the results. Only those actions showing a coefficient value of .80 or greater are depicted in the representation, to provide greater clarity in understanding the primary actions associated with fulfilling instructors' intentions. As depicted in Figure 2, the identification of three key actions most greatly related to fulfilling all three intentions also emerged from this analysis: forming authentic relationships with students, building rapport, and setting and reinforcing expectations. Using the Pearson correlation coefficient generated from the cluster analysis as a measure of the relationship between the actions and the intentions, it was determined that overall instructors' actions in establishing presence most greatly supported the intention of ensuring engagement and interaction that supported learning ( $r=.955$ ).

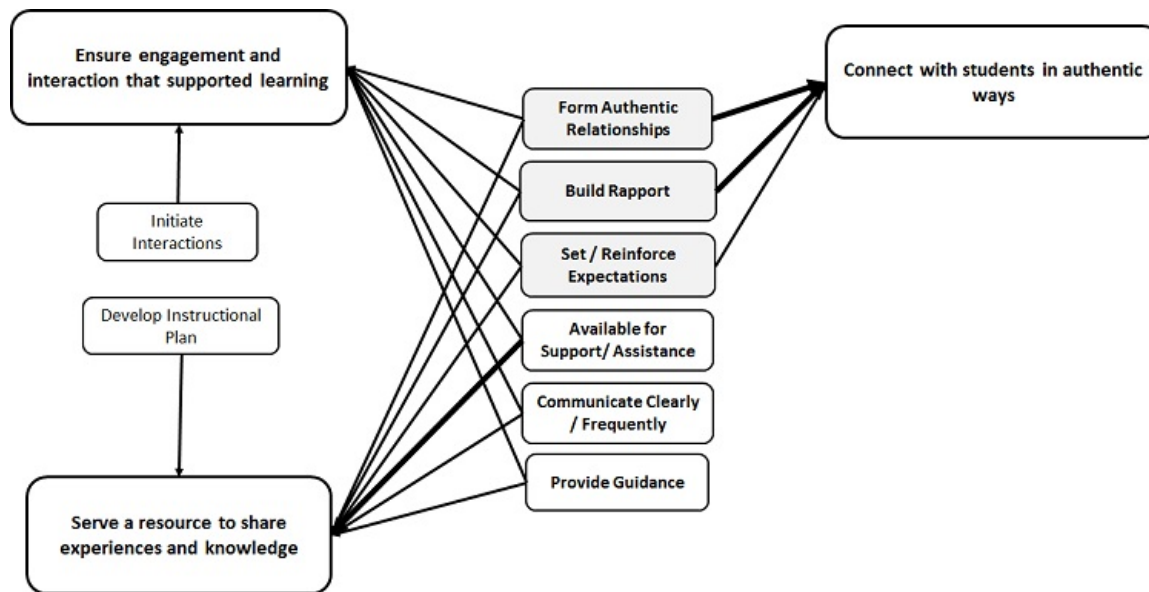


Figure 2. Recurrent themes in intentions related to practices establishing teaching presence.

Further exploration of the collective case was conducted with respect to those practices identified as related to setting the academic tone of courses and inspiring intellectual curiosity of students. Although a number of themes were associated with setting the academic climate, the

primary recurrent theme that emerged from analysis of the merged results was setting and reinforcing expectations.

Participant Davina (instructor): “Let’s face it, the subject can be boring if you don't bring any positive energy to it, so being creative in terms of how you set the tone in your class room ... let the class know what you expect of them, in the very beginning be present in the module discussions so you get a clear understanding of what types of students you have, so you can help to guide them as they move forward ...” (Orcutt, 2016, p.105).

Participant Dominik (instructor): “The academic tone is generally directed at getting students to think out of the box ... bringing out critical thinking instead of just marketing talk ... it’s trying to get the students to think originally, using research literature sources for information and not just trade press. ... it’s encouraging the students to look at the research slash academic or scholarly literature about what’s going on in the field that may be in the laboratory but not in the office yet” (Orcutt, 2016, p.120).

Figure 3 provides a visual representation of these recurrent themes and relationships that emerged during this analysis of the actions related to setting academic climate and inspiring intellectual climate.

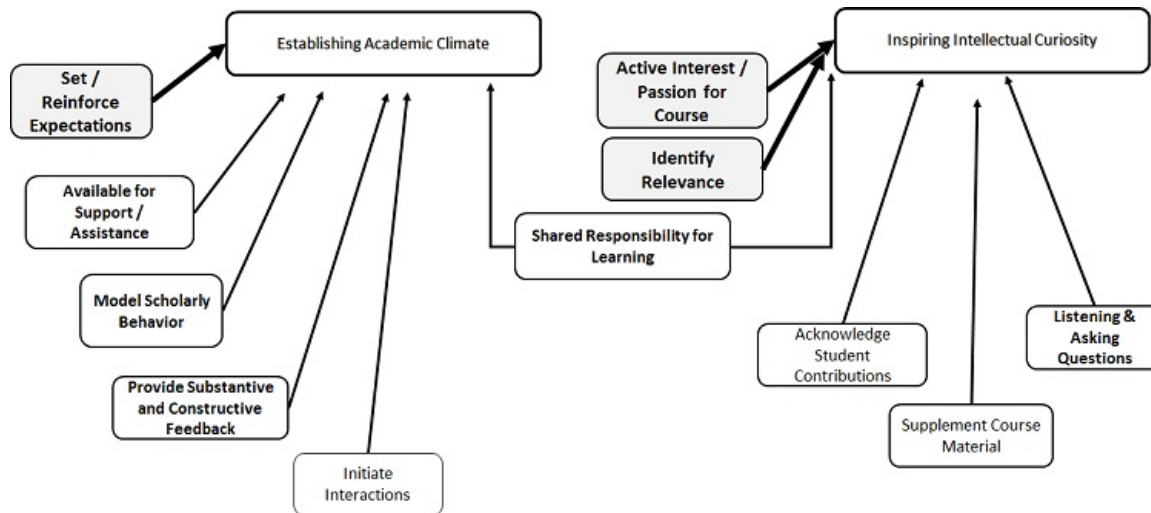


Figure 3. Recurrent themes related to setting intellectual climate.

The analysis relating to inspiring intellectual curiosity resulted in the identification of two primary recurring themes: showing an active interest or passion for the course and identifying relevance of the course for students. The collaborative atmosphere created by promoting a shared responsibility in the learning process in the classroom had an influence on both academic functions and was demonstrated mostly through acknowledging students contributions.

Participant Dominik (instructor): “One of the things that I tell students at the very beginning is that there may be areas in the course where any particular student is more knowledgeable than anybody else in the course and has relevant experience that can be shared and should be shared to allow everybody to take advantage of that” (Orcutt, 2016, p.120).

## **Discussion**

### **Meaning of Teaching Presence**

Of importance to the study was the meaning “teaching presence” held for instructors. To support the determination of whether a consistent meaning of teaching presence was shared by the participants, descriptors were used in interpreting their responses related to what teaching presence meant to them. A single recurrent theme was expressed in the participants’ perception of what teaching presence meant to them: the articulation of teaching presence in the terms of responsiveness to students’ needs and expectations. The perspective of teaching presence offered in the collective case is indicative of the instructors’ recognition that responding to needs and expectations of students establishes that environment of trust which precipitates the formation of a community of learning where teaching presence is experienced (Cox-Davenport, 2010; Kaufmann et al., 2015). This suggests a high degree of student-centeredness in the instructors, recognizing the supportive nature of the role in which they serve and how essential it is to the cohesion of the learning group. Although in the Community of Inquiry (CoI) model teaching presence is defined in terms of facilitation of discourse and direct instruction, this interpretation reflects the close relationship teaching presence has with social presence while it is being established in the online classroom.

### **Practices in Establishing Presence**

Within the temporal context of course delivery, the study identified four phases of delivery that served to reference the sequence of activities undertaken by instructors when establishing their presence in the online classroom: (1) course preparation, (2) preview period, (3) first week of instruction, and (4) remaining weeks. Of these four phases, the first three are associated with establishing presence, while the last is associated with maintaining presence.

Across the interviews, instructors exhibited a different tone while describing the initial activities when establishing presence whereby the instructors conveyed a common belief that they had to proactively initiate the interaction with students, possibly before the student even logged in for the first time. During the course preparation period prior to students having access to their online courses, the primary actions taken by instructors were to perform a thorough content review and develop an instructional plan. In this way, instructors conveyed their personality in the course content providing a sense of presence when they were not physically online with students. When students were provided access to their courses, during the preview period, the initial action commonly taken by instructors was to send or post a welcome message that communicated more than logistical aspects of the course, providing an introduction to the human qualities of the instructor. This form of personal disclosure provided a means to find connections with students upon which authentic relationships could be formed. However, the outreach to students extended beyond the welcome email, indicating a differentiation exists in mindset as well as action from common practices.

The analysis of the collective case revealed that after the initial interaction through the welcoming post, all instructors took a proactive stance during the first week of the course by initiating interactions with students, rather than waiting to respond to actions taken by students. This outreach to students not only confirmed instructors’ availability to provide support and assistance, but also communicated a direct interest in the student being an active participant in the learning process.

Although this study focused on the actions related to establishing teaching presence, which predominantly involved the actions taken at the beginning of a course, there were commonalities that were conveyed about the remaining weeks related to maintaining a presence in forums. A common activity in all online instruction is the instructor's engagement of students in the discussion forums by posting responses and facilitating the interaction among students.

A notable difference was observed in the way the instructors described their interaction with students in the forums. Most described it as more than "posting to forums" indicating a desire to help students gain new perspectives on the topic or elevate their investment in the discussion. There was a level of humility expressed in the recognition that the students could often have greater knowledge on specific topics, and they deferred to that experience, and felt they learned from their students in each course they taught. Most acknowledged that their high level of presence at the beginning of a course created a momentum in the discussions; however, when they recognized that students took responsibility and were engaging with each other, they stepped back from the participation and focused on providing feedback on assignments but kept a watchful eye on participation being ready to jump back in if interaction decreased significantly. However, when they did participate in forums in later parts of the course, they described a higher level of interaction, with the intent of challenging or advancing their students' participation beyond mere posts. Most expressed a sense of pride in the ownership that their students took in the forums.

### **Intentions of Instructors**

The intentions behind the pedagogical choices revealed by the participants related to ensuring that an active participation in the learning process occurred in the courses taught by the subjects, based on a recognition of the role the instructor serves while interacting with students in an authentic way. The actions that primarily supported the fulfillment of these intentions were identified to be: forming authentic relationships with students, building rapport, and setting and reinforcing expectations. The intentions of instructors echoed the interpretation they had of teaching presence, in which being responsive to student needs and being available to support and guide them established the role of the instructor as a facilitator of learning.

### **Influence on Academic Climate and Intellectual Curiosity**

The analysis of the collective case revealed that by setting and reinforcing expectations for performance and participation, instructors established an academic tone of expected engagement, thereby supporting their intention of creating engagement and interaction that supported learning. Instructors intentionally relayed the message to students that they had a genuine interest in sharing knowledge and experiences that had relevance to the students. Through their actions, instructors set the expectation of a shared responsibility for learning that relied on engagement and interaction among the student peers. As a collegial relationship was formed, instructors created an active interest in the course topics which not only increased engagement in the learning process, but inspired individual investigation and inquiry that contributed to group learning as well as advancement of personal learning related to the topics of the course. These insights suggest that the ability to understand what is relevant to students and encourages them to delve deeper academically has its roots in the authentic relationships formed between instructor and student, providing the instructor with the insight as to what motivates and ignites students' curiosity.

## Conclusions and Future Research

The findings of this study provide insight into the overarching question that guided this study, how instructors establish teaching presence and inspire intellectual curiosity in their courses. Overall, the collective case revealed an active interest and passion for teaching that encouraged student participation and engagement and inspired a shared responsibility for the learning process, supporting Akyol and Garrison's (2011) assertion that teaching presence becomes a shared responsibility of both instructor and students, with student participation being highly influenced by the instructor's actions. The findings show that the common goal of learning shared by instructor and student had its foundations in the creation of authentic relationships between instructor and students.

The results indicate that actions that produce a high level of visibility must be accompanied with intentional social and cognitive practices that are valued by adult learners. Pedagogical approaches must have both social and cognitive dimensions in order to establish an active teaching presence. As the intentions behind these pedagogical choices were explored, instructors repeatedly described the decision to take a proactive stance in establishing relationships with students to successfully gain the trust and respect that forms the foundation of authentic relationships. This intention of interaction extends beyond a welcome letter, and solicits students' participation by providing relevant connections to the course topics at the very start of the course. The instructor sets an academic tone through his or her own actions and enthusiasm for the course, conveying a genuine interest in supporting the student through the learning process (Costley, 2015; Kyei-Blankson et al., 2016). By communicating an expectation of shared responsibility and common learning goals, the instructor creates an environment for open exchange of information and inspires collaboration among student peers.

As interpreted from the accounts of the instructors, a key action that influenced the intellectual climate of a course was to create an inclusive and equitable learning environment. When contributions of students are not only encouraged, but respected and acknowledged as valuable, students are inspired to independently explore concepts related to the course in order to share the knowledge with peers or apply that knowledge to their own circumstances. Key to creating this environment is an instructor's willingness to share the responsibility of teaching, not just learning, promoting collaborative and engaging interaction that develops critical thinking (Costley, 2015; Kyei-Blankson, Ntuli, & Donnelly, 2016). This reciprocal relationship in the teaching and learning process, whereby instructors are confident enough to defer to students' experiences and knowledge, creates a teaching presence that is a shared agency in intellectual development that extends beyond the individual instructor (Tsiotakis & Jimoyiannis, 2016).

The essence of "presence" is a mindset for extending activity between student, instructor and content. The presence mindset is not one-dimensional; its multi-dimensional nature extends the reach 'beyond just being there'. Emerging from this research are opportunities for future research that will broaden the understanding of the nature of teaching presence and the practices used to establish it in the online classroom. As this research included data from student evaluations of faculty/instruction quality from selected archived courses, we recognize that student evaluations do not necessarily represent or translate to student performance. Thus, future research could also investigate the nature of teaching presence practices and shared agency that lead to evidence of student performance. In addition, the selection of a research site where all instructors utilized the same technology and the same instructional delivery procedures eliminated a level of variability that exists in other institutional settings, but confined the generalizability of the findings.

Specifically a suggested area of research is to determine whether experienced instructors in different educational settings using both prescribed and unstructured delivery approaches express similar attitudes and practices. Research could also extend inquiry to understand the presence mindset among faculty given varying demographics (i.e., academic disciplines, online teaching experience, teaching experience in general). For example, faculty teaching in the STEM fields may not have formal training in facilitating effective online and blended learning practices. Studies such as these suggested may provide external validity to the findings of this study and increase the generalizability to contexts beyond the structured delivery environment.

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# Student Perceptions of the Use of Multimedia for Online Course Communication

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## Abstract

A great deal of research exists in the use of multimedia communications in online classrooms as a means of furthering student engagement. However, little research exists that examines the perceptions of students when such technologies are used. Additionally, it is unclear that students are likely to engage in the use of such technologies when available. This research explores the perceptions of 69 students taking both online and hybrid undergraduate project management courses. Specifically, the study seeks to explore how students experienced the use of multimedia by their instructor and classmates in both online announcements and discussions, as well as whether these same students used or would be likely to use multimedia for similar communications. Finally, student perceptions of social presence, the degree to which one is perceived as a real person in computer-mediated communication (Gunawardena, 1995), are examined. The results of the study indicate that while students overwhelmingly enjoy the instructor's use of multimedia communication, they are unlikely to engage in using these technologies themselves. A discussion of these results and recommendations for further research complete this paper.

*Keywords:* online classes, multimedia communications, social presence

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.v21i3.1198

## Introduction

While there are numerous best practices that suggest how instructors should engage with students in online discourse, there is little known about students' attitudes and perceptions of these practices. Some best practices include using small discussion groups (Dixson, 2010), rapport and trust building (Ragan, 2007), student-led discussions (Pelz, 2004), promoting constructivist thinking through stimulating questions, brainstorming, and comparing ideas (Muilenburg & Berge, n. d.), and building a warm and inviting learning community by welcoming students, posting personal introductions, and providing lots of encouragement (Ragan, 2007). Results of studies in these areas suggest that students are more satisfied with their online experience when such approaches are implemented. However, faculty still lament that online discussions often lack significant engagement and quality (Morrison, 2012).

Significant research exists in the use of multimedia in online courses that use both synchronous and asynchronous technologies. Computer-mediated technologies in online courses have been available for many years and include videos, web chats, instant messaging, and synchronous classroom environments. However, little is known as to whether students value these

tools as a means of engaging with class peers and instructors, or whether these tools help to “humanize” the instructor or peers to students. Less is known whether students themselves will choose to use these tools as a means of participating in discussions, thereby increasing engagement.

## Literature Review

The review of current research focuses on three factors in online class discussions; best practices, the use of computer-mediated technologies, and the importance of both instructor and social presence.

### Online discussion best practices

While there are obvious differences in an online environment versus a face-to-face one, relationship building is key to a successful environment no matter the modality. For instance, research suggests that communication with intention matters (Cerniglia, 2011). Communicating with intention includes how an instructor communicates with the written word. For example, feedback on assignments should vary based on the student’s ability (Cerniglia, 2011). Written communication strategies include timeliness, having a student feel valued, and explicitly asking questions of the student in order to encourage a conversation (Cerniglia, 2011).

In addition to how instructors communicate through the written word, a teacher’s effectiveness level increases with video communications (Cerniglia, 2011). For example, sometimes writing can be overwhelming to a student to read, however a video can create a more engaging environment not only for the student but for the instructor (Cerniglia, 2011). Video feedback can also enhance engagement through more timely and easily understandable feedback (Crook, Maw, Laweson, Drinkwater & Lundqvist, 2012). Supporting this research, Dias and Trumpy (2014) provided timely audio and video feedback—either personal or general feedback enhanced social presence and student’s perception of instructor engagement was higher with these methods, as opposed with just use of the written word to communicate with students.

Finally, discussion boards are an effective tool for learning; however, instructors need creativity in how discussion boards are implemented and used. Not only should discussion boards be open ended in nature, but other considerations include encouraging students to “extend, expand on, question, or challenge ideas” (Cerniglia, 2011, p. 58). Any strategy that allows the expansion of student experiences and stories in the discussion boards deepens the learning and helps to focus the conversation (Cerniglia, 2011). In addition, Sung and Mayer (2012) indicate discussion boards can be helpful for faculty in creating positive social presence for themselves, but “social sharing” can build community.

The challenge with discussion boards is balancing how time consuming discussion boards can be for students and instructors compared to the learning the discussion board is attempting to demonstrate (Goldman, 2011). The success of the online learning environment is highly dependent on the quality implementation of online discussion boards (Maddix, 2012). Unlike a physical classroom, the ability for every student to participate is an advantage of online learning (Maddix, 2012). Discussion guidelines include a focus on design and development of the questions, setting up expectations on responses, and launching and managing the discussion (Goldman, 2011). In giving time and attention to a discussion guideline document, an instructor can implement the best

balance between the learning experience of the student, the quality of the discussion and learning, and the workload for all parties (Goldman, 2011).

One element that is critical for the instructor in the discussion board learning environment is the clear expectation of a substantive interaction (Maddix, 2012). Substantive interactions would include a focus on three elements of timeliness, effectiveness of writing, and how the student is expressing the knowledge elements necessary in learning the material (Maddix, 2012). Faculty can increase their effectiveness in learning how to ask good questions through using Bloom's Taxonomy, the Socratic Method, showing a different way of looking at a topic by playing devil's advocate, and relating ideas to personal experience (Maddix, 2012).

Essentially, through focusing on the discussion board elements, a learning community is formed (Hilton, 2013; Maddix, 2012). Learning communities are strengthened by how relationships are built in an online environment and the tools available to the student and the faculty member in the learning management system (Hilton, 2013). A faculty can enhance the ability to encourage different viewpoints by demonstrating contrasting viewpoints in sources of information and demonstrating that all viewpoints are part of the whole and contribute to the full understanding of a topic (Hilton, 2013).

Ultimately, the quality of discussion boards is under scrutiny as a measure of assessing student thinking (Williams, Jaramillo & Pesko, 2015). Research suggests that the ability for students to obtain a higher level of discourse is dependent upon the ability for an instructor to explicitly express expectations on the quality of these interactions (Williams, Jaramillo & Pesko, 2015). These expectations will be reinforced through grading expectations, including commenting on a student's ability to go beyond socializing to convergent and divergent thinking by providing examples of when these levels of thinking are achieved (Williams, Jaramillo & Pesko, 2015). To increase the effectiveness of discussion boards in learning, a higher level of engagement is required by all parties in the learning experience.

### **Computer-mediated technology**

Using the computer to facilitate human communications can have both advantages and disadvantages in online classrooms. Frequently, student engagement is measured in terms of the number of interactions in the classroom (Dixson, 2010). However, the quality of the content, specifically, the instructor posts has been shown to be an equally important factor. While instructor facilitation may help lead the discussions and encourage a deeper connection with the content, students more fully engage with their peers in the discussions (Dixson, 2010). The quality of content seems to be an important part of the student engagement in the online discussions (Canney, 2015; Lowes, Lin, Wang, 2007). In addition, Lowes et. al (2007) confirmed that the quality of the interaction between instructor and student helped further engagement in online discussions. Additional information as well as provocative or probing questions were two examples of techniques that furthered engagement (Canney, 2015).

### **Social presence theory and application**

Dixson (2010) indicates that students that were highly engaged with other students in their course were more satisfied with their course experiences. The instructor role was that of facilitator, encouraging a deeper level of discussion. Social presence theory classifies various types of communication along a continuum. Sallnas (2000) defines social presence as the degree of awareness of the other person in any given communication. For example, face-to-face

communication has the highest social presence, while written or text-based communication has the least social presence. The social presence, in the online classroom, includes the extent to which the instructor is perceived as a real person, as opposed to a webmaster. This presents an interesting challenge to online instructors: how to create a social presence online while utilizing mediums that may be limiting. The role of an online instructor is that of a facilitator, organizer, and manager (Cooper & Hendrick-Keefe, 2001). Understanding this is key to understanding the use of multimedia in creating social presence in the online classroom.

In an online classroom, there are eight possible social presence cues identified by Abdullah (1999) and Rourke, et al. (2001). These cues include humor, emotions, self-disclosure, support or agreement for an idea, addressing people by name, greetings, complimenting another's idea, and illusions of a physical presence.

- Humor: Use of humor in the online classroom, such as through announcements or emails can reduce social distance and conveys goodwill (Aragon, 2003).
- Emotions: Showing emotions to students such as happiness can add clarity to a message and forge connections (Scollins-Mantha, 2008). Sharing of feelings and emotions using emoticons in emails to students, for example, is a way to do this in writing (Tu & McIsaac, 2002).
- Self-disclosure: While instructors may hesitate to share personal information, sharing of some personal information can build the online relationship between student and instructor. For example, noting in an email your plans for the weekend "I am going kayaking, do you have big plans for the weekend?" posting pictures of the instructor performing his or her favorite activity can also heighten social presence, (Savery, 2005).
- Support or agreement for an idea: Through online feedback such as discussion boards and allowing students to peer review posts and assignments, the instructor can generate social presence in this manner.
- Greetings and addressing students by name: Rather than simply replying to an email or communication, saying, "Hi Lisa," or "Good afternoon, Roger" can create greater social presence online.
- Complimenting: Telling students of a job "well done" or "keep up the good work" on assignment feedback can enhance instructor social presence, and develop confidence and connection in the online classroom (Scollins-Mantha, 2008).
- Illusions of a physical presence: Social presence in this manner (Johnson & Keil, 2002) can be accomplished through synchronous tools such as audio or video recordings, feedback, and lectures. Instructors must understand the isolation felt by students when communication lags (Tu & McIsaac, 2002).

Based on this information, the focus of this paper is an important topic—how are student attitudes and perceptions affected by using multimedia tools? The purpose statement and research will be presented in the forthcoming sections.

## Methods

The purpose of this quantitative study was to explore the attitudes and perceptions of students to the use of multimedia in online class discussions and announcements posted by their instructor. The research question guiding this study was “what are student attitudes and perceptions of the use of multimedia tools for announcement and discussions posts in online and hybrid courses?”

### Study Design

The intention of this study was to uncover the attitudes and perceptions of students to the use of multimedia, both voice and web camera enabled communication in online class announcements and discussions. A survey-based approach was used to gather data and simple statistical analyses were performed as a means of exploring these responses. Students in three undergraduate project management classes at a university in central Washington State were the subject of this study. Two classes were fully online and one was offered as a hybrid class. Approval had been obtained by the institutional review board before proceeding with data collection.

Five questions were added to the end of term student course surveys. These questions were intended to gauge the student’s review of the multimedia responses posted by the instructor, as well as their own use of such multimedia tools. Finally, students were asked if they felt that the use of multimedia, either voice or web camera helped them identify with their instructor or classmates more as real individuals. Appendix A contains the questions.

The university where the study took place uses Canvas as the learning management system. Canvas allows the recording of both audio and video as an alternative to text for announcements, discussion responses, and instructor feedback. Both instructors and students may use these technologies without limitation. At the beginning of the course, the instructor encouraged students to participate by engaging in discussions using the multimedia method of their choosing. Instructions were provided to students and regular encouragement was given throughout the course.

### Methodology

The study questions were added to the standard end of course student evaluation survey and students were incentivized to complete the evaluations by earning a small number extra credit points when the overall class percentage of completion hit 80%. The data were obtained from institutional effectiveness and processed through SPSS.

## Results

The student response rates for the three classes are listed in Table 1.

		Frequency	Percent	Valid Percent
Valid	ADMG 374 On Campus	27	48.2	48.2
	ADMG 374 Online	20	35.7	35.7
	IT 376 Online	9	16.1	16.1
	Total	56	100.0	100.0

Table 1. Number of participants by class and modality



The results for each question were analyzed cumulatively across the three courses and are as follows:

Question 1: During this term, your instructor used multimedia methods of communication, specifically voice recordings and web camera recordings to communicate announcements and participate in the class discussions. How often did you view or listen to these recordings?

With N=56 students responding to this question, over half the students surveyed (31) reported that they Always or Frequently viewed or listened to multimedia posts. Table 2 contains the student responses.

		Frequency	Percent	Valid Percent
Valid	Never	6	10.7	10.7
	Rarely	4	7.1	7.1
	Occasionally	15	26.8	26.8
	Frequently	17	30.4	30.4
	Always	14	25.0	25.0
	Total	56	100.0	100.0

Table 2. Responses to Question 1

Question 2: If you listened to or viewed these recordings, did you find them useful?

With N=55 students responding to this question, again over half of those responding (37) indicated that the multimedia was useful. Table 3 contains the responses.

		Frequency	Percent	Valid Percent
Valid	Never Listened	4	7.1	7.3
	Rarely Useful	3	5.4	5.5
	Occasionally Useful	11	19.6	20.0
	Frequently Useful	21	37.5	38.2
	All were useful	16	28.6	29.1
	Total	55	98.2	100.0
	Missing	1	1.8	
	Total	56	100.0	

Table 3. Responses to Question 2

Question 3: During this term, your instructor encouraged you to use multimedia, specifically voice recordings and web camera recordings to respond to announcements or discussion posts. How often did you participate by using voice recordings or web camera recordings?

Here, N=56 students responded to this question and more than half (39) admitted that they Never or Rarely used this technology themselves to respond to discussions or announcements. Table 4 contains the responses.

		Frequency	Percent	Valid Percent
Valid	Never used	24	42.9	42.9
	Rarely used	15	26.8	26.8
	Occasionally used	5	8.9	8.9
	Frequently used	7	12.5	12.5
	Always used	5	8.9	8.9
	Total	56	100.0	100.0

Table 4. Responses to Question 3

Question 4: If you participated using voice recording or web camera recordings, did you enjoy the experience?

While 19 students admitted that they did not participate in discussions, those that did Somewhat Enjoyed or Enjoyed the experience (30). Table 5 contains the responses.

		Frequency	Percent	Valid Percent
Valid	I did not participate	19	33.9	34.5
	I did not enjoy the experience	6	10.7	10.9
	I somewhat enjoyed the experience	13	23.2	23.6
	I enjoyed the experience	17	30.4	30.9
	Total	55	98.2	100.0
	Missing	1	1.8	
	Total	56	100.0	

Table 5. Responses to Question 4

Question 5: If you used multimedia tools, either by listening to or viewing the recordings or by recording responses yourself, did you feel the experience helped you relate to your faculty or fellow classmates as real people?

Of the N=56 students that responded to this question, the majority (37) reported that the multimedia recordings were Somewhat helpful and Definitely Helpful in helping them relate to their instructor and classmates as real people. Table 6 contains the responses.

		Frequency	Percent	Valid Percent
Valid	I did not use these tools	9	16.1	16.1
	I did not feel them helpful in relating	10	17.9	17.9
	I found them somewhat helpful in relating	17	30.4	30.4
	They were definitely helpful in relating	20	35.7	35.7
	Total	56	100.0	100.0

Table 6. Responses to Question 5

### **Possible Errors**

Internal and external validity issues may stem from the classes chosen to study, feeling toward the instructor, and overall student performance. Different results may occur if these were not online or hybrid courses, but fully on-campus courses. In addition, there may be variance between student's attitudes about school and performance online and hybrid students. It is questionable whether this study could be generalized over long periods of time, and the classes studied may not be a representation of the general population.

### **Discussion**

Two distinct findings were identified in these results. The first was that while students admitted to watching these multimedia posts (31 of 56), found them useful (37 of 55) and enjoyed the experience (39 of 56), students chose not to participate in using multimedia for their own responses, even though instructions and encouragement were provided throughout the course and the technology was readily available within the learning management system. While students responded positively to the experience, they did not themselves engage with these tools. This finding may support the construct of trust as a best practice for discussions (Kelly, 2008). Students who feel uncertain or vulnerable may be unlikely to take risks.

Second, while these same students admitted that they did not participate in the use of multimedia tools themselves, they believed that these tools helped them relate more to their instructor and classmates as real people (37 of 56). This was especially interesting as it represents an attitude that students may wish to have a more intimate relationship with their instructor, but on their own terms. Using multimedia can help facilitate community among the students (University Teaching & Learning Center, The George Washington University, n.d.; Ragan, 2007). A mixed methods study by Mandernach (2009) indicated in the quantitative data that there was no significant difference in student engagement or learning when multimedia was used in the online class, yet in the qualitative responses these same students felt more "engaged." This study seems to support our finding; while students value multimedia, there is a reluctance to use these tools themselves. Research performed by Miller (2013) may explain this. While students may not participate in the multimedia, it still gives the illusion of social presence, thereby adding value regardless. "Social presence is the ability of participants to identify with the group, communicate in a trusting environment, and develop social relationships by way of expressing their individuality." (Wilcoxon, 2011, para. 8), lending more importance to the use of multimedia to help establish social presence, both instructor presence and student presence.

So far, the research shows students find the multimedia addressed in this study useful, and it creates greater social presence, but the question remains, why don't they use the multimedia tools provided to them? Some possibilities are lack of comfort with technology, a lack of understanding of how their grade may be impacted by using multimedia for discussion responses, and a tendency to desire maximizing their time and approach class completion in a transactional manner.

First, lack of comfort using the technology, and/or the fact students may be unsure of how to use the technology could be a reason why students do not use the multimedia, despite the advantages the student finds with such tools. It is important to note 14% of all higher education students are taking 100% of their courses online while another 14% takes some of their courses online (Allen & Seaman, 2014). In addition, research shows high comfort levels with technology,

with 97.8% of students owning a mobile phone. In addition, students who are younger than 20 report frequent engagement with instant messaging, texting, use of social network sites, and downloading or streaming TV and video (Jones, 2012). Those students under 20 are comfortable using many methods of technology, while of those students over 35, 78.5% never use social networking sites and other similar forms of technology. It would be expected with the high frequency of online course offerings combined with comfort levels in technology, students would not find classroom and learning management system technology a challenge to use. Further, one would expect students would be comfortable using the multimedia options available to them.

Early research by Rodriguez Ooms & Montanez (2008) shows comfort with technology is not related to student satisfaction in an online course, but rather, comfort level is related to the individual student motivation to learn how to use the technology. This could be a possible reason for not wanting to use the technology—motivation to learn something new.

Also, students of all ages may be comfortable using technology from a personal perspective, but not from a classroom perspective due to lack of motivation, rather than comfort levels. In addition, the research study addressed in this paper did not measure demographics, but perhaps a larger share of students in the courses were non-traditional students, less comfortable with technology on the whole as Jones (2012) research suggests. The authors believe that comfort level with use of the multimedia technology is likely not a factor in the fact they don't use the multimedia, but instead it may be simple lack of motivation to use it, despite students seeing the benefit of such multimedia technology.

Second, students want clear expectations of how assignments will be graded (Mupinga, Nora, & Yaw, 2006). Additionally, grading discussion responses tends to be more subjective and therefore more difficult to define quality expectations (Beckett, Amaro-Jiménez, and Beckett, 2010). With respect to expectations, students come to online classes with various learning styles and preferences of how they engage with course material (Mupinga, Nora, & Yaw, 2006). These preferences may manifest themselves in active vs. inactive learning or visual vs. auditory preferences. In a study conducted by Mupinga et al., students identified four key needs for support in their online classes: “technical help, flexible and understanding instructors, advanced course information, and sample assignments” (p. 187). It may be possible that students would prefer to hear examples of discussion responses that would meet quality expectations before they commit to trying multimedia for a response. One open-ended response from a student surveyed indicated that “Sometimes it is difficult to understand exactly what an instructor is looking for without being in class . . .” (p. 187). Examples may help fill these gaps.

Beckett, Amaro-Jiménez, and Beckett (2010) found that students may need clear instructions on how to complete the assignment and clear evidence of how the assignment will be graded. As a result, it has been suggested that one way to avoid the subjectivity involved in grading discussion posts is to use rubrics (Robins, 2016). While rubrics may help avoid the subjectivity of grading, Robins suggests that the use of strong rubrics without a strong instructor social presence may lead students to become apathetic, believing that the discussion is simply a burdensome task. Rubrics and instructor social presence, specifically through the mimicking of excellent examples will help students see more meaningful performance expectations. However, this still may not be enough to encourage students to engage in using social media for discussion responses unless specific performance measures are addressed through assignment instructions or examples. Students may simply lack the confidence with the process of public speaking to believe that they will successfully meet quality performance expectations.

Finally, according to Brilleslyper, Ghrist, Holcomb, Schaubroeck, Warner and Williams (2012), students tend to focus on the points accumulation within a class, thus, they tend to not focus on learning outcomes. It is possible that we design courses for learning, but the points becomes the overriding goal of the student (Kohn, 1999). This focus on points can often lead to the student that argues over a grade rather than the learning of the objectives.

In addition, in a transactional approach to learning, a student will often only ask questions that are related to deliverables and the requirements of those deliverables, and not demonstrate an inquisitive learning approach in their questions of faculty (Farias, Farias, & Fairfield, 2010). If you hear a student asking about word count, or how many pages to write, or is there an opportunity for extra credit, then these are transactional based, grade concern questions – not learning questions.

An interesting statistic was discovered by Maats and O'Brien (2012) where research was conducted on the grade versus learning dilemma. They found that 90% of students wanted a good grade, and only 6% cared about the learning. This highlights the fact that grades may not be the motivator that we think they are for learning. Thus, faculty should find ways to refocus students on learning and connections in the classroom rather than focusing solely on the grade. If faculty can move the needle on learning and natural curiosity then student behavior can move from a transactional process to a transformational process.

Additional research might further address the reasons students don't use technology and seek student perceptions. Additionally, a larger population of students, multiple instructors, and a diverse selection of courses is recommended to generalize this study.

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## Appendix A

1. During this term, your instructor used multimedia methods of communication, specifically voice recordings and web camera recordings to communicate announcements and participate in the class discussions. How often did you view or listen to these recordings?
  - 1 = I never listened to or viewed these recordings
  - 2 = I rarely listened to or viewed these recordings
  - 3 = I occasionally listened to or viewed these recordings
  - 4 = I frequently listened to or viewed these recordings
  - 5 = I always listened to or viewed these recordings
  
2. If you listened to or viewed these recordings, did you find them useful?
  - 1 = I never listened to or viewed these recordings
  - 2 = I rarely found the recordings useful or helpful
  - 3 = I occasionally found the recordings useful or helpful
  - 4 = I frequently found the recordings useful or helpful
  - 5 = I found all of the recording to be useful and helpful
  
3. During this term, your instructor encouraged you to use multimedia, specifically voice recordings and web camera recordings to respond to announcements or discussion posts. How often did you participate by using voice recordings or web camera recordings?
  - 1 = I never used multimedia to respond to announcements or discussions posts
  - 2 = I rarely used multimedia to respond to announcements or discussions posts
  - 3 = I occasionally used multimedia to respond to announcements or discussions posts
  - 4 = I frequently used multimedia to respond to announcements or discussions posts
  - 5 = I always used multimedia to respond to announcements or discussions posts
  
4. If you participated using voice recording or web camera recordings, did you enjoy the experience?
  - 1 = I did not use multimedia to respond to announcements or discussions posts
  - 2 = I did not enjoy the experience
  - 3 = I somewhat enjoyed the experience
  - 4 = I enjoyed the experience
  
5. If you used multimedia tools, either by listening to or viewing the recordings or by recording responses yourself, did you feel the experience helped you relate to your faculty or fellow classmates as real people?
  - 1 = I did not use multimedia in the class
  - 2 = I participated in the multimedia experience. However, I did not feel the experience helped me relate to my faculty or fellow classmates as real people?
  - 3 = I participated in the multimedia experience. I felt the experience helped me somewhat relate to my faculty or fellow classmates as real people.
  - 4 = I participated in the multimedia experience. I felt the experience definitely helped me relate to my faculty or fellow classmates as real people.

# Using Design-Based Research in Higher Education Innovation

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## Abstract

This paper discusses the design-based research approach used by the Center for Innovation in Learning and Student Success (CILSS) at the University of Maryland, University College (UMUC). CILSS is a laboratory for conducting applied research that focuses on continuous improvements to the university's instruction of curriculum, learning models, and student support to identify promising innovations for underserved populations in adult higher education; to drive adoption of next-generation transformational online learning; to develop new educational models based on learning science, cutting edge technology, and improved instructional methods; to help more UMUC adult students succeed by increasing retention and graduating more students in shorter time frames (thus reducing their costs). As such, leveraging technology and pedagogy in innovative ways is key to the Center's work. CILSS serves as the research and development arm for the university, promoting innovative ideas and breakthroughs in learning.

In this paper, we detail one interpretation of design-based research (DBR) and how it can be applied by an innovation center working within a university for program evaluation. We also posit that the conceptual framework and assumptions of andragogy (Knowles, 1984) have applicable relevance to the instructional shifts that include adaptive learning in the curriculum. A review of the literature on DBR explores the central features of this approach. A review of andragogy as the conceptual framework for this paper highlights what we believe to be the central features of the evaluation approach of adaptive learning software. We then present the model used by CILSS when designing and testing a pilot project. To illustrate the approach, we provide the example of a recent pilot that uses the adaptive learning software RealizeIt in UMUC's Principles of Accounting I course, a course that traditionally has lower than average success rates.

*Keywords:* Design Based Research; Innovation; Continuous Improvement; Adaptive Learning; Evaluation; Accounting; Adult Learners

Ford, C., McNally, D. & Ford, K. (2017). Using design-based research in higher education innovation. *Online Learning, 21*(3), 50-67. doi: 10.24059/olj.v%vi%i.1232

## Introduction

DBR is not so much a precise research methodology as it is a collaborative approach that engages both researchers and practitioners in the iterative process of systematically analyzing, designing, and evaluating educational innovations and interventions aimed at solving complex, real-world educational problems. Whereas traditional educational research methods are aimed at examining what works (i.e., efficacy), often *in a controlled laboratory setting*, DBR is concerned with understanding and documenting how and why the designed intervention or innovation works *in practice* (Anderson & Shattuck, 2012; The Design-Based Research Collective, 2003; Nieveen & Folmer, 2013; Plomp, 2013).

## Literature Review

### Central Features of DBR

DBR is frequently described in the literature as being pragmatic, interventionist, and collaborative. Similar to action research, DBR involves problem identification, assessment, and analysis in an applied educational setting, along with the implementation and evaluation of some type of change or intervention to address a problem. Although action research and DBR are grounded by theoretical and empirical evidence, they also privilege practical evidence, knowledge, and solutions (Anderson & Shattuck, 2012; Lewis, 2015; McKenney & Reeves, 2014; Plomp, 2013). Where these two methods typically diverge is around the premium placed on collaboration. Both Anderson and Shattuck's and Plomp's work have asserted that action research is typically performed by teaching professionals with the goal of improving their own practice rather than as a collaborative partnership with a research and design team.

Starting with the initial assessment of the problem and the specific context in which it occurs and continuing throughout the iterative design, implementation, and evaluation process, DBR relies on the collaboration of a multidisciplinary team comprised of researchers, practitioners, subject matter experts, designers, and others, including administrators, trainers, or technologists, whose expertise may be crucial to the project (McKenney & Reeves, 2014). DBR also draws from multiple theories to inform design, as illustrated by the Carnegie Foundation's Pathway program. The design was informed by theories related to student engagement, mathematics learning, learning strategies, and non-cognitive learning factors, including perseverance and growth mindsets (Russell, Jackson, Krumm, & Frank, 2013).

DBR is an iterative approach involving multiple cycles of design and in-situ testing of the design. The knowledge generated during each phase of the DBR process is used to refine the design and implementation of the intervention, which is why DBR is also considered adaptive (Anderson & Shattuck, 2012; McKenney & Reeves, 2014). This differentiates DBR from other types of educational research (Bannan, 2013), which typically involve a single cycle of data collection and analysis focused on producing knowledge.

Implementing and evaluating a high-fidelity representation of an intervention in-situ can involve a substantial commitment of funding, time, and resources. Effective planning and the use of low-fidelity rapid prototyping during the early stages of a DBR project enable the team to test their assumptions and quickly reject bad designs or to modify the design prior to implementation or summative evaluation of the intervention's effectiveness (Easterday, Rees Lewis, & Gerber, 2014).

For practitioners, administrators, and policymakers, the contextual relevance of the intervention is just as important as the methodological rigor and efficacy (Fishman, Penuel, Allen, Cheng, & Sabelli, 2013). DBR integrates design research, evaluation research, and validation research. Consequently, a variety of quantitative and qualitative research methods and design techniques are required to develop, test, and refine an intervention while generating knowledge and design principles that address the relationship between teaching, learning, and context variables (Anderson & Shattuck, 2012; Bannan, 2013; Reimann, 2016).

## Challenges Associated with DBR

It is beneficial to first consider and classify the object of research to determine whether DBR is the right approach. For example, Kelly (2013) indicated that design research may not be cost-effective for simple or closed problems. DBR may be more effective in cases in which previous solutions or interventions failed or the specifics of the problem require assessment, clarification, and solution design. According to Kelly, DBR is indicated when one or more of the following conditions are present:

- When the content knowledge to be learned is new or [is] being discovered even by the experts.
- When how to teach the content is unclear: pedagogical content knowledge is poor.
- When the instructional materials are poor or not available.
- When the teachers' knowledge and skills are unsatisfactory.
- When the educational researchers' knowledge of the content and instructional strategies or instructional materials are poor.
- When complex societal, policy or political factors may negatively affect progress (p. 138).

DBR entails multiple cycles of design and implementation refinements that can span multiple semesters or even years, during which collaborative partnerships, resources, and funding may be constrained or overtaken by competing priorities (Anderson & Shattuck, 2012; The Design-Based Research Collective, 2003). DBR considers not just design efficacy but also the conditions that impact the effectiveness of implementation in practice. Yet without a plan for actively managing project scope during these iterations, the DBR team runs the risk of gold plating an intervention to account for every possible permutation in the implementation environment or pursuing additional incremental improvements that exceed the purpose, goals, and requirements of the project. Criteria must be established to guide decision-making about whether or when to abandon, adapt, or expand a design (Dede, 2004). Generally, CILSS abandons a pilot project when outcomes appear harmful to students, for example, by harming learning outcomes or grades. An iteration with mixed results is usually not cause to abandon the project; rather, it is an opportunity to refine and repeat the iteration before moving on to the next stage of the pilot.

At UMUC we have created our own process flow and iteration process. CILSS generally plans on three to five iterations, beginning with one section and scaling up to a full randomized control trial (RCT) with all sections in a given term. CILSS uses a multi-method approach, including interviews, focus groups, surveys, and analytics. Ultimately, any research project culminates with randomized control trial, testing the effect of an intervention that has been developed over several iterations.

## Addressing Implementation at Scale

Implementation at scale requires greater consideration of the extent to which the intervention may interact or conflict with other variables in the learning environment, including existing policies, curriculum, assessment methods, and instructor willingness and ability to implement the intervention or change (Lewis, 2015). Interventions that worked in controlled settings or on a small scale have often failed as they are scaled up, due to variations and adaptations at the system and classroom levels (Fishman, Penuel, Allen, Cheng, & Sabelli, 2013; Penuel, Fishman, Cheng, & Sabelli, 2011). These issues can be addressed by DBR. As an extension of

DBR, Design-Based Implementation Research (DBIR) is focused on building organizational or system capacity for implementing, scaling, and sustaining educational innovations. DBIR's research focus extends to the identification and design of organizational routines and processes that support collaborative design and productive adaptation of core design principles across settings (Fishman et al., 2013; Penuel et al., 2011).

### **Conceptual Framework: Andragogy**

Andragogy encompasses a set of core assumptions about adult learners intended to inform the design and delivery of adult education (Knowles, Holton, & Swanson, 2014). These assumptions should be viewed along a pedagogical-andragogical continuum to the extent that an adult learner may differ from a child learner. According to McAuliffe, Hargreaves, Winter, and Chadwick (2009), andragogical learning design draws from theories of transaction, which focus on the context-dependent and pragmatic needs of learners.

Andragogy is a learner-centric process model. Underlying andragogy's process model is a competency model associated with a level of performance. The competency model is designed to reflect the values and learning expectations of the learner, faculty, the institution and society. An adult learner originating from previous learning environments that emphasized passive, teacher-centric learning approaches will likely require additional real-time help in developing his or her ability to engage effectively as self-directed learners (Blondy, 2007; Cercone, 2008; Knowles, 1973; Merriam, 2001).

At UMUC, performing learner and contextual analyses based on andragogical assumptions help inform the development of these competency models and the corresponding instructional design and planning at a macro-level. However, DBR is concerned with addressing persistent problems of practice. Therefore, we must also consider the variances course instructors may encounter in each learner's self-directedness, preparedness, and motivation. Knowles recognized, both conceptually and practically, that an adaptive, flexible approach was needed to address the variability of individual adult learner needs and behavior across learning situations and contexts (Holton et al., 2001). Through diagnostic experiences, self-assessment, and the immediacy and accuracy of feedback, self-directed adult learners can also monitor their own learning and development against the underlying competency model (Knowles, 1996).

Nonetheless, online asynchronous learning platforms present a challenge in terms of the lag between the revelation of an individual difference or need related to our andragogical assumptions and the individual instructor's ability to adapt the learning process or provide help or guidance in real-time—at the teachable moment. Given Holton et al.'s (2001) assertion that the primary focus of andragogy is on *how* rather than *why* adult learning transactions occur, it is reasonable for administrators, designers, and instructors to question the extent to which embedded andragogy design considerations can be executed reliably in practice at the micro-level of the individual learner and to work collaboratively to develop solutions that support both the instructor and the learner.

Researchers have indicated that learning is improved when we can personalize the learning and adapt for the student's ability by identifying problem areas and addressing them immediately (Murray & Pérez, 2015). While our DBR process is undergirded by andragogy assumptions and principles, our adaptive learning design recognizes individual adult learners' differences at the

learning transaction level to facilitate learning and provide help or guidance when mistakes are made. Among the andragogy process elements specified by Knowles that are reflected in technology-enabled adaptive learning design are diagnosis of learning needs, development of objectives, or more specifically a learning pathway comprised of content and learning activities oriented to learners' specific needs, and the evaluation of learning through the re-diagnosis of learners' needs.

### **Adaptive Learning at UMUC**

RealizeIt is an adaptive learning software that provides the availability for many learning paths to a final destination—the interaction of which alters the educational environment from a fixed setting to a flexible (adaptive) context. The core elements of adaptive learning include incremental learning; an opportunity for continual feedback for learners given regular assessment, benchmarking, indexing growth; and offers potential advantages over current online learning pedagogical approaches. RealizeIt assumes that students are not forced to learn at the average speed of the class; rather, each student can take the time individually needed to learn. This means that completion can be accomplished in a shorter time for some, while extended time to fill in gaps of learning for others will be needed. Although adaptive courseware has been successful in other institutional contexts, it was imperative for adaptive learning to be tested with the UMUC student population.

### **The CILSS DBR Model**

#### **The Problem Statement and Research Design**

Courses with high enrollment and low success rates (or lower than average success rates) are referred to as Obstacle Courses at UMUC. While the success rates for many of these courses are in fact higher than the national average, the university would, nonetheless, like to see these success rates improve. High enrollment and low success is common nationally for courses, such as Introduction to Accounting, which are required by more than one major but in which students struggle. Implementing RealizeIt was proposed as a possible way to ameliorate the low success rates in several courses. Adaptive courseware has been shown to allow students in an online environment to have their needs assessed individually with data about their abilities being collected in real time. To test whether this is the case, a piloting process that would take place over several terms was designed. This process drew on DBR research to design and iteratively improve courseware for UMUC's Principles of Accounting I to test the effectiveness of this platform (the specific adaptive learning software, with content designed and embedded by UMUC) on course outcomes in the online environment.

#### **The Team**

While CILSS is a research and innovation center, implementing a pilot requires multiple stakeholders to work together—both researchers and practitioners. As UMUC's classes are, for the most part, taught partly or wholly online, the Learning Design and Solutions department (LD&S) is a vital part of any team that aims to test the effectiveness of courseware. UMUC's LD&S is made up of cutting edge designers who are fully engaged in bringing innovation to bear on issues in higher education.

The collegiate faculty is fully involved in any piloting within their programs. The accounting department was an essential part of the RealizeIt pilot team. This was especially the case because the existing Principles of Accounting I course needed to be mapped into the RealizeIt system. As well as collegiate faculty, several subject matter experts (SMEs) were also required to validate the mapping of the course and to ensure that the existing syllabus, readings, and other class materials were embedded in RealizeIt as well as possible. It was essential that the process of embedding the course in RealizeIt was done well to ensure that the pilot was testing the effectiveness of the courseware and not held back by issues with material being improperly embedded.

### **The Iterations**

To ensure that students are not harmed by a pilot that does not benefit them and that pilots do not fail in a way that causes harm to the students or the university, several iterations of a pilot are planned in advance. At UMUC there are four separate sessions in an academic term. In the case of using RealizeIt, this meant that the platform was used initially in one course for the entirety of the eight-week session. This allowed the LD&S team and SMEs to test the prototype they created on a smaller unit of analysis and to test how well it worked, highlight any issues, and decide what could be done better in the future. After this had been accomplished, the pilot was expanded to encompass several sections in a semester. Again, problems and challenges were noted so that the platform and any supports could be improved for the next term. Next, the platform was used for several sections of a term, using different instructors. Finally, the platform was used as part of a randomized control trial, in which students (and instructors) were randomly assigned to either a treatment group (a section using the RealizeIt system) or a control group (a section using the traditional platform). Several methods were used to determine what advantages, if any, RealizeIt gave to students.

### **Scaling Up and Knowing When to Stop**

One criticism that has been made of DBR is that because the research process is iterative, it is not clear which iteration is the final iteration (Dede, 2004). Iterations can potentially carry on forever. This may be the case in some settings; however, the final iteration is built into the original research design, and the iterations culminate with a RCT and full intensive evaluation.

The problem of interventions that work well in controlled settings but not when scaled up has received much attention in the education literature (e.g., Duffy & Kirkley 2004; Sternberg et al., 2011). CILSS took several steps to increase the likelihood that results found in the pilot would also be found in the real world. One such step was randomly assigning instructors to teach using the RealizeIt platform. Most instructors had not used RealizeIt before. Although more favorable results may have been more likely using instructors who volunteered to teach using RealizeIt, this would be stacking the deck in favor of positive evaluation results. Instructors who volunteer to teach using RealizeIt may be more comfortable with and enthusiastic about the software than the average instructor, resulting in selection bias.

In keeping with Brunswik's (1956) theory of representative design, we recognize that it is the average instructor who will have to use RealizeIt if it is fully scaled up within the university, and so the results of the pilot evaluation must reflect this. This again highlights the importance of the collegiate faculty being fully invested members of the pilot team: UMUC collegiate faculty appreciate the importance of well-researched innovations and so are as interested as the researchers in representative and robust results.

As mentioned, the number of iterations is built into the research design from the beginning. Generally, three iterations are required, with the third iteration being a large-scale RCT. The first iteration is usually carried out by a faculty member who is invested in the innovation and may be part of a session/term for one section or the entire session/term for one section. The second iteration addresses any issues uncovered in the first. This iteration is for several sections and lasts the duration of the term/session. The second iteration uses several different instructors for a plurality of viewpoints on how well the intervention works. The third iteration again addresses any issues uncovered during the second and is a full scale RCT in which half the sections in a given term are randomly assigned to treatment (in effect, randomly assigning the instructors also). This allows CILSS to statistically analyze the effect of the intervention on course outcomes and student satisfaction and perceptions.

One or two iterations may be added at any point in the cycle. For example, if the first iteration goes poorly for a reason that can be identified, it may be best to repeat this iteration rather than move to the second stage. If the results of the RCT are mixed or not significant, it is necessary to repeat this iteration before deciding whether to scale up the pilot.

### **The Evaluation**

Although data are collected and analyzed while the pilot is ongoing, the final iteration of the pilot is the most intensive regarding data collection. As final grades alone are often a poor measure of success, data are gathered on student interaction with the platform, student quiz and exam grades, student discussion posts (qualitative and quantitative), and student impressions and experience with the platform. As the final iteration of the pilot is a randomized control trial, the same data are collected for both the treatment and control groups.

### **ACCT 220**

Principles of Accounting I (ACCT 220) is required for several majors at UMUC, including Business and Finance. Like many introductory courses nationally, it typically has a high enrollment and a lower rate of success. UMUC uses data analytics to monitor the performance of such courses that can be obstacles for students. Adaptive learning software has shown to be promising in similar contexts, increasing success rates by creating individual learning paths for students.

ACCT 220 went through four complete iterations of the RealizeIt system (three planned iterations and one supplemental iteration). The first iteration was in Spring 2016. RealizeIt software was used for one pilot section in a fully online section for all eight weeks, the entire length of the course with selected faculty who were engaged in building the pilot. The instructor in this first iteration was not randomly assigned. She was a faculty member who was a member of the pilot team. In future iterations, the instructors would be randomized to better judge how the project would perform at scale.

### **Iteration 1 Results**

Results were analyzed to test whether RealizeIt had an effect on course success rates and final grades. Data from UMUC's data warehouse allowed us to control for variables that might have an effect on outcomes of interest, such as age, cumulative credits, and course success rate. The analysis showed a significant positive effect on course success rates (the likelihood of a student achieving a final grade of C or higher). The analysis also showed a significant positive effect on grade. The average grade was 2.6 for students in the control sections and 3.0 for those in



the RealizeIt sections. An Ordinal Least Squares (OLS) regression model (which controlled for demographics and student historical academic performance) estimated that being in a RealizeIt section increased final grades by .55 points on average and holding all else equal ( $p=.02$ ). This means that a student in a control section with a C+ (2.3) would be expected to have a grade of B- (2.7) in a RealizeIt section. Of course, given the small sample size ( $n=55$ ), these results were promising but not definitive.

Interviews with the instructor and feedback from students indicated a number of areas that could be improved. It was evident with the first iteration of the course that the adaptive treatment sections needed to be recalibrated with the amount of technical support required. We also identified instances in which the RealizeIt system was not appropriately displaying figures or calculations. The time calculated on the nodes was automatically set at 20 minutes per node—feedback from students highlighted this as a point of frustration as the nodes rarely required only 20 minutes. It was evident that we needed to address the technical issues and reset the predicted times in order to set a realistic expectation for students.

## **Iteration 2**

The second iteration of ACCT 220 was in Summer 2016. This time, three pilot sections were used. Again, the sections were fully online, and the RealizeIt system was used for all eight weeks. Sections were randomly chosen and students were given the option to opt out and be enrolled in a traditional online classroom. The three pilot sections and three control sections resulted in a sample size of 169 students, 82 of whom used RealizeIt. Instructors were assigned to teach the sections before the sections were randomized, effectively randomizing the instructors. This controlled for any bias introduced by instructors who may have been more interested in technology or who were more enthusiastic about this approach to teaching.

## **Iteration 2 Results and Adaptations**

Quantitative results from the second iteration were not as encouraging as those from the first iteration. The analysis showed that there was no significant effect of the treatment on course success, controlling for demographic and other student variables ( $p=.64$ ). There was also no significant effect of the treatment on final grade ( $p=.90$ ).

Interviews with the instructors and feedback from students once again indicated a number of areas that could be improved. One area of insight was around the faculty. Adaptive learning requires faculty to shift their mindset regarding the ways in which they engage with students in the course. Our findings suggested that we needed to better prepare faculty to communicate the shift that happens in utilizing adaptive technology in tandem with learning analytics. Instructor training became an area of greater focus. As a result, we created a faculty mentor program so that faculty who had used the platform and felt comfortable with the technology could help new instructors, encouraging them to engage with the technology and answering any questions they may have. This allowed us to test our hypothesis that if faculty were better prepared, the student experience would improve.

## **Iteration 3**

The third iteration of ACCT 220 was once again a randomized control trial. This trial involved 15 treatment sections and 16 control sections. The sample size was 797 students, 412 of whom were in RealizeIt sections. In this iteration, all students were asked to complete a baseline survey and an end of semester survey that asked for information not available through the data

warehouse (such as hours of employment, previous use of adaptive software, etc.) and for detailed feedback on perceptions of RealizeIt. User data from the RealizeIt system was also collected for this iteration, allowing us to see at which points in the RealizeIt system students were experiencing difficulty.

### **Iteration 3 Results and Adaptations**

The analysis of the data showed that students in the RealizeIt sections were more likely to successfully complete the course with a final grade of C or higher than those in the control sections, controlling for demographic variables and a measure of how many hours the student works in paid employment ( $p=.08$ ). That is, the effect of the treatment on course success was positive and significant.

The average grade was 1.8 for students in a control section, and 2.1 for students in a RealizeIt section. An OLS model estimated that the effect of being in a RealizeIt section was an average increase of .24 grade points for students' final grades, holding all else equal ( $p=.00$ ). This model once again controlled for student demographics and historical academic performance. This result is robust to the addition of the survey variables, such as the student's level of confidence with technology, whether they had previously used adaptive software, and how many hours they work in paid employment.

These results mirror the results of the first iteration (in which only one section used RealizeIt). However, the third iteration has several advantages over the first. The sample size is much larger in this iteration (about 14 times larger). This means that we can be more confident in the results of our statistical analysis. The instructors were assigned to sections before the sections were randomized, effectively randomizing the instructors. And all online sections were part of the pilot and were randomized to treatment or control (each online term has several sessions, which begin at different times). This means that the sections that ran later in the term were as likely to be chosen for RealizeIt as those that ran earlier in the term. This is important, as there may be unmeasured differences between the students who take courses in the first session and those who take classes in the last session.

Beyond the final grades of the students, it was important to determine at what point RealizeIt was having an effect on student learning and to ensure that the aggregation of final grades into grade points was not creating the illusion of significant difference. To this end, we examined the effect of being a member of the treatment group on the constituent parts of the final grade. RealizeIt students had higher grades in all but one of the outcomes examined. However, the results are significant for only three outcomes, as can be seen in Table 1. The gains from Homeworks outweighs the loss seen in Quiz 2 however, as Homeworks (which is a combination of all homework assignments over the term) is worth 20% of the final grade, while Quiz 2 is worth 10% of the final grade.

Dependent Variable		RealizeIt Coefficient	P-value
Quiz 1		2.24 (1.67)	.18
Quiz 2		-6.92 (1.56)	.000
Quiz 3		.56 (1.76)	.75
Homeworks		4.03 (1.73)	.02
Final Exam		.49 (2.07)	.81
Final Grade		3.17 (1.58)	.05

*Table 1.* Fall 2016 Grades. All models are OLS regression and include controls for Age, Gender, Credits Earned, Current Session Workload, Campus, Pell, Cumulative GPA, and whether the student was Active Duty. Final Grade is measured in percentage points, not grade points.

The end of semester surveys also provided data on any difficulties the students had with the course, their impressions of their instructors, and the material covered. Broadly, there were few statistically significant differences between the two groups on these measures. Of course, it is worth noting that the sample size for these end of semester analyses is smaller because of the response rate. Two hundred and one students out of 797 participated in the end of semester survey (25% response rate).

When asked to rate their instructors on responsiveness, students in the control group rated their instructors 4.26 on average, while students in the RealizeIt group rated their instructors 4.42 on average. An OLS model estimated that being in the treatment group meant rating the instructor .3 points higher on the 5-point scale, on average and holding all else equal ( $p=.04$ ). Students in the treatment section also rated their instructors higher on whether they provided helpful feedback. The average was 4.24 for control sections and 4.35 for RealizeIt sections. An OLS model estimated that being in the RealizeIt section meant rating the instructor .5 points higher, on average and holding all else equal ( $p=.04$ ).

Students were also asked whether they thought this course was less rigorous, equally rigorous, or more rigorous than other UMUC courses they had taken. Half (50%) indicated that it was more rigorous, and 46% indicated it was equally rigorous. An ordered logistic regression

controlling for demographic and other variables showed that being in the treatment group had no effect on perceptions of course rigor for this question ( $p=.20$ ).

In addition to being asked how the course compared to other UMUC courses taken, students were asked how rigorous the course was compared to non-online courses taken in the past. Almost half (47%) indicated that the course was more rigorous than non-online courses they had taken, while 48% indicated it was equally rigorous. An ordered logistic regression controlling for demographic and other variables showed that being in the treatment group had no effect on perceptions of course rigor for this question ( $p=.49$ ).

The final section of the end of semester survey questionnaire asked students who were in the treatment sections about their impressions of RealizeIt. Students were asked the extent to which they agreed with statements about RealizeIt, using a 5-point Likert scale from 1 = Strongly Agree to 5 = Strongly Disagree. Table 2 presents these results (Fall 2016 columns), which have been reordered here for ease of interpretation, with higher scores being better.

	Fall 2016			Spring 2017		
	N	Mean	SD	N	Mean	SD
RealizeIt helped me learn subject better	103	3.71	1.41	118	3.82	1.38
RealizeIt provided feedback to stay on track	106	3.65	1.38	118	3.74	1.36
RealizeIt helped me better learn course material	105	3.76	1.38	118	3.79	1.42
RealizeIt's grading procedure was effective and logical	105	3.32	1.46	118	3.69	1.45
RealizeIt benchmarks helped my learning	106	3.75	1.35	117	3.87	1.38
RealizeIt feedback helped me learn	106	3.58	1.32	118	3.75	1.42
Effective compared to non-RealizeIt classes	105	3.60	1.33	116	3.79	1.38
RealizeIt assessments effectively measured my learning	105	3.49	1.41	118	3.79	1.37
RealizeIt increased engagement with course content	104	3.68	1.33	117	3.81	1.41
RealizeIt was easy to use	105	4.05	1.34	117	3.92	1.37
I was well prepared for using RealizeIt	105	3.74	1.30	117	3.79	1.26
RealizeIt instructions were clear and effective	106	3.92	1.32	115	3.89	1.37
Tech support helped me solve any RealizeIt issues	105	3.68	1.27	113	3.60	1.25
I would take another course using RealizeIt	106	3.58	1.48	117	3.79	1.44
Time spent in RealizeIt was valuable	105	3.76	1.29	117	3.86	1.34

Table 2. Students' Impressions of RealizeIt

As there is no comparison to the control group for these questions, the mean result for each question is reported. However, it is worth noting that the survey instrument used here was based on Dziuban, Moskal, Cassisi, and Fawcett (2016) to allow researchers to compare across institutions. The favorable results here are comparable to those reported by Dziuban et al. (Table 3).

<b>Item</b>	<b>n</b>	<b>X</b>	<b>SD</b>
RealizeIt helped me learn the course material	241	4.02	0.92
RealizeIt's assessment exercises were effective	235	3.82	0.78
Difficulty of the "learning path" sequence	240	3.35	0.81
Difficulty of the learning material	241	3.24	0.78
Difficulty of the questions asked	239	2.99	0.80
RealizeIt increased my engagement	233	3.92	0.87
Grading accurately reflected my knowledge	229	3.81	0.86
Ability levels reported by RealizeIt were accurate	235	3.79	0.84
I would take another course using RealizeIt	234	4.09	0.99
RealizeIt system became personalized to me	228	3.67	0.87
I followed recommended "next steps"	239	3.51	1.11
Time spent in RealizeIt	229	3.31	1.15
RealizeIt was easy for me to use	234	4.24	0.77
The instructions in RealizeIt were clear	241	4.12	0.80
"Learning Path" was easy to use	184	4.01	1.00
"Guidance panel" was easy to use	211	3.91	0.89
RealizeIt provided me with the necessary feedback	237	3.86	0.78
"Guidance panel" was helpful	182	3.81	0.67

Table 3. Dziuban et al.'s (2016) Study of RealizeIt Effectiveness at University of Central Florida: Student Reactions to Survey Items. Differing n's represent missing data.

Students were also asked about the pace of RealizeIt, whether they ever ignored RealizeIt's suggestions for completing content, and how much time they spent in RealizeIt relative to non-adaptive learning courses. The majority of students (67%) indicated that the pace of RealizeIt was just right, while 19% indicated it was somewhat fast. Forty-three percent indicated that they rarely or very rarely ignored RealizeIt's suggestions for completing content, while 18% indicated they did so often or somewhat often. Fifty-three percent indicated they spent more time or much more time in RealizeIt than non-adaptive courses, and 34% indicated they spent the same amount of time as in non-adaptive courses. Again, the sample size for these responses is quite small, and so results should be interpreted cautiously.

Finally, the end of semester survey allowed students to give qualitative responses to questions regarding technical issues and what could be improved with the system. These data points were analyzed and used to make recommendations to instructional designers at the institution designers, as well as to the vendor engineers.

These qualitative data were combined with the RealizeIt usage data to identify the points at which students had difficulty or were dropping out of the system. The data showed several questions that were queried by students at high rates. These questions were investigated by the designers and rephrased to ensure clarity. The data also showed several objectives that a high number of students began but did not finish the objective. Designers used this information to revisit problematic objectives to determine if the material was unclear or not well aligned with the learning objective. These improvements aim to enhance the usability of any aspects of the design that are less than optimal.

#### Iteration 4

Although CILSS had reached the end of the proposed cycle of iterations at the third iteration, university administration requested one more iteration to gather additional data and determine whether the pilot was suitable for upscaling. The same data points were gathered for this iteration as for the third iteration and results were similar. The sample size for Spring 2017 was 29 sections (14 RealizeIt sections and 15 control sections), which amounted to 808 students, 413 of whom used RealizeIt. Once again, RealizeIt students were more likely to successfully complete the course ( $p=.01$ ). There was also a significant effect on final grade. RealizeIt students completed with a final grade that was .32 points higher than non-RealizeIt students, on average ( $p=.00$ ). The average grade was 2.22 for students in the control sections and 2.48 for students in the RealizeIt sections.

Table 4 shows that, for Spring 2017, RealizeIt students also had significantly higher results in Quiz 1 (6.5 points), Quiz 3 (3.4 points), Homeworks (5.7 points), and in the Final Grade (5.1 points). Unlike Fall 2016, there were no measures for which RealizeIt students received lower grades.

		RealizeIt Coefficient	P-value
Dependent Variable	Quiz 1	6.52 (1.36)	.00
	Quiz 2	.15 (1.28)	.91
	Quiz 3	3.42 (1.33)	.01
	Homeworks	5.74 (1.55)	.00
	Final Exam	1.50 (1.81)	.41
	Final Grade	5.10 (1.31)	.00

Table 4. Spring 2017 Grades. Final Grade is measured in percentage points, not grade points.

As with Fall 2016, there were few differences between the two groups on measures of any difficulties the students had with the course, their impressions of their instructors, and the material covered. Once again, students in the treatment group rated their instructors .3 points higher on responsiveness, on the 5-point scale, on average and holding all else equal ( $p=.00$ ). RealizeIt students also rated instructors .4 points higher on responsiveness ( $p=.00$ ), .35 points higher on course knowledge ( $p=.00$ ), .4 points higher on maintaining accurate course records ( $p=.00$ ), and .3 points higher on the quality of their grading ( $p=.01$ ), on average and holding all else equal.

Descriptive statistics for students' impressions of the RealizeIt system and its effectiveness and usefulness were also strikingly similar to the results from the third iteration (See Table 2: Spring 2017 columns) (and once again similar to results reported in Dziuban et al. [2016]—Table 3).

### **Results and Lessons Learned from RealizeIt Pilot**

The researchers have presented the approach to DBR taken by CILSS at UMUC and the results of a project that illustrates this approach. Like the RealizeIt pilot discussed, the DBR approach itself is also subject to continual improvement. The approach detailed here allowed us to learn about issues related to technical problems, faculty training, and design. These problems were then tackled for subsequent iterations in order to improve the intervention and retest. However, the DBR approach itself can also be improved. More formalized focus groups would have been an asset in the initial iterations. Focus groups would have allowed for more qualitative data on student perceptions and could have potentially pinpointed problem areas sooner.

Students were randomly assigned to either treatment or control sections. Once students were assigned, they were given the option to opt out of the pilot. This approach sought to overcome problems of selection bias, as students who are more interested or motivated are likely to be the ones who sign up for a pilot study (Campbell & Stanley, 1971). However, as the section chosen for RealizeIt was the first online section, and therefore the first section to fill, it is possible that the students who were enrolled were also students who were somewhat more motivated or organized than the average student and are therefore not representative of the population. Nonetheless, as this was the first iteration and focused on design issues and technical problems, this does not pose a problem for our research design. The two sections (one treatment and one control) resulted in a sample size of 55 students, 26 of whom used RealizeIt.

While CILSS had not planned the final iteration involving the hybrid sections, this was added during the third iteration. The reason for this was the positive feedback that instructors were getting from students and the desire on the part of the university administration to gather more data to better determine whether the pilot should be scaled up. As discussed in the literature review section, this ability to add iterations to a research design is both a blessing and a curse. On one hand, it allows for flexibility in the research design. On the other hand, it means that an evaluation can continue indefinitely, with invested researchers always needing one more iteration. We do not believe that to be the case here. Once the current iteration is completed, further iterations will only be carried out at the behest of university administrators should they feel that more data are needed to make a decision to scale up the pilot.

## Discussion

There is a growing demand in the field of education for providing educational technology evaluations that are systematic and measure the efficacy of educational technology solutions. In their review of the DBR literature, Anderson and Shattuck (2012) found that 68% of the interventions involved online and mobile technologies. However, the majority of studies focused on K-12 student populations rather than the higher education sector. This revealed the current gap in DBR research studies focused on the iterative design and implementation educational technology interventions in the higher education sector. The approach using DBR provides researchers the opportunity to utilize a collaborative framework with practitioners at all levels in the field. The intent of this paper is to provide some additional insights of using DBR as a framework to move to platforms that are adaptive in nature. The RealizeIt platform afforded us with the opportunity to advance self-directed learning consistent with andragogically-informed design and to improve student outcomes. Our use of DBR in this scenario is consistent with previously recommended and applied uses of DBR to address the question of how education should leverage technology to address complex open problems and the related questions around learning, teaching, and assessment (Bannan, 2013; Kelly, 2013). Further, our use of iterative design and evaluation cycles enabled us to surface important methodological issues associated with studying learning in what Kelly (2013) described as a “complex and nested learning environment” (p. 140) within the cyberinfrastructure. Experience that includes mistakes can provide the basis for rich learning. For the first time, we had comprehensive and robust data to measure the learning occurring in the online environment.

While this study allowed the use of a mixed method approach, we know that future studies are required. Consistent with current thinking on DBR, assessment targets surface during the unfolding design and implementation cycles, for which appropriate measures must be developed. Likewise, the validity and reliability of those measures must be actively considered throughout the project (Kelly, 2013) so that the evidentiary methods and claims are properly aligned to subsequent iterations and implementations of design prototypes. Here, in this evaluation, we took the lens and philosophy of a qualitative researcher and, in that sense, knowing what students believe matters. If a student believes s/he learned, it is likely that the student’s next action will be based on that belief, for example, signing up for an additional class. However, student self-reports only create one narrow view of the evaluation of this new learning paradigm. Upon completion of this study, longitudinal impacts of students and their academic careers should be observed as a result of their participation in adaptive learning in core foundational courses for their major.

In hindsight, the evaluation also was challenging, given the rapid pace of the cycle of semesters and gathering the data. It should be noted that although there were opportunities in the course cycle to improve the course, it was not consistently possible to make improvement on the very next rollout of the course, given the overlap of the course sessions. Consistent with Bannan’s (2013) Integrative Learning Design Framework, we plan to include additional targeted focus groups, observation/modeling, and interviews at the end of the final iteration cycle to validate that we accurately identified all levels of feedback about the innovation pilot prior to making recommendations about a full-scale implementation. While randomized control trial was used to test the final product that had been developed through earlier iterations, this provides a culminating evaluation of the whole cycle, giving us a holistic view and harnessing the power of the DBR approach.



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# Understanding Faculty Use of the Learning Management System

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## Abstract

The learning management system (LMS) has become a critical tool for nearly all institutions of higher education, and a driving force in online learning. According to a 2014 report by the Educause Center for Analysis and Research, 99% of higher education institutions have an LMS in place, and the LMS is used by 85% of faculty and 83% of students. This was not always the case, however. There was a time in the not-so-distant past when using an LMS was considered highly innovative. Understanding the growth and adoption of the LMS is a stepping stone to understanding how faculty may choose to adopt other technological and pedagogical innovations. This study was conducted at a large, research-intensive public university in the Midwest, which has used the same LMS for 15 years. From a small pilot, adoption has grown to nearly universal use. This study used system logs and database queries to examine how faculty used the LMS. The results identified the features that were used most frequently and how usage had changed over time. In addition, the study compared the usage data for face-to-face and online courses to determine if there are differences in LMS use due to course modality. Based on this, it is possible to better understand the role the LMS plays in higher education and online learning, to inform development of next generation learning systems or other innovative technologies.

*Keywords:* learning management system, lms, cms, ngdle, faculty

Rhode, J., Richter, S., Gowen, P., Miller, T., & Wills, C. (2017). Understanding faculty use of the learning management system. *Online Learning*, 21(3) 68-86. doi: 10.24059/olj.v%vi%i.1217

## Introduction

Educators have long sought to infuse contemporary innovations into teaching and learning. Through the years, various print, audio, video, and computer technologies have been incorporated into education and training (Lever-Duffy, McDonald, & Mizell, 2003; Picciano, 2001). With each wave of technological innovation, tools become more seamless and instructional practices evolve. As the Internet came of age, Learning Management System (LMS) technology became widely available, enabling faculty with little technical skill to deliver instruction to students at a distance. Most higher education institutions have since integrated the LMS with other institutional infrastructure systems, encouraged faculty adoption of the LMS, and provided the necessary user training and support. Understanding the growth and adoption of the LMS is a stepping stone to understanding how faculty may choose to adopt other technological and pedagogical innovations. This study at a large, research-intensive public university in the Midwest, which has used the same LMS for 15 years, examined which features were used most frequently and how usage has changed over time.

## History of Learning Management Systems

The Learning Management System (LMS), also referred to as Course Management System (CMS) or Virtual Learning Environment (VLE), has evolved over decades of technological innovation to become a cornerstone of institutional instructional technology infrastructure. With roots dating back to the first computer-assisted instruction system, PLATO, developed in the 1960's (Bitzer, Braunfeld, & Lichtenberger, 1961), the LMS was popularized with the advent of the Internet, with many LMS platforms available today (Hill, 2017). LMS platforms commonly include a suite of integrated tools that enable online delivery of instructional content, interaction and collaboration, and tracking and reporting of student participation (Rouse, 2005). The LMS has been touted as having been instrumental in extending instruction and access to learning beyond the physical classroom (Harrington, Staffo, & Wright, 2006), enabling secure online collaborations among faculty and students (Barron, 2003; Liu, 2005), and promoting the integration of otherwise discrete content delivery, course management, and student assessment functions (Linder, Bruenjes, & Smith, 2017; Weaver, Spratt, & Nair, 2008).

The longstanding and steady growth of LMS use in higher education has been well documented (Carmean & Haefner, 2003; Daniels, 2009; Harrington et al., 2006; Malikowski, 2010; Mkhize, Mtsweni, & Buthelezi, 2016; Mills, 2005; Vovides, Y., Sanchez-Alonso, S., Mitropoulou, V., & Nickmans, G.; West, Waddoups, & Graham, 2007). With learning management systems being present at 99% of higher education institutions, their use is now ubiquitous (Dahlstrom, Brooks, & Bischel, 2014; Green, 2013; Lang & Pirani, 2014). Recent studies of higher education students and their technology preferences have noted that nearly all students use an LMS and that the LMS is consistently identified by students as among the most important instructional technologies for their academic success (Brooks, 2016; Dahlstrom, Walker, & Dziuban, 2013).

The LMS remains a mainstay of online education infrastructure, with 85 percent of faculty confirming their use of the institution's LMS (Brooks, 2015) and 81 percent of chief online education officers reporting the LMS to be the technology that is most important to online programs (Legon & Garrett, 2017). Institutional leaders recognize the importance of supporting faculty in their use of instructional technologies including the LMS, with faculty development ranked as the number one key issue in teaching and learning in 2017 (Educause Learning Initiative, 2017).

Despite its widespread adoption, some have questioned whether the LMS is still needed. Education futurists call for LMS tools and platforms to be more agile to support emerging instructional practices, as some wish to unbundle the components of a learning experience to remix open content and educational apps in new ways (Adams Becker et al., 2017; Anshari et al., 2016; García-Peñalvo & Forment, 2014). Some thought leaders feel current learning management systems are too limited in functionality (Brown, Dehoney, & Millichap, 2015a) and have proposed a next-generation LMS, often referred to as a "next-generation digital learning environment" (NGDLE), to support more personalized and flexible learning experiences (Brown, 2015). Rather than being a single system, the NGDLE would encompass a "confederation of IT systems and application components that adhere to common standards...that would enable diversity while fostering coherence" (Educause Learning Initiative, 2015).

With the maturation of the LMS and critical mass adoption across higher education, there is a need to look deeper into how the LMS is being used, to see if it is still meeting the needs of

faculty and students. Measurement of LMS usage, however, is challenging and often relies on estimates based on guesswork. This study addresses this problem by analyzing faculty usage of the LMS via empirical data gathered directly from the LMS database, and without the adoption of sophisticated yet expensive analytics systems. This provides a means to follow the digital footprints faculty leave in the LMS as a reflection of their course design.

### **Review of Related Literature**

Previous studies have sought to understand the motivations and experiences of instructors as they adopt a learning management system (Samarawickrema & Stacey, 2007; West, Waddoups, & Graham, 2007) and their overall satisfaction with the tools available (Walker, Lindner, Murphrey, & Dooley, 2016; West, Waddoups, Kennedy, & Graham, 2007), focusing largely on the attitudes and observations shared by faculty themselves. Not surprisingly, faculty experiences have often varied widely from one institution to another, as enabling and impeding factors differ. Even so, research on the patterns of faculty adoption of the LMS and the degree to which the available capabilities meet instructional needs have been valuable. The data from such studies have provided interesting insights, but have inherent limitations because they often relied on instructor perceptions through self-reported usage.

Malikowski (2008) took an alternative tactic in seeking to understand the factors related to breadth of LMS feature use, manually tallying tool usage frequency in LMS courses from across 842 course websites volunteered for study by 394 faculty members over a three-year period. He selected six features of the LMS and recorded the number of times each was utilized within the sample of courses. Through his descriptive and inferential statistical analysis looking at clustered use of tools, he identified that a stable state of LMS adoption at his institution had been reached. While this was an interesting approach, it was a monumental task to manually examine usage across courses and too time consuming to apply and replicate at scale.

Conceptual studies have since posited models for a more holistic view of institution-wide LMS adoption, specifically examining analytics captured by the LMS and their potential use for institutional decision-making and instructional intervention. For example, Janossy and Hover (2008) proposed a 14-step model for analyzing user behavior within the system that could be applied to any LMS through content analysis of system database tables. Dawson, McWilliam, and Tan (2008) demonstrated how data captured from the LMS could be used to inform institutional decision-making processes and identify potential "at-risk" students. While presenting examples of data derived from an institution-wide LMS, they underscored the challenge of readily and accurately interpreting data and translating findings to practice. Whitmer (2012) explored the interplay of student LMS usage, persistence, and course achievement within a large hybrid-format course and found that data from the LMS could be used as a meaningful indicator of student effort. The rapidly expanding field of learning analytics continues to push the boundaries of what is known, and what can potentially be learned, from usage data stored by the LMS and other information technology applications.

Despite the conceptual interest, few studies have empirically analyzed LMS usage data at scale and over time. Fritz (2016) sought through an institution-wide analysis of LMS usage data to demonstrate how analytics focused on student use of the LMS could identify effective faculty LMS course designs, noting the potential for LMS usage to serve as a proxy for online teaching and learning engagement. Park and Jo (2016) analyzed system log data from 7,940 LMS course

sites to evaluate learning activity, noting significant gaps in LMS usage levels across colleges and disciplines within the institution. More recently, research exploring student use and time on task within the LMS has provided an additional perspective to faculty use. Taking tool use as a proxy for course design, Whitmer, Nuñez, Harfield, and Forteza (2016) sought to discover archetypes of course design across institutions through examination of LMS usage. Analyzing an anonymized data sample that included 70,000 Blackboard courses from 927 institutions with 3,374,462 unique learners, they aggregated tool usage data at the course level based on the percentage of time students spent using each tool. As a result, Whitmer et al. identified five course patterns which generalized broad approaches to LMS usage which ranged from supplemental use to fully integrated holistic use.

Understanding the relevant factors affecting the adoption and use of the LMS can aid the design, development, and implementation of more effective support and training for faculty and learners (Kultur & Yazici, 2014). Given the vast and ever-expanding volume of data being generated and recorded regarding the use of instructional technology systems, there is a need for simple and automated methods for gathering and examining actual usage data. By understanding usage patterns of instructional technology tools such as the LMS by faculty members and students, institutional support personnel and administration can make better, data-informed decisions regarding future technology procurement and support prioritization to help ensure that instructional needs are being met.

### **Context for Study**

The faculty at one Midwest, public, research-intensive university became interested in blended and online teaching in the late 1990s. This grassroots interest was supported through training and resources provided by the university's faculty development center. During that time, a committee of university faculty explored several LMS options and ultimately chose Blackboard (now known as Blackboard Learn). In 2001, a limited pilot was conducted, and Blackboard was adopted as an enterprise-wide system in 2002.

The university's faculty development center was charged at that time with providing support for faculty on all aspects of teaching with technology, including teaching using the LMS. Due to the university's culture of departmental autonomy, use of the LMS was not mandated and training was not required. Blackboard adoption and training have always been voluntary, yet usage has grown year after year. Today, nearly all faculty use the system. However, the term "use" can be defined in many ways and encompasses a variety of scenarios.

As adoption has become more saturated and more courses have been offered online, training and support have become more sophisticated and differentiated. This added complexity strained the capacity of the faculty development center to continue to offer high-quality support. Better data and evidence were necessary to prioritize the best level and types of support moving forward.

### **Research Questions**

Analysis of the LMS adoption and tool usage has developed at the university since Blackboard was selected. Initially, the university only tracked the overall usage of the LMS, such as the number and percentage of faculty and students who used the LMS for at least one course.

As overall adoption increased, it became important to take a more nuanced approach to address individual tool usage as well as overall adoption. This study addressed three primary research questions:

1. What LMS tools do faculty include in their courses most often?
2. How has LMS tool use changed over time?
3. Does LMS tool use differ based on course modality (face-to-face versus online)?

In particular, this study considered faculty course design in the use of individual tools within the LMS.

## Methods

This study utilized automated methods to accurately identify how LMS tools were implemented across courses and used over time. Previous studies' manual methods for collecting this kind of data were not feasible due to the time and effort involved. Fortunately, data for Blackboard Learn is stored in a database and can be queried using custom-written scripts for either Oracle or Structured Query Language (SQL) servers. Because the university operates Blackboard Learn in a self-hosted environment (which means that the university owns and maintains the servers on which the LMS is installed), university staff also have direct access to the main database where the data are stored. When universities choose to have Blackboard host the system for them, there are still some data which can be extracted from the Open Database. Other LMSs have alternate methods for gathering similar system data, as well.

The SQL queries used in this study were adapted from the work of Kodai (2013). University staff customized the scripts to stay current with changes in the structure of the data due to upgrades to the LMS, as well as to track additional tools and features unique to the university. The SQL script revolved around the COURSE\_CONTENTS table of the database, which tracked the tools and content added to courses. Each row of that table represented the use of a tool in a given course. Tools were identified by "handles" (CNTHNDLR\_HANDLE) and courses were identified by unique IDs (CRSMAN\_PK1). From there, the script aggregated the data by course ID and tool name, and counted the number of records returned for each course-tool pair.

Occasionally, another table needed to be queried when a tool count could not be aggregated in this manner. For example, the Announcement tool was included in each course only once. Counting the single instance of the tool did not indicate whether or how much the Announcement tool was used. In this case, the query aggregated usage counts based on the ANNOUNCEMENTS table, which was where the content of any Announcements were stored. Because these additional tables also referenced the same unique identifiers for each course, the query was able to combine this with the results from the primary COURSE\_CONTENTS table.

University staff ran the SQL script initially against all of the course data which existed in Blackboard (back to the spring 2011 semester), and again at the end of every semester. The results were compiled in a spreadsheet. Once tool use counts were successfully collected from the database, blank records were removed so that the statistics were not reduced by unused Blackboard course sections. Only courses with tool counts greater than zero were kept in the dataset. This included a few courses which did not use the LMS, but ensured all courses with minimal tool use were included. This process recognized that there was a wide range of legitimate use of Blackboard



for teaching, and that it was not always possible to distinguish courses taught using Blackboard from those minimally used for other purposes.

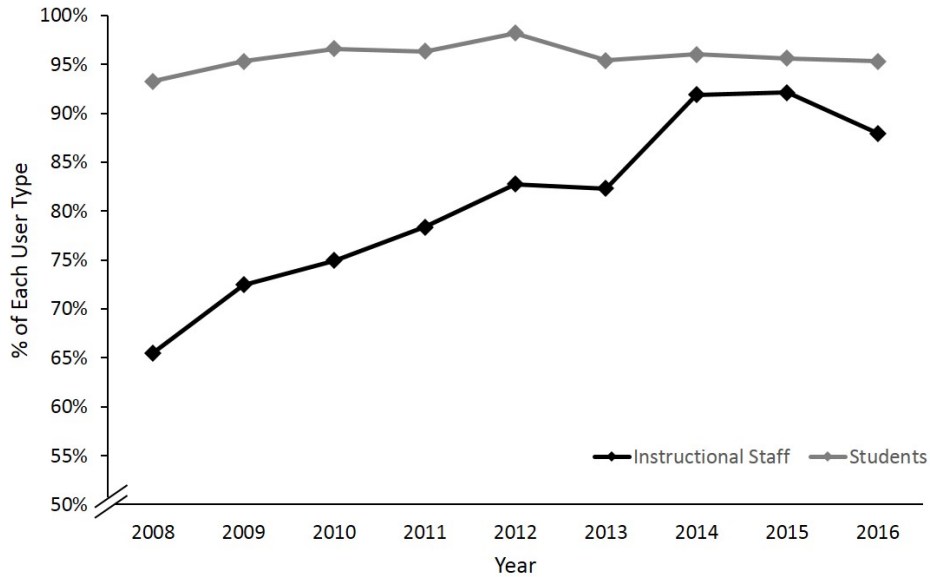
Finally, the counts of tool usage were converted using a dummy coding method that only indicated whether or not a tool was used. For every course where a tool was used, the tool was coded as a 1, and coded as a 0 when the tool was not used. This binary approach was used as an initial analysis tool, to determine whether a tool was utilized within a course. There are interesting pedagogical and technology-integration implications for the number of times a tool was used (such as whether a course included 1 grade per student or 30 grades per student, or if 5 announcements were posted or 50), but such investigation is reserved for a future study. For the current research, the dummy coded values were used to compute the percentage of courses that used each tool in a given semester.

A significant aspect of using this approach was data verification and error-checking, at multiple steps in the process. Because the Blackboard LMS has evolved over time, upgrades and patches occasionally necessitated changes to the script. For example, the built-in plagiarism detection tool was originally a stand-alone feature, but then became an option enabled on the primary Assignment tool. This also included a change in the data-structure, which was detected during routine verification measures. Another example is the addition or replacement of tools that required new or updated scripts, such as the migration from Wimba Classroom to Blackboard Collaborate, and more recently to Blackboard Collaborate Ultra. Each of these changes required significant changes and extensive validation.

When the queries were run, the process was monitored to ensure that the operations completed successfully. In the event that one or more scripts failed, the queries were revised and retried. If the scripts ran successfully, the results were scanned visually for any anomalies, such as tools reporting no usage in any course. Finally, the tool usage percentages and trends were inspected for data consistency, including unusual spikes or steep changes. In difficult cases where the queries were particularly challenging to refine, staff built test courses for comparison against query results to identify the appropriate table entry for gathering usage data. To ensure adequate understanding of the results, staff also developed a detailed data dictionary that defined how each tool was measured.

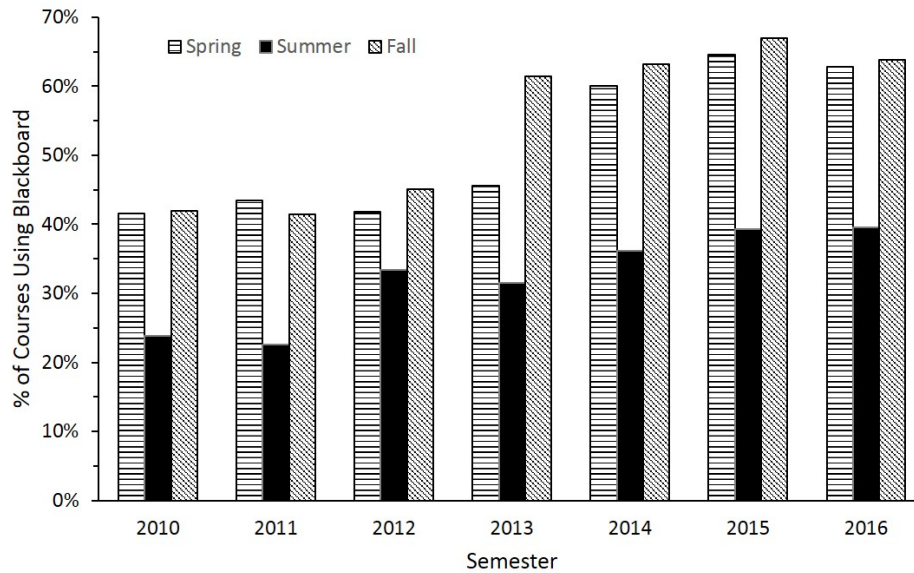
## Results

The results of the analysis show that the use of Blackboard for credit-bearing courses has grown substantially over the years at the university. Use of Blackboard by faculty rose from 65.5% of all instructional staff in the fall of 2008, which includes faculty, instructors, and teaching assistants who are instructor of record for a course, to a peak of 92.1% in fall of 2015, before decreasing slightly to 87.9% in fall of 2016 (Figure 1). Over the same time period, student use has remained consistently high, in the low to mid-90%. Since student use is both driven and limited by faculty use of Blackboard, the high percentage of students using it while faculty use was fairly low speaks to the widespread usage across campus.



*Figure 1.* Percent of students and instructional staff who used Blackboard in the fall semester of each year.

In addition, further analysis of the courses that used Blackboard showed that only 41.9% of all course sections used Blackboard during the fall 2010 semester (Figure 2). However, over time that has increased, and 63.8% of all courses sections used Blackboard during the fall 2016 semester. Interestingly, as with overall instructional staff use, the percentage of courses using Blackboard also peaked in the fall semester of 2015, at 67.0%. For this purpose, “use” is defined as any course section requested by faculty in Blackboard. The university requires faculty to submit an automated request for their Blackboard course to be created. This process also synchronizes the course with the student information system, so that the Blackboard course can be automatically populated with the students who were enrolled in the course. This definition of use indicates that faculty intended to use the Blackboard course, but it does not consider whether faculty did in fact make use of the course, or how they did so. In addition, although it is clear that the majority of faculty were using Blackboard, and adoption rate is an important indicator of the success of a technology implementation, it does not sufficiently answer questions regarding how the technology was used, and how its use had changed over time.



*Figure 2.* Percent of course sections, which used Blackboard in the spring, summer, and fall semesters of each year.

The most frequently used tools in the fall 2016 semester were Announcements, Items, Grades, Folders, Files, Assignments, Web Links, Plagiarism Detection, Discussion Boards, and Tests, in that order. Descriptions of each tool and the usage in the fall 2016 semester are in Table 1. While these tools are specifically available in Blackboard Learn, they are common elements of most LMSs. After selecting tools based on prevalence in the fall 2016 semester, the same analysis technique was used to track the usage of those tools for every term in which data were available, back to the spring semester of 2011 (Figure 3). For individual tools, “use” was defined as the tool being deployed or activated at least once within a course. The percentages were calculated as the number of courses in which the tool was used compared with the number of courses in which at least one tool was used (excluding courses which may have been requested, but were not used).

<b>Tool</b>	<b>Description</b>	<b>Percent of courses using in Fall 2016 semester</b>
<b>Announcements</b>	timely reminders posted within the LMS and optionally sent as email	82.13%
<b>Items</b>	content type that includes either one or more files or formatted text created using a WYSIWYG editor, or both	76.79%
<b>Grades</b>	one or multiple columns of grades recorded in the Grade Center, for the purposes of tracking scores and calculating a total grade and/or communicating scores and feedback to students	70.61%
<b>Folders</b>	content type used to provide organizational structure for other content and assessments	62.30%
<b>Files</b>	content type that allows the upload/posting of a single file, without any accompanying text	53.33%
<b>Assignments</b>	assessment that allows students to submit a previously created file for grading, facilitates in-browser grading and integrates with Grade Center	52.60%
<b>Web Links</b>	content type used to provide a hyperlink to a website, with optional attached files or formatted text	29.88%
<b>Plagiarism Detection</b>	a setting available for Assignments to compare the content of student-submitted files to other submissions and web-based content to identify potentially-plagiarized work	22.34%
<b>Discussion Boards</b>	threaded discussion with at least one reply posted	21.22%
<b>Tests</b>	an assessment that includes one or more questions of a variety of both objective or subjective question types (e.g., multiple choice, fill in the blank, matching, short answer, essay)	19.30%

*Table 1.* Ten Most Commonly Used Tools in the Fall 2016 Semester

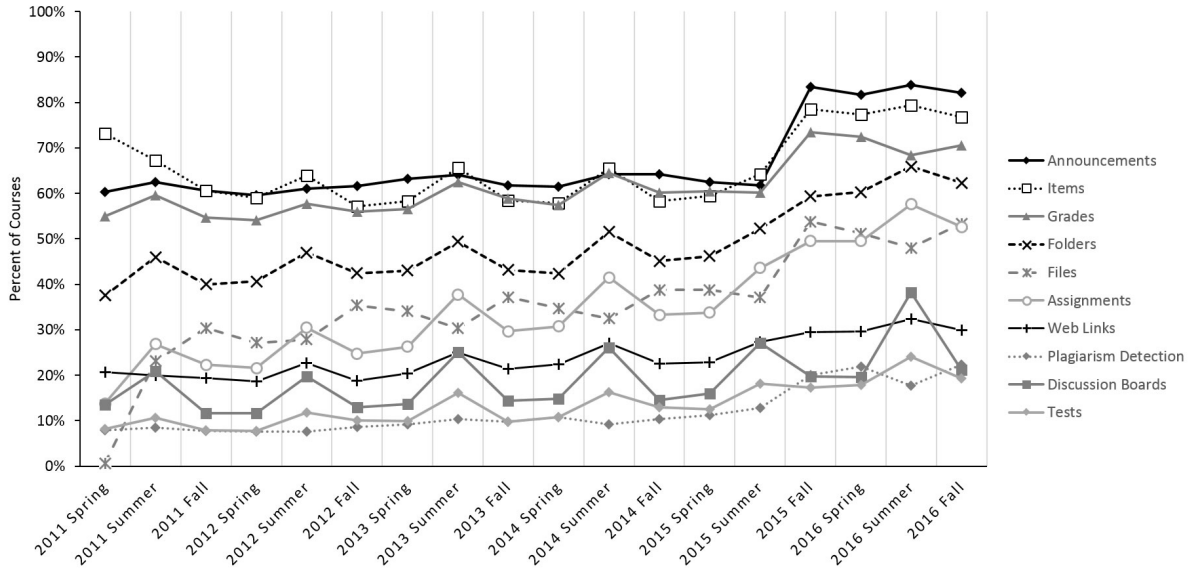


Figure 3. Percent of all Blackboard courses using each of the ten most-used tools.

The analysis shows that use of most tools generally increased over the approximately five-year time period. While use of some tools increased more than others, all of the top ten tools were used in a higher percentage of courses in the fall 2016 semester than in the 2011 spring semester. There was a marked decrease in the use of Items from spring 2011 to fall 2011, while Files rose. That May, after the end of the spring 2011 semester, the university upgraded from Blackboard Learn 8 to Blackboard Learn 9.1, which introduced Files as a new content type. The simultaneous decrease in use of Items and increase in use of Files is evidence that some faculty adopted Files and stopped using Items. As Files became more prevalent, Items again increased in usage, demonstrating side-by-side use of the two tools.

There was a steeper increase in use of several tools in the fall semester of 2015, including Announcements, Items, Grades, Files, and Assignments. This was likely due to an ongoing campaign to reduce printing by both faculty and students. Students were responsible for paying for their printing as of the fall 2015 semester (Ervin, 2012), which would have encouraged faculty to use digital assessments more. As a result, this would have led to increased use of Grades as well, because the assessment tools feed into the Grade Center.

The visualization of the usage trends shows interesting peaked behavior for most tools during each summer semester, as a higher percentage of courses used tools during those semesters. This is particularly noticeable for Folders, Assignments, Discussion Boards, and Tests. There may be several contributing factors that led to this behavior. The primary reason for an increase in tool use in the summer seems to be increased online course offerings each summer. Figure 4 shows that online courses represented a much higher percentage of overall course offerings in the summer semester than in either fall or spring semester. In Figure 4, the online courses category includes those offered both fully online or online with face-to-face meetings, whereas the face-to-face courses category includes traditional face-to-face courses as well as independent study, internship, dissertation/thesis, and student teaching courses. This behavior closely mimics the peaks seen in the tool usage, so the next step was to examine tool usage based on the course modality.

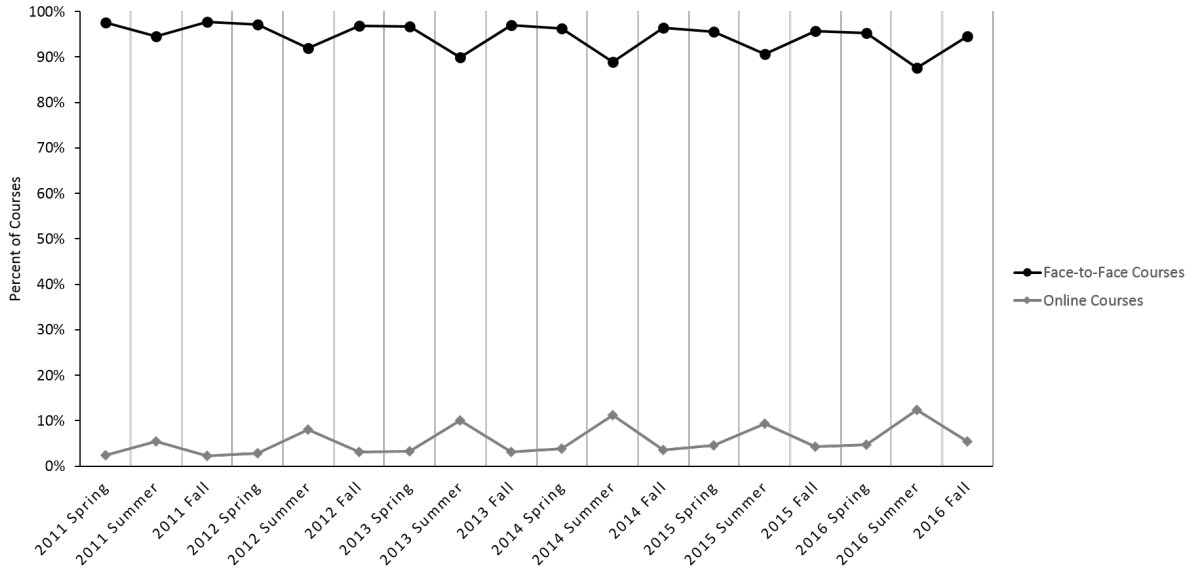


Figure 4. Percent of courses offered face-to-face or online for each semester.

Interestingly, face-to-face courses showed some of the same peaked behavior for tool use seen in the initial combined data. Figure 5 shows that Files, Grades, and Assignments were used at somewhat higher rates during each summer semester in face-to-face courses than they were used during the fall and spring semesters. Because most courses have a compressed schedule when offered during the summer semester, at only 8 weeks long as opposed to 16 weeks long during fall and spring semesters, faculty may have relied on more Blackboard tools to support instruction or to reduce in-class time by blending instructional activities into the online environment. Overall, though, tool usage showed less variation and volatility in face-to-face courses than in the combined data.

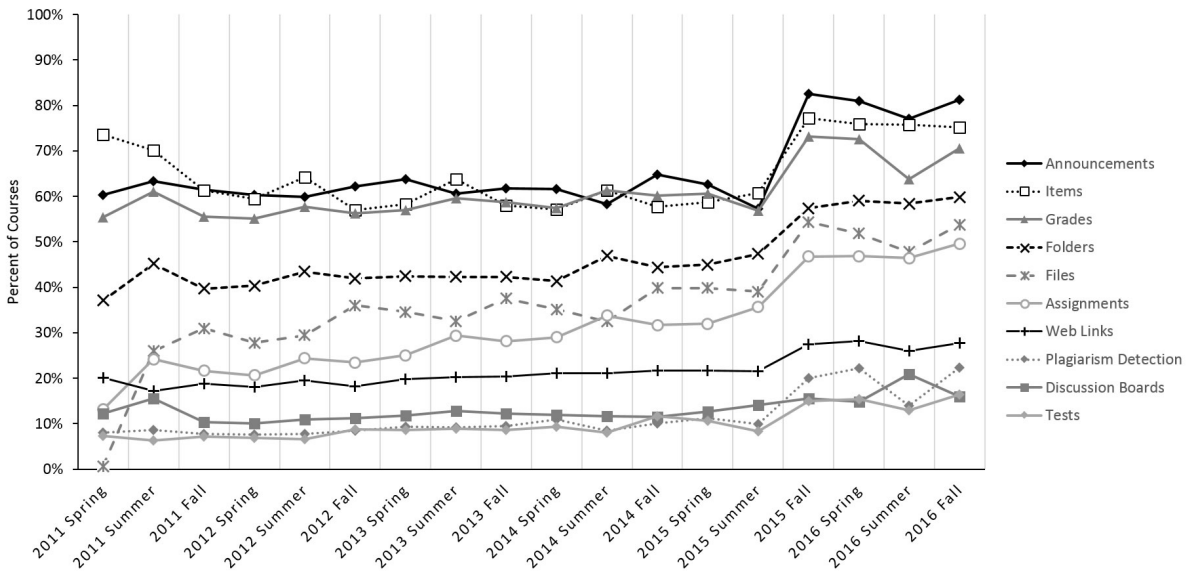


Figure 5. Percent of face-to-face courses using Blackboard which use each of the ten most-used tools.

By comparison, online courses used nearly all of the LMS tools at higher rates than face-to-face courses (Figure 6). For example, eight of the top ten tools were used in at least 50% of online courses in the fall 2016 semester. In addition, six of the tools were used in over 75% of online courses in fall 2016 (Items, Announcements, Folders, Assignments, Grades, and Discussion Boards, in descending order of prevalence). This is to be expected, since online courses rely heavily on technology to support student learning.

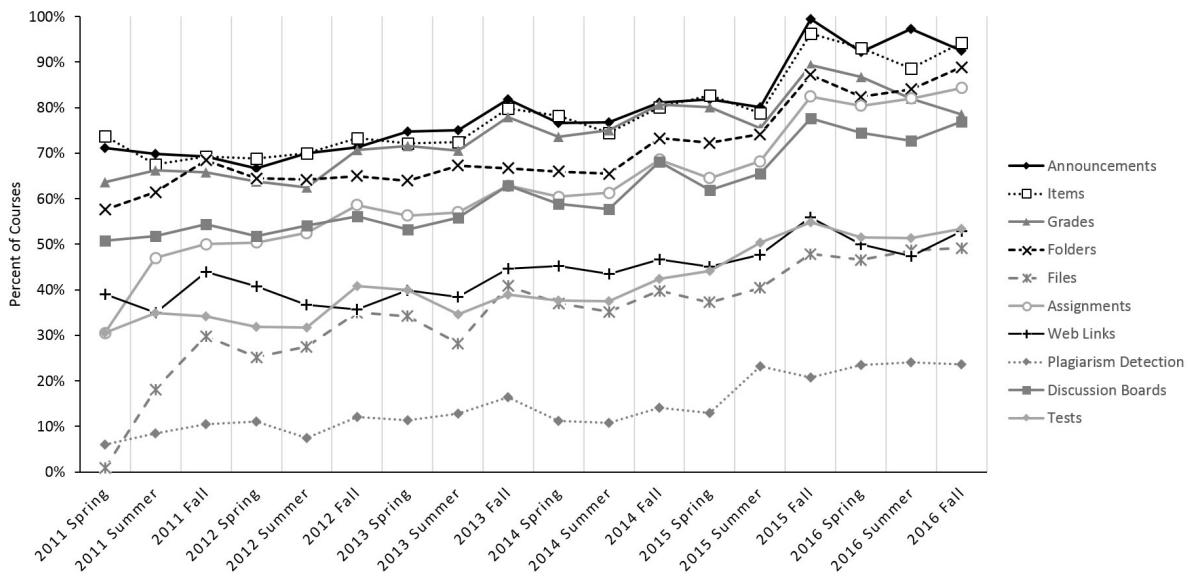


Figure 6. Percent of online courses using Blackboard which use each of the ten most-used tools.

The two tools which were used less frequently in online courses compared with face-to-face courses were plagiarism detection and files. Plagiarism detection was used at a rate consistent with face-to-face courses. In the fall 2016 semester, 23.55% of online courses and 22.26% of face-to-face courses used plagiarism detection. Usage was fairly stable from summer 2015 through fall 2016 for online courses, while face-to-face courses saw a substantial drop in usage in summer 2016. Files were used slightly less often in online courses in the fall 2016 semester with 49.17% of online courses and 53.76% of face-to-face courses posting content as Files. Given that Items were one of the most used tools for online courses, the lower usage of Files does not represent less content being posted in online courses, but rather a stronger preference for Items as the means for posting content in the LMS. This may be because the Item tool allows the faculty to provide additional context or instructions using the text editor, which is unavailable for Files. Further investigation is needed to determine the motivation for using one tool over the other.

### Discussion

Initially, this study was undertaken to improve LMS support within the university. Understanding how the LMS is currently used has helped to inform the workshops and resources offered by the university faculty development center. For example, the center can prioritize topics for development of online tutorials based on the most-used tools, such as advanced techniques for grading Assignments using integrated rubrics. The results have also influenced the center's

summer staffing models for LMS support. In the past, it was assumed that support requests would be lower in the summer because there are fewer courses offered. However, the increased usage rate of LMS tools in the summers challenged that assumption, forcing the center to rethink its strategy, and ensure adequate staff coverage for the summer months.

The data also helped to visualize a bigger picture of the use of the system. In general, a support unit interacts with a fairly biased sample of faculty, namely those that either struggle with the system and therefore experience problems or those who excel at using the system and use it in advanced ways, and thus experience problems. While data on support staff interactions can be used to inform the practices of a faculty development center (Krishnamurthi & Rhode, 2013), it provided a limited view due to this sample bias. Considering the actual use of the system provided more scope to inform decision-making. There were other sources of data to consider, as well, such as website analytics, that could provide insight into the demand or gaps of existing resources (Rhode, Richter, Gowen, & Krishnamurthi, 2015).

There are number of limitations to such a study, however. First, using do-it-yourself data collection using database queries required significant amounts of verification to demonstrate that the queries were gathering accurate results. Because of this, data gathering may be iterative and incremental as opposed to comprehensive, as the process was refined. In this study, there were a few LMS tools about which data could not be gathered, such as web conferencing sessions, because such data was not available to a database query. For other tools, usage data was held in another system, making it difficult or impossible to aggregate with the course-based tool usage data. Web conferencing was again an example of this; the institution's primary web conferencing system stored usage data in a separate server hosted by the provider, and records session and user data but not course, making it impossible to report web conferencing usage in the same format as the other LMS tools. As more technologies external to the LMS are used and integrated with the LMS, such as via a learning tools interoperability (LTI) standard or with publisher provided systems, data gathering will continue to become more difficult. This approach was best-suited for tools native to the LMS.

Another limitation to the data is that some information is simply not available to the researchers. For example, specialized courses, including independent study, internship, dissertation/thesis, and student teaching cannot also be designated as online in the university's student information system. It is possible that some sections of these specialized courses are actually considered to be online courses (such as when the section is dedicated for students in an online degree program), but that information is not currently recorded. Also, the researchers did not have access to other data sets that would be obvious to include in research on LMS usage, such as course grades, achievement of student learning outcomes, or faculty and course evaluations. It would be worthwhile to investigate whether specific tools or combinations of tools impact these types of outcomes, but requires data management structures or protocols not currently in place at the institution.



### **Conclusion**

This is just the beginning of using LMS tool usage data to investigate patterns of teaching and learning. At this one institution, LMS adoption overall may not be increasing because use has reached the saturation point. Total (100%) adoption is not likely to occur, and is not even a desirable outcome. However, it is clear that individual tool use is still increasing, with obvious differences between online and face-to-face course modalities.

There are several future directions that study of LMS usage should consider. For example, this study only considered descriptive statistics of usage trends, and further statistical analysis is needed. In addition to considering individual tools, there is much to be learned about clusters or combinations of tools. Which tools are used together and create synergies of practice? In addition to the differences by course modality, are there also differences to be seen by academic discipline or by pedagogical approach? While using LMS database logs provides a comprehensive and unbiased view of the use of LMS tools, it cannot interpret intention or motivation for use. Future research should also consider why faculty use the LMS in general, or what their pedagogical intention is for adopting individual or clusters of tools within the LMS.

Despite the growing popularity of Next Generation Digital Learning Environments (NGDLE), which are loosely coupled collections of tools (Brown, Dehoney, & Millichap, 2015a), studies such as this show that there is still a need for formal learning management systems to provide structure for the learning process. While the NGDLE is an attractive application of the more advanced cloud-based tools and emerging protocols such as LTI and xAPI, the extensive use of the LMS and of the variety of tools used in each course indicate that the more flexible NGDLE environment may also require too much time and knowledge for individual faculty to implement.

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# An Instructor Learning Analytics Implementation Model

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## **Abstract:**

With the widespread use of learning analytics (LA) tools, there is a need to explore how these technologies can be used to enhance teaching and learning. Little research has been conducted on what human processes are necessary to facilitate meaningful adoption of LA. The research problem is that there is a lack of evidence-based guidance on how instructors can effectively implement LA to support students. The goal of the study was to develop and validate a model to guide instructors in the implementation of LA tools. Using design and development research methods, an implementation model was constructed and validated internally. Themes emerged falling into the categories of adoption and caution with six themes falling under adoption including:

- LA as evidence,
- reaching out,
- frequency,
- early identification/intervention,
- self-reflection, and
- align LA with pedagogical intent.

Three themes emerged falling under the category of caution including:

- skepticism,
- fear of overdependence, and
- question of usefulness.

The model should enhance instructors' use of LA by enabling them to better take advantage of available technologies to support teaching and learning in online and blended learning environments. Researchers can further validate the model by studying its usability (i.e., usefulness, effectiveness, efficiency, and learnability), as well as, how instructors' use of this model to implement LA in their courses affects retention, persistence, and performance.

*Keywords:* Information Systems, Learning Technology, Learning Analytics, Design and Development Research

McKee, H. (2017). An instructor learning analytics implementation model. *Online Learning*, 21(3), 87-103. doi: 10.24059/olj.v%vi%i.1230

## Introduction

### Background

Learning analytics (LA) is the collection, analysis, and reporting of available data to improve the teaching and learning process and environment (Siemens & Long, 2011). There are two main categories of research in the field of LA. The first is on how to capture, process, and present data to educational stakeholders in useful ways. The second, and less common, focus of research is on how to take up and use analytics in practice to inform choices or prompt action (Wise, Vytasek, Hausknecht, & Zhao, 2016). More simply, the majority of research has focused on how to create useful information from large quantities of collected data (Dawson, Gasevic, Siemens, & Joksimovic, 2014). Less research has been conducted on how to actually put this information to use to achieve desired purposes in the educational environment (Ferguson et al., 2014; Lockyer, Heathcote, & Dawson, 2013; West, Heath, & Huijser, 2016; Wise, 2014; Wise et al., 2016). LA holds potential application for a range of stakeholders in higher education including instructors, researchers, curriculum developers, learning environment designers, and university policy makers. LA is utilized at many levels within academic institutions, but a common application is at the course level (Dziuban, Moskal, Cavanagh, & Watts, 2012). Data within the learning management system (LMS) regarding student activity can be tracked and analyzed to monitor student progress, predict student success or failure, or inform instructional design. LA at the course level is an important area of research that promises to improve learning outcomes in online and blended courses by providing rich information regarding participation and performance to instructors and students alike.

Much of the literature in the second category of LA research uses the term “intervention” to describe the act of taking up and using analytics in practice (Lockyer et al., 2013; Wise, 2014; Zacharis, 2015). Wise et al. (2016) pointed out that this term can be useful, but can also include the undesired connotation that LA use is an interruption in the regular teaching and learning process. Instead, they chose to use the term “LA implementation” to describe the use of LA as an ongoing part of the regular monitoring and responsive adjustment to teaching and learning practices. This study also uses the term “LA implementation” to describe the process of taking up and using analytics in practice.

### Problem Statement

While LA tools may show that students who regularly log into an LMS perform better than their less active peers, this information alone changes nothing and does not mean the instructor will provide a suitable response (Roll & Winne, 2015). Furthermore, simply telling the student to log into the LMS more often will not be helpful (Dawson et al., 2014). While analytics tools may provide insight, they do not help instructors to provide a systematic and integrated response to such situations that will result in better outcomes for the at-risk student. As Wise (2014) stated, “without a plan for shifting patterns of teaching and learning activity, new technologies often remain ancillary to the teaching and learning process, either used tangentially to marginally enhance existing practices or often simply collecting dust on the virtual shelf” (p. 203). Little research has been done on what human processes are necessary to facilitate meaningful implementation of LA.

There is a general lack of research-based guidance on how various stakeholders (i.e., learners, instructors, and administrators) can effectively use LA tools, but researchers have begun to address this in recent years. West et al. (2016) presented a framework for institutional



implementation of LA to support student retention efforts. Wise et al. (2016) addressed the problem of how students can take up and use LA in practice, but many LA tools are designed for instructor use and students cannot access the information they generate. Mor, Ferguson, and Wasson (2015) focused on how instructors can use LA to inform their reflective practice and learning design, but very few studies have focused on how instructors can use analytics in practice to support the student learning process. There is a need for a model to support instructor-specific use of LA to encourage its systematic use as an integrated part of the teaching process. The research problem is that there is a lack of evidence-based guidance on how instructors can effectively implement LA in their courses.

This study focused on the use of LA at Southwestern Oklahoma State University (SWOSU). SWOSU is a regional university in western Oklahoma with approximately 5,000 undergraduate, graduate, and professional students enrolled and approximately 225 faculty members employed. SWOSU currently provides faculty with two LA tool options. All faculty have access to Canvas Analytics as part of the Canvas LMS. SWOSU is also piloting AspirEdu's Dropout Detective in two of its fully online programs including RN to BSN and Health Information Management (HIM). Both of these tools are designed for instructor use. This paper will present a brief review of literature concerning LA tools, models, and implementation. The methodology of the study will then be presented. Last, the resulting LA implementation model will be presented along with conclusions and recommendations for research and practice.

### **Literature Review**

A review of the literature guided the identification of what LA tools and models are currently available to instructors, how they are being used, and the benefits and limitations of such tools and models. This review informed the design and development of a preliminary model to guide instructor use of LA. The following review of literature includes a brief overview of the current state of the body of knowledge in the LA field regarding data capture, processing, and display as well as LA implementation.

#### **Learning Analytics Tools**

**Performance and tracking.** The majority of research in the LA field has been on the development and validation of LA tools to support student performance tracking. Spivey and McMillan (2013) as well as Mo and Zhao (2012) presented research studies focused on using Blackboard LMS to track student data. Spivey and McMillan (2013) investigated the relationship between student effort and performance by utilizing data already being tracked in Blackboard. The researchers found that more frequent access and a more evenly spaced study schedule (as opposed to “cramming”) had a positive effect on student performance. Mo and Zhao (2012) had very similar findings. Both studies focused on using the tools already built into the LMS to track student data to monitor students and analyze effort and performance. Similarly, You (2015) found a link between academic procrastination and course achievement when examining LMS data. These studies are examples of using the tools at hand to begin implementing the principles of LA in the online classroom.

Mazza and Dimitrova (2007) developed and analyzed a student monitoring tool for supporting instructors in online courses. The researchers surveyed users regarding the effectiveness, efficiency, and usefulness of their tool and found that the use of graphical

representations of data was important to the user. Similarly, Ruipérez-Valiente, Muñoz-Merino, Leony, and Delgado Kloos (2015) presented a study of another LA tool that visualized data for the user. Ali, Hatala, Gašević, and Jovanović (2012) presented two evaluations of their tool, LOCO-Analyst, which also focuses on visualizing LMS data for instructors, and, last, Macfadyen and Dawson (2010) discussed the development and implementation of another dashboard-like tool that also visualizes LMS data and found that meaningful information can be extracted from LMS data and tools can be developed which visualize student progress and the likelihood of their success. All four of these studies concluded that the visualization aspect is important so instructors are able to readily discern outliers and points of concern and react to such circumstances quickly.

**Student retention.** Another common theme found in the literature on LA tools is the development of tools aimed at increasing student retention. Retention efforts begin in the classroom, so this topic has many stakeholders and touches every level of higher education. Agnihotri and Ott (2014) presented the development of an LA tool aimed at student retention. They viewed this issue from an administrative level and sought to provide a tool for retention counselors within the university. The purpose of this tool was to provide retention risk ratings to counseling staff for each new freshman before the start of the fall semester. Agnihotri and Ott (2014) concluded that such tools are capable of increasing student retention, but that the development process must utilize a broad perspective of the entire retention process.

Similarly, Harrison et al. (2015) presented an early alert system designed to identify students at risk of discontinuing enrollment. They included demographic, institution, and learning environment variables in their model resulting in a tool that could accurately predict those at risk of discontinuing. Jayaprakash and Lauría (2014) presented yet another early alert system designed to identify students at academic risk for the purpose of increasing student retention rates. Knight and Shum (2014) took the discussion of tool development a step further by introducing the idea that the design LA tools should be informed by epistemology, assessment, and pedagogy. They made the point that it is not the tool itself, but the way in which it is wielded, which determines its value. This idea leads to the discussion of LA models to guide the implementation and use of LA tools.

### **Learning Analytics Models**

More recent research has gone beyond tool development and validation and begun to take a broader view of the issue of LA model development and validation. Martinez-Maldonado et al. (2015) as well as Scheffel, Drachsler, Stoyanov, and Specht (2014) presented frameworks to support the development and evaluation of LA tools, respectively. Ali, Asadi, Gašević, Jovanović, and Hatala (2013) sought to identify what specific factors would lead instructors to use or not use LA tools. Macfadyen and Dawson (2012) pointed out that LA should be consulted and integrated into the institutional strategic planning process. Ferguson et al. (2014) presented a framework to support the implementation of LA at the institutional level. Although no specific framework or model was presented, Dringus (2012) described a number of principles for the adoption of LA tools while expressing an attitude of caution when considering LA as being potentially “harmful.” Last, West et al. (2016) presented a framework for LA implementation in relation to student retention. This framework was meant to stimulate a discussion about the institutional implementation of LA.

Perhaps most relevant to this study are the frameworks presented by Wise (2014) and Wise et al. (2016). Wise (2014) presented a discussion of designing interventions based on the output of LA tools pointing out that this part of the process is often ignored and is a relatively unexplored area of research. There are three specific aspects of the application of LA: what traces of learning should be captured, how to present these traces to learners, and how to frame the inclusion of analytics as part of the course activity to guide their use in productive decision-making by learners and teachers (Wise, Zhao, & Hausknecht, 2014). These interventions have to do with the latter two aspects. Wise (2014) pointed out that as LA tools are becoming more prevalent, intervention design becomes critical to their effective implementation and offered the following important research questions: when in the teaching and learning process should analytics be consulted; who should be accessing analytics; why are they being consulted; and most importantly, how the use of the analytics articulates with the rest of the teaching and learning practices taking place.

Wise (2014) presented a framework which began to answer some of these questions, but a revised and extended version of this framework was presented by Wise et al. (2016). They presented a model for student use of LA as a part of a self-regulatory cycle of grounding, goal-setting, action, and reflection, the Student Tuning Model. The Student Tuning Model suggests that students engage in a continual cycle of planning, monitoring, and adjusting their learning practices as they are informed by analytics. The element of Grounding has to do with the relationship between the information the analytics provide and the specific educational context in which they are being provided. Students must understand the purpose of the learning activity, what represents meaningful engagement in the activity, and how the LA provided will reflect this to the student. Goal-Setting has to do with the student planning specific objectives and actions for reaching them in relation to the larger context established through Grounding. Action is when students engage in behaviors to realize their goals. Reflection occurs when students use analytics to reflect on the actions they took in comparison to the goals they set.

The Student Tuning Model was meant to outline how students might productively engage with analytics. Wise et al. (2016) also provided a framework for pedagogical design to support student use of analytics. The Align Design Framework includes the four principles of Integration, Agency, Reference Frame, and Dialogue/Audience. The first principle of Integration states that the instructor should position student analytics use as an integral part of the learning process. The second principle of the framework is Agency which has to do with students taking ownership of their learning process. The principle of Reference Frame states that instructors should provide a comparison point to students. The final principle of this framework is Dialogue/Audience. This principle states that the instructor should create an environment where interpretation of analytics is discussed between the instructor and students so that students don't simply feel that they are being watched.

While this framework is a good starting point, the research problem remains that there is a lack of evidence-based guidance on how instructors can effectively implement LA tools which are designed to present information only to the instructor and not the student. Wise's (2016) framework does little to help in this situation. Lockyer et al. (2013) addressed this issue in part by presenting the idea that a conceptual framework should be established for typical LA patterns expected from particular learning designs in order to better help teachers interpret the information that analytics provides. Lockyer's model has a narrow focus on how learning design can inform the use of LA and is difficult to generalize to a variety of learning situations.

## Method

A qualitative design and development research approach (Richey & Klein, 2007) was used to address the research problem that there is a lack of evidence-based guidance on how instructors can effectively implement learning analytics (LA). Specifically, model construction and validation methods were used to construct an instructor LA implementation model. The study took place within SWOSU and focused on the use of the LA tools available there.

First, the review of literature served as the basis for answering the first research questions: (a) what LA tools and models are currently available to instructors, (b) how are they using these tools and models to support teaching and learning, and (c) what are the benefits and limitations of such LA tools and models? Next, a needs assessment was conducted to address the second research question: what needs to be considered to design an effective model to guide instructors in using LA tools and implementing interventions? A survey and a follow-up focus group were used to identify needs of stakeholders including instructors, online learning administrators, and online learning committee members. Then, a preliminary model to guide instructors in the use of LA tools was designed based on the review of literature and the needs assessment which addressed the third research question: how can stakeholder needs inform the design of such a model? The next phase included an expert review of the model using Delphi panel technique. This approach addressed the fourth research question: how do instructors perceive the effectiveness and efficiency of the proposed LA model? Last, modifications were made to the model to implement suggestions from the Delphi panel, which addressed the fifth research question: what modifications are needed to improve the proposed LA model? This three-phase process (i.e., needs assessment, model construction, and model validation) resulted in a model, which is useful to instructors wanting to effectively implement LA tools in their courses.

## Results

### Overview

This study was designed to identify stakeholder needs regarding the implementation of LA at the course level in order to develop and validate a model to support instructor use of LA. The researcher began by conducting a needs assessment including a survey and two focus group sessions. The survey was used to collect quantitative and qualitative data from instructors regarding the use of LA in their courses. The survey included questions in the categories of demographics, prior use and perceptions, efficacy, model construction, and focus group participation. The focus group sessions were meant to elicit more detailed information from participants. The first session had seven participants in attendance, and the second had ten. Next, data from the survey and focus group sessions were analyzed in the context of the research questions and a model was developed based on the review of literature and analysis of the data. Last, the model was reviewed by a Delphi panel until consensus was reached. The model was approved by the panel, which serves as internal validation.

### Model Construction and Validation

The survey was sent to approximately 350 full-time and adjunct faculty from both SWOSU campuses. There were 61 (i.e., 17.42%) responses to the survey. The low response rate is explained by the fact that the survey was sent to both SWOSU campuses as well as adjunct instructors. Many of the recipients were unfamiliar with the topic of LA and uninterested in the study. The results of

the survey items in the categories of prior use and perceptions and efficacy confirmed the desire to implement LA in the classroom and the need for instruction on how to effectively do so. The next section of the survey asked the open-ended question: “What additional information or training would enable you to use learning analytic tools (e.g., Canvas Analytics or Dropout Detective) more effectively?” Of the 61 respondents, 34 provided a response to this question. These qualitative data was analyzed along with the focus group data. The next section of the survey asked participants if they would be willing to participate in a focus group. Of the 49 participants who answered this question, 31 responded that they would be willing to participate (63.3%). Those who answered yes provided their contact information (name, email address, phone number) in the final section of the survey.

The next phase of the study were the focus groups. The researcher conducted two focus group sessions because of the large number of willing participants. There were initially 31 survey respondents who stated they would be willing to participate. Once scheduled, the focus group sessions were attended by a total of 17 participants. A semi-structured approach was used, with the researcher using the focus group protocol to loosely guide the discussion and asking follow up questions when necessary. The researcher took brief notes and had a teaching assistant take an additional set of notes. Each focus group session was scheduled to run about one hour. Both sessions ran about 15 minutes over the allotted hour due to rich discussion that occurred. The notes from the focus group sessions, as well as the text from the qualitative survey item, were loaded into qualitative research software which was used to analyze, identify themes, and code the data according to the themes.

The resulting model, which is included in the next section, was validated internally using a Delphi panel method. The researcher recruited three participants from the focus group sessions to participate in the Delphi panel. These three participants were considered subject matter experts in LA at SWOSU. Their participation in the focus group sessions also enabled them to assess whether the model addressed the needs and opinions voiced during the focus group session. The model was sent to the panel by email, and they were asked to complete a questionnaire to assess whether the model adhered to what was discussed during the focus group as well as the usability of the model according to the Rubin and Chisnell’s (2008) attributes. For the most part, the Delphi panel found the model to be complete, useful, efficient, effective, and learnable. Three suggestions for improvement were made, but after discussion and clarification of the model's purpose, it was determined that the suggestions were beyond the scope of the model's intent and the model was approved. This served as internal validation of the following model.

### **Resulting Model**

Based on a review of the current literature regarding LA and a needs assessment (including a survey and two focus group sessions) regarding LA implementation at SWOSU, the following instructor LA implementation model was developed (Figure 1). The first focus group session was very positive and implementation strategies were discussed and refined. The second group expressed a very cautious attitude toward the implementation of LA. It became clear during the focus group sessions that the themes identified fell into two broad categories: adoption and caution. These contrasting attitudes reflect the various tones of literature concerning LA implementation (Dringus, 2012; Wise, 2014). Although themes fell into these two seemingly conflicting groups, the model is meant to demonstrate that both adoption and caution are part of the overall implementation process. Themes are organized according to these two categories, and practical and conceptual guidelines are presented based on these themes.

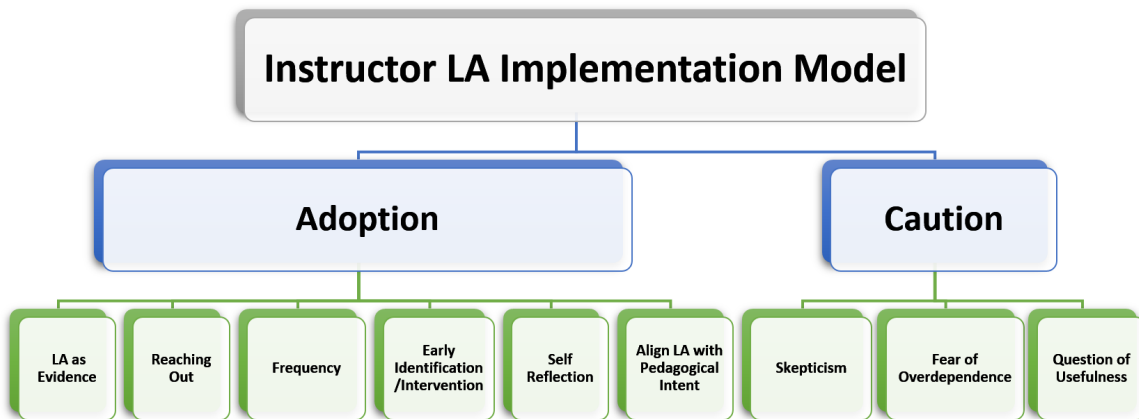


Figure 1. Instructor Learning Analytics Implementation Model

**Adoption.** Many instructors participating in the focus groups already used LA extensively in their courses. Others were eager to learn more and begin the implementation process. Based on the needs assessment and review of literature the following themes emerged: LA as evidence, reaching out, frequency, early identification/intervention, self-reflection, and aligning LA with pedagogical intent. These themes fell under the category of *Adoption*.

**LA as Evidence.** It seems that many instructors appreciate that LA provides indisputable facts and information. This type of information can be used in a variety of ways, but it is a common theme that instructors appreciate the ability to look up and report hard data. For example, this information can be used to confirm or dispute a student's story if he claims computer issues prevented him from completing his work. It might also help to support an instructor if a grade is disputed because LA can track student activity as well as student/instructor communication. Instructors might also use charts, graphs, etc. from an LA tool when reaching out to a struggling student. These data can help justify instructor concern and persuade the student that there is a problem that needs to be addressed. Instructors might also benefit from their students knowing that this information is readily available. If a student knows that the instructor can see a high level of detail on student course activity, this increases accountability on the student's part. He will feel that his actions matter and someone is paying attention.

It can be very difficult for instructors to remember details regarding student activity, communication, etc. When implementing LA in a course, instructors should remember that these tools are there to support their teaching practice. When questions arise, instructors should remember to consult these tools because they often reveal more information than instructors can readily recall themselves. In addition, when contacting students regarding participation, activity, or grades, it might be helpful to include data generated by LA in that line of communication. This evidence helps students understand that instructors are not relying solely on instincts or memory, but that specific facts and details are available.

**Reaching out.** Many instructors expressed that LA helps them to reach out to students who are struggling and can result in a better relationship. Instructors often use the information generated by LA to identify students who are struggling or falling behind, and "reach out" to these students by contacting them personally. This simple act is often enough to help students improve because

it lets them know that someone notices and cares. One focus group participant said it “shows the students that you are aware of what they are doing and how they are performing. Giving them a heads up early on makes them feel that they are in charge of their performance. Sometimes they may just admit that they are lazy, but at least it is up to them how they will move forward. It also lets them know that you can identify problems.” Another said that acting on non-participation lets students know they are missed.

Instructors can use LA tools to identify students who are struggling and initiate some kind of conversation with them. Sometimes students might just need a little nudge. Often students in large or online courses feel that no one notices whether they succeed or fail, and even a few words can make a big difference. Instructors teaching large or online courses know that it is difficult to monitor the progress of so many students when instructors often do not ever meet these students face-to-face. The job is not easy. LA tools can make that job a bit easier so instructors can be more effective in reaching out.

**Frequency.** A useful strategy is to consult LA tools consistently as the course progresses. Many instructors make a habit of consulting these tools once or twice per week to see if there is any new information to act upon. This consultation provides instructors with information on student activity in addition to what is observable from the course itself. How often these tools should be consulted depends on the course structure. What is important is to develop a schedule that works for the course and abide by it. Wise et al. (2016) stated “the frequency with which the analytics are provided or accessed as well as the schedule for reflective activity will vary depending on the context. The goal is to create a specific timing for cyclical review” (p. 12).

**Early identification/intervention.** Many instructors feel that LA tools are most beneficial early in the course because it is important to identify struggling students early when there is still time to get them back on track. One focus group participant suggested always having an assignment due during the first week of the course and using these tools to see which students are not putting that effort in right off the bat. Identifying and intervening early with these students is key. Another participant recommended identifying where the “point of no return” is in each course and being mindful as it approaches. Helping students get on track with the course before this point can increase the probability of success.

Additionally, it is important for instructors to develop consistent intervention strategies to use when acting upon the information provided by LA tools. Many instructors benefit from the use of preformatted messages. These messages can be used to reach out to struggling students, advise them on where to find help, and direct them to campus resources such as retention, tutoring, writing center, etc. These messages should by no means be restricting and should be edited and customized to whatever degree the instructor prefers, but having preformatted messages makes this kind of communication more consistent and can save instructors’ valuable time. It is also beneficial to decide beforehand what constitutes a need for intervention and what kind of intervention is appropriate. Many instructors develop a flowchart or similar visual depiction of their policies, which helps them to decide when and how to intervene. A flowchart like this also provides consistency and saves time.

**Self-reflection.** A common theme in the literature as well as in the needs assessment is the use of LA for the purpose of self-reflection. LA can provide a wealth of information to instructors wanting to assess their course and teaching practices. Focus group participants discussed how LA can be used to analyze teaching and adjust courses based on findings (e.g., when students are

actively involved, when they lack interest, and where there are areas of improvement). Using LA for test item analysis is useful to this end. Analyzing which exam questions are most frequently missed can reveal what teaching areas need more focus or perhaps might reveal some “bad questions.” One focus group participant mentioned that she uses LA to see what level of instructor discussion participation results in higher student evaluations. This helps her to identify how much participation is appropriate so as not to monopolize the conversation or have too small a presence.

Instructors wanting to implement LA in their course structure can greatly benefit from using LA as a tool of self-reflection. The information can supplement the traditional course and instructor evaluation and perhaps reveal more detailed information. This type of self-reflective activity can take place throughout the teaching and learning process, but also at the end of each semester before beginning another. Instructors can use what they learned from LA in one semester as they design and make changes to the course for the next semester.

*Align LA with pedagogical intent.* The last theme of LA adoption identified in the literature and needs assessment is that the use of LA tools must align with the instructor’s pedagogical intent. These tools are not one-size-fits-all. There are some circumstances in which certain features are not useful in a course. There are even situations where LA is not useful at all in a course. Instructors must always be mindful of what is being measured and reported and whether this information is an accurate reflection of learning based on their course design. Pedagogy must drive the use of LA. Wise et al. (2016) presented the Align Design Framework which offered principles for pedagogical practice to support the use of LA. The idea is that instructors can adjust their pedagogy to support LA implementation. While there is an important relationship between pedagogy, course design, and the use of LA, focus group participants felt that pedagogy is of greatest importance and the use of LA must be aligned and adjusted to fit the developed pedagogy. One focus group participant stated, “You must analyze what elements of LA tools will add value to your course and know this before the course begins so you have a plan for how to use LA in your course.” It is important for instructors to understand what is being measured by these tools and how, consider how these measures align with the course structure and pedagogy, and remember this when consulting these tools and acting on the information they provide.

Another participant noted that the use of LA also depends on the interest of the faculty member. This model is useful for faculty who desire to utilize LA, but the use of these tools should not be forced. Some instructors are not interested in these tools and feel that they can serve their students and develop relationships without the use of this type of technology. LA should only be used to supplement and assist instructors but will never be able to replace the personal connection between instructors and students.

The idea of aligning the use of LA with the instructor’s pedagogical intent was discussed from a number of perspectives relating to the implementation and adoption of LA, but it was also discussed from a cautionary perspective. Many participants felt that instructors implementing LA in their courses must be wary of these tools and consider how much weight should be placed on the information they reveal. These concerns relate to the second category of themes, which reflect an attitude of caution.

**Caution.** Much of the literature, as well as the qualitative data collected in the needs assessment, revealed a very cautious attitude towards the implementation of LA in the classroom. Many felt that these tools can be inaccurate, impersonal, or intrusive. It is common for users to be wary of new technologies, and LA is no exception. A number of themes emerged within this



category such as: skepticism, fear of overdependence, and the questioning of the overall usefulness of LA.

***Skepticism.*** If LA is going to be useful in a course, it is essential that the use of LA aligns with the instructor's pedagogical intent; however, many instructors question whether this can be the case. When these tools are not transparent about how they collect, analyze, and report data, instructors become skeptical as to whether the data can be trusted. The way these tools measure student success is not always representative of the students' effort and performance. In addition, different tools use different metrics so it is difficult to compare them. Transparency is essential if instructors are going to trust that the information provided by LA tools is accurate and can be acted upon. One participant noted that she wants to see exactly what measures are going into the algorithms that detect and label "at-risk" students.

Similarly, there is concern that LA is too often about the bottom line and does not take the cultural context of the students and campus into account. An example of this is that many students at SWOSU work full time, often on a family farm. These students might begin to struggle to keep up, and LA does not reflect these types of situations. LA is unable to identify students who are personally at-risk in some way rather than academically at-risk. While LA cannot detect this level of detail regarding students' personal circumstances, they can accurately reflect symptoms of a deeper problem. One participant noted that these tools must be used critically to help instructors understand these underlying causes.

Another concern is that students may begin to understand what activity these tools measure and how they measure it, and these students may begin to "work the system." For example, if an LA tool measures how long students are logged into the LMS, they may log in and stay logged in while working on other things and not actively engaged in the course. Another example is if an LA tool measures the number of clicks (e.g., click tracking software) students may use this to their advantage by clicking their mouse randomly to increase their participation level. One participant said that students might think "you want more clicks, I'll give you more clicks!" Some LA tools measure student performance in relation to the performance of the class as a whole. Some participants expressed concern that students may attempt to take advantage similarly to when a class is graded on a curve. Everyone underperforms because they know their performance is measured as it relates to the class as a whole. While it is uncommon for instructors to actually assign grades based on LA data, the concern about this misuse of LA is real.

Participants expressed the fear that LA tools may encroach on privacy in some way. This concern has already been expressed in the literature on LA. Picciano (2014) pointed out that "as well-intentioned as LA might be in terms of helping students succeed, this 'big data' approach may also be seen as 'big brother is watching' and, as such, an invasion of privacy that some students would find objectionable" (p. 41). Many fear that it might make students uncomfortable for instructors to have this level of detailed information, but they also fear that administration will use this information to monitor instructor performance. This fear of surveillance is closely related to the fear that these tools do not always measure performance accurately because there is no "one-size-fits-all." The concern is that administration will use LA destructively to monitor employees, which might create a privacy issue.

One participant mentioned that faculty and administration alike must come to a level of "rhetorical literacy" in order to make proper use of LA. Selber (2004) introduced the idea that there are different levels of literacy, which can be developed regarding the use of technology:

functional literacy (computers as tools), critical literacy (computers as cultural artifacts), and rhetorical literacy (computers as hypertextual media). The participant noted, “The basic idea is functional literacy is the most basic kind of usage of technology, while rhetorical literacy requires a much more sophisticated self-awareness of the technology user. Selber (2004) argues that most users get stuck in the critical literacy stage and think that there is no other place to go, especially when it comes to using technologies responsibly and ethically.” This participant felt that users of LA tools should reach a level of rhetorical literacy in order to use LA properly, but also felt that is unlikely to happen. The main concern was that administration could inappropriately use this technology to monitor instructors without having a true understanding of the technology, the course, the instructor, or the pedagogy. Rhetorical literacy would mean that these things are critically understood which would enable users to make effective use of LA. Many participants felt that LA should be used as a tool, not a weapon.

***Fear of overdependence.*** A similar theme found in the needs assessment is the fear that users will become overly dependent on these tools. The concern is that faculty and administration might put too much stock into these tools and treat them as the “end-all-be-all” solution to the problem of helping at-risk students and increasing retention. One participant noted that it is a problem in our society in general for people to want a quick-fix answer or something that will make everything better, but that is not how it works. There is a time and a place for LA. He advised to not be too critical or too enthusiastic about the use of LA. Just as LA should be used as a tool, not a weapon, users need to remember that it is only one tool in the toolbox.

***Question of usefulness.*** Finally, some instructors question the overall usefulness of LA tools. Many mentioned that some students are just not prepared for a course and there are no interventions that would enable the student to succeed. One participant also questioned to what degree instructors should commit to helping the students succeed, and what should simply be left to the student. While it is ultimately up to the student to succeed in a course, instructors should also be available and willing to use whatever resources and time they have available to support students. LA tools ultimately save instructors time and act as an assistant for instructors wanting to look deeper into the level of student participation.

***Model Conclusions.*** It is important to be mindful of these themes and cautious about the implementation of LA, but these concerns do not mean that LA cannot be implemented successfully when approached cautiously. Instructors should remember that LA is a powerful tool, but should not be used as a weapon, and this tool is only one in the toolbox. LA is not a quick fix answer that will ease all of the retention problems faced by instructors, but it can serve to assist them in their efforts to support students, which is the ultimate goal. These tools must be used critically while seeking to reach a level of rhetorical literacy concerning this new technology, which can greatly benefit students and instructor practice if implemented appropriately and effectively.

## Discussion

The purpose was to develop and validate an instructor learning analytics (LA) implementation model. This model was developed to enable instructors to effectively implement whatever LA tools they have available in their courses. Although based on the research conducted at a single institution using only two available LA tools, the model is intended to be generalizable to a number of environments and LA tools. A thorough review of the existing literature on LA as well as a needs assessment guided the development of the model.

### Implications

This study helped to identify the needs of instructors wanting to implement LA in their courses. The results informed the design of an instructor LA implementation model. The model was validated internally by a panel of experts. The final model includes practical and conceptual guidelines regarding the use of LA and is meant to be generalizable to a number of environments and LA tools.

### Recommendations

This section includes two categories of recommendations. First, recommendations for future research are presented. Second, recommendations for professional practice in relation to the implementation model are presented.

**Future research.** This study could be expanded to include external validation of the model presented here. Using the instructor LA implementation model from this study, researchers can work with an institution of higher education to study the impact of the model's use. This type of study would also measure the model's usability (usefulness, effectiveness, efficiency, and learnability) in a setting external to the one where the model was developed.

The model could also be studied in relation to student retention. Researchers could seek to study how instructors' use of this model to implement LA in their courses might affect course grades and student persistence. Researchers could also study the effect of the model's use on the overall teaching and learning process.

**Recommendations for practice.** The first recommendation is that instructors at SWOSU wanting to implement available LA tools and technologies (i.e. Dropout Detective and/or Canvas Analytics) use the model presented here to support their efforts. Review of this model will enable instructors to better understand how to effectively implement LA in their courses. The model demonstrates the benefits of LA and practical and conceptual guidelines to guide LA implementation. It also includes some areas of caution that instructors should be aware of so as not to fall into common pitfalls in the implementation of LA. The model should be made available to SWOSU instructors through the Center for Excellence in Teaching and Learning, and a workshop should be offered by the researcher for interested faculty.

Second, since the model was designed to be generalizable to a number environments, instructors at other universities can use the model to implement LA in their course. This model is meant to be something that can be adopted and used by individual instructors in individual courses. The institution as a whole does not have to implement this model as a standard of practice. Instructors can use this model at will, and it should be used only by those who have an interest and desire to do so. The researcher will make this model available to any interested parties who might put it to use in order to improve their teaching practices.

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# Blended Learning from Design to Evaluation: International Case Studies of Evidence-Based Practice

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## Abstract

This study compares and contrasts four international faculty development programs for blended learning in order to understand the benefits, challenges, lessons learned, and recommendations from such initiatives. The benefits identified for faculty members, who participated in these programs, were that they became more reflective of their teaching practice and began to make a role adjustment from being a content provider to a designer and facilitator of learning for students. The biggest challenge appeared to be a lack of common institutional definition and understanding of blended learning as well as a lack of time and resources to support faculty in the redesign of their courses. With regards to lessons learned, each program emphasized the need for all institutional stakeholders to be involved in supporting the initiative and that blended learning does not simply imply adding digital technologies to an existing face-to-face course. The key recommendation from this study is that a faculty development program for blended learning needs to be clearly aligned with the institution's vision and mission.

*Key Words:* blended learning, institutional vision, pedagogical framework, reflective practice

Vaughan, N., Reali, A., Stenbom, S., Van Vuuren, M.J. & MacDonald, D. (2017). Blended learning from design to evaluation: International case studies of evidence-based practice. *Online Learning, 21*(3), 103-114. doi: 10.24059/olj.v21i3.1252

## Introduction

Universities and colleges around the world are increasingly adopting blended approaches to learning and teaching (Cher Ping & Libing, 2016). The EDUCAUSE Learning Initiative (2017) recently identified faculty development for blended and online teaching as the number one key issue for teaching and learning in higher education. A significant proportion of faculty in higher learning institutions have had little formal teaching development and experience. Add to this, the

pressure that is being placed on these institutions to increase access to higher education, to improve the quality of student learning, and to control or reduce the rising cost of instruction and it is not difficult to see the challenge and importance of faculty support programs (Kenny, 1998; Twigg, 2003).

In response, many institutions have initiated professional development programs to help the faculty prepare for blended teaching and effectively integrate technology into their teaching practices. These programs usually involve technology training workshops, seminars, summer institutes or project based work with a production team to create a course web site (Murray, 2002). One of the criticisms of these types of faculty development initiatives is that they do not create opportunities for sustained critical reflection and discourse about one's teaching practice. A study by the American Association of Higher Education (Rice, Sorcinelli, & Austin, 2000) suggests that:

Faculty want to pursue their work in communities where collaboration is respected and encouraged, where friendships develop between colleagues within and across departments, and where there is time and opportunity for interaction and talk about ideas, one's work, and the institution. (p.13)

Faculty have indeed indicated that they want to pursue their work in communities where collaboration is encouraged and respected, however scheduling regular face-to-face meetings is becoming ever more difficult. Increased teaching and research commitments leave faculty with little time for professional development. This study compares and contrasts four international faculty development programs for blended learning. Specifically, with regards to the:

1. Rationale for the blended learning faculty development initiative
2. Benefits
3. Challenges
4. Lessons learned
5. Recommendations

### **Rationale**

The four institutions that participated in this study are the Universidade Federal de São Carlos, Brazil, KTH Royal Institute of Technology, Sweden, North-West University, South Africa, and the University of Ottawa, Canada

For the Universidade Federal de São Carlos in Brazil, the main driver for the professional development initiative was to help faculty develop successful approaches to distance and blended teaching. In 2009, SEaD (Secretary General of Distance Education) an academic support organization was created. The purpose of this unit was to execute university policies and support the development of the Open University (established in 2006) and blended approaches to teaching. This organization also develops quality educational standards for distance education and the use of digital technological resources. In addition, the unit actively researches topics and issues related to distance and blended education.

Since its founding in 1827, KTH Royal Institute of Technology in Stockholm has grown to become one of Europe's leading technical and engineering universities, as well as a key centre of intellectual talent and innovation. KTH is Sweden's largest technical research and learning institution and home to students, researchers, and faculty from around the world dedicated to advancing knowledge. As a classical 'brick-and-mortar institution', the rationale for KTH to emphasize a blended approach to learning is to enhance the quality of the courses that are offered



at the University. This is accomplished by helping faculty develop new learning activities and assessment methods through the use of digital technologies that can complement or replace the standard course design of lectures and written exams. The blended approach to learning that KTH is adopting is aligned with the institution's vision for 2027, which emphasizes "the virtual and physical learning environment should be equally important" (KTH, 2017).

North-West University (NWU) in South Africa consists of three main campuses with over 64,000 students. Based on a directive from the federal government, the NWU and many other higher education institutions in South Africa have adopted blended learning as a strategy to improve equitable student access and success. Their blended learning strategy has become imperative to accommodate the ever increasing numbers of students and to extend access to new populations of students, alleviate the demand on physical infrastructure, and to enhance the process of teaching and learning for the diverse body of students. New digital technologies provide opportunities for trainers, teachers, and developers to create new learning environments that support and enhance students' cognitive experiences as well as the social environment contributing to student success.

At the University of Ottawa in Canada, blended learning is endorsed by the Board of Governors as a means of reaching objectives set out in their strategic plan *Destination 20/20*. (University of Ottawa, 2017). In particular, the University's commitment to promote quality teaching on campus, enrich the student learning experience, and facilitate the career development of professors in the area of pedagogy and teaching innovation.

The blended learning initiative, offered through the Teaching and Learning Support Service (TLSS), is steeped in a course design process, which elaborates on the stages of a constructing a course, practices for assessing and evaluating students, proper ways of integrating technology, producing multi-media content, best practices for delivering a course, and strategies for evaluating and improving our teaching. Support is provided in a variety of formats (online modules, blended workshops, consultations, and online resources) to account for the different needs and schedules of faculty. Additionally, incentives are provided in the form of annual grants for blended course development and an excellence award for blended course design.

## **Benefits**

Each of the four international universities involved in this study have identified the benefits of their blended learning initiatives. For example, at the Universidade Federal de São Carlos in Brazil a key benefit has been an increased focus on the teaching-learning process, specifically by faculty members being more explicit and deliberate with their pedagogical approaches to learning in their blended courses. In addition, the online training that faculty have received through the blended learning program has helped to overcome the institutional dichotomy of face-to-face versus distance education. Administrators, faculty, and students are now recognizing the value of online and blended approaches to learning in higher education.

A distinguishing feature of the KTH Royal Institute of Technology is that in order to gain tenure in Sweden faculty members are required to complete ten weeks of courses about teaching and learning in higher education. Two of the courses offered at KTH are specifically about blended learning. One is an introductory course and the other one has a project-based focus (Table 1). The major benefit of these courses is that faculty's perspective about blended learning has started to change. Faculty now view blended learning as a pedagogical approach that can be used in all programs rather than by just the early adopters of technology. Another advantage of introducing

blended learning at KTH is that faculty have been triggered to reflect on their current practice as teachers and encouraged to work more on the educational design of their courses.

Type	Course Title
Core	Teaching and Learning in Higher Education
Electives	Teaching Strategies and Design for Online and Blended learning
	Designing online and blended courses – a project course
	Learning for Sustainable Development
	Develop the learning by grading criteria
	Leading Educational Development
	Supervision and Assessment of Degree Project Work in First and Second Cycle

*Table 1.* KTH courses in teaching and learning in higher education for faculty members

To date, North-West University in South Africa has identified four major benefits of blended courses. First, this mode of delivery provides students with more flexible opportunities for learning by means of on-and off-campus educational experiences. Second, the design of blended courses supports the learning needs of a diverse student body, by involving students in a range of individual and collaborative learning and assessment activities, so that they can engage as learners who progressively assume responsibility for their own learning. Third, blended courses create an enabling learning environment for students that focuses on inquiry-based, active, participative, responsive, and meaningful engagement. Fourth, a blended approach can foster communities of learning outside the formal classroom and promote teaching and learning innovation.

At the University of Ottawa in Canada, the benefits of establishing a blended learning initiative have been identified at the faculty and administrative levels. In particular, the advantages described relate to the ways that perspectives and practices have changed as a consequence of the blended learning initiative.

From a faculty perspective, an introduction to blended learning created new entry points to discuss issues related to teaching and learning. For example, interest or misconceptions about the blended format spurred registration in workshops on the topic. The resulting participation created opportunities for faculty to reflect on and redesign components of their course, experience and evaluate educational technology, connect to faculty with similar interests, learn about different facets of teaching and learning, and become aware of the tools, support, and services available to them on campus. Regardless if a blended course was fully realized by a faculty member through the training process, the incremental application of principles shared in workshops helped create a more comprehensive understanding of course design, teaching, and learning. Incidentally, connecting with the TLSS prompted further participation in workshops, events, and use of consultation services. As a result, the TLSS has been able to identify and collaborate with faculty champions who share their experiences with blended learning and act as agents of change on campus.

From an administrative perspective, support of faculty in converting courses, recognition of blended learning as viable and equivalent to other formats, and promotion of this approach to teaching and learning at the program level has created entry points to evaluate and innovate current teaching practices. Additionally, administrative support demonstrates value placed on faculty member's teaching and learning practice, creates a more diverse course offering that meets students' needs, and helps meet objectives set out by the university's strategic plan. For example, applications to blended learning grants must be approved by directors who often led development efforts; programs that obtain funding for multiple courses use the opportunity to have program level discussions about how to adjust their courses, take part in training as a group, or make use of consultation services.

While others such as Siemens and Dawson (2015) have identified the advantages of blended learning from the student perspective, the blended learning initiative at the University of Ottawa has not *directly* supported students. However, material was created for faculty members to provide informational, technical, and promotional content to their students. In addition, collaboration with campus services providing direct student support is ongoing.

### **Challenges**

Conversely, a series of challenges associated with blended courses have also been encountered at the four study institutions. The Universidade Federal de São Carlos has identified challenges at the macro, meso, and micro system levels. The macro system focuses on factors external to Universidade Federal de São Carlos. The key challenge at this level is dealing with an unstable Brazilian educational policy and with the modification of the financial parameters in the case of the Open University of Brazil. The meso system refers to challenges internal to Universidade Federal de São Carlos. The key challenge at this level has been to promote a 'new teaching culture' with a focus on student learning and teacher presence in the online environment. Other challenges include translating the 20% reduction of class time for blended courses into action and recognizing distance education and the use of digital technologies as methodological tools. At the micro-level, inside SEaD (Secretary General of Distance Education), numerous challenges have also been encountered. These challenges primarily relate to different theoretical perspectives, objectives, and personal points of view about blended courses.

At KTH Royal Institute of Technology, the major challenge for redesigning courses for blended learning has been time and resources. The institution needs to balance the resources required to support blended courses between the costs for purchases or programming of systems (add-ons) versus the cost for training and support of faculty members. As blended learning is a significant shift in faculty's approach to teaching the institution needs to provide them not only with support and tools for development but also the time to re-design their courses. In addition, faculty members often find it difficult to transition to their new roles as facilitator and designer rather than on just being a content provider in a blended course.

North-West University in South Africa has encountered challenges with the slow adoption of digital technologies by faculty into their teaching practice, developing a shared vision and understanding of blended learning at the institution, student readiness for this approach to learning, and change management issues. With regards to digital technologies, some of the barriers to the adoption of blended learning by faculty are their own adequate or inadequate computer skills, lack of time to prepare new and appropriate teaching and learning materials, students' restricted access to technological resources, and a lack of innovative teaching strategies to address the digital

generation of students. Faculty's use of digital technology is often limited to research, academic writing, and communication. Few have advanced experience using technology for teaching activities. Successful digital technology adoption, therefore, depends on the perception and skill level of an individual faculty members.

Another challenge to overcome is a lack of a shared single vision and understanding of blended learning amongst faculty and the academic development staff and management at NWU. A clear institutional framework, shared understanding and goal is needed to achieve successful implementation. It is essential that faculty display a contextually correct understanding of the concept of blended learning in order to perform related activities accordingly. Even the faculty members who indicate that they are comfortable integrating ICT's successfully, often do not have the confidence to engage in blended courses due to a lack of adequate knowledge of blended approaches to teaching. Without a universal definition of blended learning there is no shared language by which the education field can describe the phenomena or address its opportunities and challenges. This complicates the situation and slows down the blended learning adoption rate tremendously. Although faculty have used computers and technology for a number of years in very innovative ways in their classroom teaching, until recently they have not generally used technology to provide students with a true "blend" of instruction that gives them some element of control over their learning. The institution needs to provide the necessary support to use digital technology in such a way that it brings about a fundamental shift in instruction that has the potential to optimize learning for the individual student in ways that traditional instruction never could.

With regards to student readiness for blended courses at NWU, there is a great deal of diversity with regards to location and support. For example, on-campus students have ready access to learning materials, computers, and the Internet whereas distance education students have variable access (e.g., excellent to none).

In terms of change management, the focus should be on creating blended educational environments that include the provision of high-quality learning materials to support interactive learning processes in which students develop their capacity for self-directed learning.

At the University of Ottawa in Canada, much like KTH in Sweden, there exists challenges with the time and resources needed to implement and modify our blended learning initiative. Additionally, while bilingualism is a strength and point of pride of the university, the creation of material in both languages compounds the challenge of time and resources. For example, a recent switch to a new Learning Management System (LMS) requires updating resources, workshops, and re-training staff and professors on the new platform. This in turn takes time away from developing new material on more current topics like multimedia production.

The original target of the University of Ottawa's blended learning initiative was to redesign 1000 blended courses and train 500 professors by the year 2020. However, this timeline has proved to be unrealistic as faculty members develop and integrate components of blended courses slowly and strategically. This slower pace of adoption has allowed faculty to become more familiar with the technology and support available and more comfortable with characteristics of the blended format. As a result, the development of blended courses, as per their definition, lags behind the training of professors.

Finally, while the TLSS experiences great support and enthusiasm for blended courses from some departments, others are slower in their adoption of the format. This is due in part to the diverse needs and agendas across faculties and some prevailing misconceptions about the

definition of blended learning. The result is an uneven distribution of courses developed across faculties and continued promotional efforts aimed at informing the campus community about the format.

### **Lessons Learned**

Based on their experiences supporting faculty development for blended learning each of the four institutions provide a series of lessons learned. The Universidade Federal de São Carlos has developed a series of lessons that apply to the macro, meso, and micro systems involved in supporting blended courses. At the macro level, they have attempted to develop patience, resilience, and creativity to deal with Brazil's continual changing educational policies and support for blended and online learning. With regards to the meso level, inside the university, they have learned that change takes time and extensive dialog is required, it cannot be imposed. The institution must realize that faculty members' timelines for change often differ from those mandated by the university. In terms of the micro level, inside SEaD (the unit mandated to support blended courses), there must be an emphasis on constructive and collaborative work, planned activities, sensitive listening, dialog, persistence, and the establishment of links of trust between the SEaD professional staff and faculty members. Garrison (2016) has recently written about how "Thinking and learning in collaborative settings provide an environment where participants engage in critical reflection and discourse. The intended outcomes are not only personal meaning but mutual understanding. Thinking and learning collaboratively is a process of engaging with new ideas, raising questions, and clarifying misunderstandings" (p.vii).

KTH Royal Institute of Technology has learned that change can begin to take place when everyone at the institution values online and blended approaches to teaching and learning. They have also learned that these approaches to teaching can increase faculty's pedagogical knowledge while still emphasizing that conceptual subject matter is important. In addition, they have learned that blended courses are about creating educational environments that help students become self-directed learners, not just about adding a series of digital technology applications. Sriarunrasmee, Techataweewan, and Mebusayac (2015) studied the connection between blended courses and self-directed learning and their results revealed that students in the blended courses had higher scores in self-directed learning and communication skills than students in the regular classroom.

The faculty development initiative at KTH has during the recent year been heavily affected by a switch to a new learning management system (LMS). This change has, however, both been negative and positive. On the negative side, just as in the University of Ottawa's case, it has been demanding to do the re-training and updating of course material for the new LMS. That said, the new LMS also serves as a catalyst for faculty to either get started to blend courses or to revise and refine their instructional design when switching platforms.

The two key lessons learned at the North-West University in South Africa are the need to redesign for blended learning and that you cannot blend by simply adding digital technologies. In addition, they have discovered that digital technologies can sometimes be a driver for change. For example, early adopters of technology are also often eager to adopt new teaching strategies for blended courses whereas laggards always need to intentionally redesign for blended teaching approaches. Blended learning is not about simply adding digital technologies to the current curriculum. Face to face teaching practices plus technology does not equal a blended course. Online activities must be created that replace or integrate with face to face class time. This comment has previously been echoed by Picciano (2009) who compares blended learning to

mixing paint “when two cans of different colored paints are mixed, the new paint will look different from either of the original colors. In fact, if the new paint is mixed well, neither of the original colors will continue to exist. Similar situations exist in blended learning” (p.10).

At the University of Ottawa in Canada, the lessons learned include working with senior leadership to develop realistic targets for the blended learning program, involving all stakeholders (e.g. students, faculty, administrators, and campus community) in the development and implementation of the initiative, and creating a flexible institutional definition of blended learning.

The initial backing of the Board of Governors, while instrumental to the development of the Blended Learning Initiative, directed their initial focus almost exclusively toward faculty. As a result, other stakeholders in the organization that were directly influenced by blended learning were left out of important decisions. For example, with regards to the funding program for blended course design, an initial inclusion of program directors and financial administrators would have clarified faculty specific processes for transferring funds and approving grants. Similarly, connecting with the registrar’s office in advance would have simplified the process of categorizing courses with a blended code. Porter and Graham (2016) have also identified the importance of working collaboratively with senior leadership in order to facilitate faculty adoption of blended learning in higher education.

### **Recommendations**

As previously indicated, faculty development for blended and online teaching is a major issue for teaching and learning in higher education (ELI, 2017). The four institutions involved in this study provide recommendations for effective faculty development support. The Universidade Federal de São Carlos recommends the institutional promotion of student involvement in the process. They also recommend a greater variety of support for blended courses in order to meet the needs of different faculty groups and programs at the university. In addition, they recommend ‘staying the course’ with blended learning. Institutional change takes time and is a dynamic process that requires continuous review and involvement of different members of the academic community to establish short, medium and long term goals for the blended learning initiative. In terms of institutional adoption and implementation Porter et al. (2014) also emphasize that change takes time and that ongoing support is required from senior administration in order to ensure that blended learning does not become perceived as another short term “fad” in higher education.

KTH Royal Institute of Technology emphasizes that blended learning should be a strategic initiative aligned with the mission and vision of the institution. First, senior leadership must ‘walk the talk’ by providing the necessary time and resources for faculty to develop blended approaches. Second, a recommendation is to build the faculty development initiative on a solid research-based foundation. As faculty members at KTH are also researchers, they appreciate that the professional development courses and workshops offered are grounded in current research. For them, this is a sign of quality and indicates that blended courses are a valid and reliable approach to teaching and learning in higher education. Third, a success factor for KTH has been the reorganization of research, education, development, and technology support services into one single unit. As a result of this, these four support areas have become more integrated in supporting the design, development, implementation, and evaluation of blended courses. Picciano et al. (2016) have written extensively about the importance of evidence-based practice and the need for ongoing blended learning research.

The key phrase echoed throughout the literature regarding implementation of blended courses is ‘buy-in’. It is also the case at North-West University in South Africa for successful implementation. Time should be set aside to communicate with, to engage, and to actively involve faculty and students so that they are fully aware of the blended learning initiative. They recommend a three-step strategy for the successful implementation of blended learning; communicate, learn, and collaborate. In Stage One, with regards to communication; they suggest supporting formal and informal educational opportunities that prepare interested parties for blended learning initiatives. Based on their experience they believe that blended learning is too broad and complex to explain in a brief presentation. They recommend preparing a series of modular activities that are delivered in a series of workshops to help faculty and students understand concepts, models, and planning processes required to succeed with blended learning.

Stage Two, the learning phase, involves offering workshops that help faculty gain a deeper understanding of the different components of blended courses. For example, workshops on curriculum development, digital technology integration (e.g., LMS, Google Applications), and learning interface development (e.g., developing learning materials). Some of these workshops might also be appropriate for students.

Stage Three involves collaboration. Faculty members do not have to ‘reinvent the wheel’ and create their own blended course models. Opportunities can be created for the sharing of best practices by working with other faculty members on blended courses in virtual environments and hosting inter-campus events. These types of activities will help to build a body of knowledge from all participating campuses and faculties that is contextual to the institution.

At the University of Ottawa, the TLSS recommends identifying the objectives of the blended learning initiative early and to ground it in the context of the institution. Ensure that a range of stakeholders are involved in the process to understand the needs and potential apprehensions towards blended learning. The adoption of blended learning can require a culture change and, as a result, it is important to build momentum, have buy-in from members of the community, and to collaborate with champion faculty on campus. With regards to faculty development, the TLSS recommends providing a variety of support opportunities (online, blended, face-to-face, consultations, etc.) and clarifying the technical support and tools available for the development and implementation of blended courses.

## **Conclusion**

This study compared and contrasted four international faculty development programs for blended learning in order to understand the rationale, benefits, challenges, lessons learned, and recommendations from such initiatives. With regards to rationale, all of the programs were designed to help faculty members develop successful approaches to blended teaching that would increase student access and success with learning opportunities in higher education. In addition, initiatives at KTH Royal Institute of Technology in Sweden (Vision 2027) and the University of Ottawa in Canada (Destination 20/20) were directly aligned with the vision and mission of the institutions.

The benefits identified for faculty members, who participated in these programs, were that they became more reflective of their teaching practice and began to make a role adjustment from being a content provider to a designer and facilitator of learning for students. The observation was made at the Universidade Federal de São Carlos that faculty who participated in the blended learning program increased their focus on the teaching-learning process by being more explicit

and deliberate about their pedagogical approach to learning. At KTH in Sweden the higher education courses about blended learning have acted as a trigger for faculty to reflect on their current teaching practice and encouraged them to work more on the educational design of their courses. NWU in South Africa indicated that the blended learning initiative has become a catalyst for promoting teaching and learning innovation at their institution. And, the University of Ottawa stated that the introduction of blended learning to faculty members has created new entry points to discuss issues related to teaching and learning.

In terms of challenges, all four programs emphasized the lack of time and resources to support faculty through the complete cycle of designing, developing, implementing and evaluating blended courses. Another key challenge identified was the lack of a common institutional definition and understanding of blended learning. The faculty development team at NWU in South Africa states that without a universal definition of blended learning there is no shared language by which the education field can describe the phenomena or address its opportunities and challenges.

Two key lessons that emerged from comparing and contrasting the four international blended learning programs were the need for all institutional stakeholders to be involved in supporting the initiative and that blended learning does not simply imply adding digital technologies to an existing face-to-face course. For example, the University of Ottawa stressed the importance of working with senior leadership to develop realistic targets for the blended learning program and involving all stakeholders (e.g. students, faculty, administrators, and campus community) in the development and implementation of the initiative. KTH indicated that change can begin to take place when everyone at the institution values online and blended approaches to teaching and learning but the Universidade Federal de São Carlos emphasized that change takes time and extensive dialog is required, it cannot be imposed. Again, NWU stated the importance of developing a common institutional definition as many faculty believe that blended learning is simply about adding digital technologies to the current curriculum. They stress that face to face teaching practices plus technology does not equal a blended course. Online activities must be created that replace or integrate with face to face class time.

The key recommendation from this study is that a faculty development program for blended learning must be clearly aligned with the institution's vision and mission. KTH emphasizes that blended learning should be an institutional strategic initiative. Both the NWU of South Africa and The University of Ottawa echo this comment and recommend identifying the objectives of the blended learning initiative early and to ground it in the context of the institution. The Universidade Federal de São Carlos recommends 'staying the course' with blended learning. Their experience suggests that institutional change takes time and is a dynamic process that requires continuous review and involvement of different members of the academic community to establish short, medium and long-term goals for the blended learning initiative. Finally, NWU emphasizes the need for those responsible for the blended learning program to continually communicate, learn, and collaborate with others in the university.



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# A Formative Case Evaluation for the Design of an Online Delivery Model Providing Access to Study Abroad Activities

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## Abstract

Despite the pressure from potential employers and higher education administrators to develop students' global and intercultural competence, traditional study abroad programs simply are not feasible for many postsecondary students (Berdan & Johannes, 2014; Fischer, 2015). The purpose of this study was to evaluate the effectiveness of an online delivery model for study abroad activities. Building upon the findings of an initial exploratory program using Adobe Connect web conferencing tools, this evaluative case study was the second in a series of design based research studies intended to identify effective practices and develop recommendations to further refine the model through an iterative evaluation process. Using the Online Learning Consortium's Quality Framework, each of the Five Pillars that support successful online learning (access, student satisfaction, faculty satisfaction, learning effectiveness, & scale) was evaluated through a combination of anonymous surveys, pre/post assessments, observations, and student & instructor interviews (Moore, 2005).

Regarding access, 26 students who were enrolled in an intercultural communication course were able to participate in a study abroad experience in Italy; 10 students participated in the traditional study abroad trip in Italy while the other 16 participated virtually. The online students were able to join the live meetings, thus expanding their access to international experiences that normally would be closed to them. In terms of student and faculty satisfaction, both groups of students and the instructor reported specific areas of satisfaction, offered critical feedback, and felt that the concept was a viable one. While the students who traveled to Italy had a far more immersive experience, both groups demonstrated gains in learning. Using Morais and Ogden's (2010) global citizenship pre/post assessment, both groups showed improvement on the self-awareness and intercultural communication scales, and when comparing the two groups the online students improved more on the social responsibility scale while the students who traveled improved more on the global knowledge scale. Both groups submitted assignments of similar quality, engaged in communications between the abroad and online groups, and interacted with the instructor and experts in the field. In terms of differences in student engagement, students had differing opinions on the interaction with the technology and the online group asked more questions during live meetings. The implications of this pilot study should inform the planning of the next case evaluation and are important for other educators who wish to implement a similar approach to internationalizing the curriculum through online instruction.

*Keywords:* Internationalization, study abroad, international education, online learning, distance education

Howard, W., Perrotte, G., Lee, M. & Frisone, J. (2017). A Formative Case Evaluation for the Design of an Online Delivery Model Providing Access to Study Abroad Activities. *Online Learning*, 21(3), 115-134. doi: 10.24059/olj.v21i3.1234

## Introduction

In response to increasing demands by employers for globally prepared graduates, many institutions of higher education set strategic goals aimed at enhancing internationalization. Both employers and educators promote the importance of global and intercultural competence to success in our modern-day workforce, which has resulted in a push to increase enrollment in study abroad programs (Berdan & Johannes, 2014; Fischer, 2015). There are many obstacles to study abroad such as cost, lack of suitable opportunities, rigid degree pathways, and competing obligations from internships, work, or family. According to the Institute of International Education (2017) the national average of U.S. undergraduate students who traveled abroad during their degree program in 2016 was 10%. The student population that does study abroad typically does not reflect the diversity of most U.S. higher education institutions overall (Institute of International Education, 2017).

In tandem with efforts to internationalize the curriculum, online education has steadily increased as a strategic priority for higher education in the United States. According to the Babson Survey Research Group's *Grade Level: Tracking Online Education in the United States*, over 70% of Chief Academic Officers that responded agreed that online education is critical for their institution's long-term strategy (Allen & Seaman, 2016). Within a culture of growing technology acceptance, it would be logical to explore technology-based online programs that would directly benefit those students that simply cannot study abroad by offering access to high-impact international experiences without the barriers discussed above.

The purpose of this study was to evaluate the effectiveness of using web conferencing tools to allow students to actively participate in live study abroad activities from home or on campus. Building upon the findings of Howard and Gunter's (2017) initial exploratory program using Adobe Connect, this evaluative case study is intended to further refine a technology-based model that expands student access to high-impact international experiences by connecting students in the U.S. with their peers, instructors, and experts abroad.

## Literature Review

Traditional study abroad programs, including short-term programs, have an established history of demonstrated benefits for students (Chieffo & Griffiths, 2004; McKeown, 2009; Spencer & Tuma, 2002; Tarrant, Rubin, & Stoner, 2014; Vandever & Menefee, 2006). For example, Chieffo and Griffiths (2004) found that short-term study abroad programs had a positive impact on students' intercultural awareness and functional knowledge. Tarrant, Rubin, & Stoner (2014) also found through experimental research that study abroad paired with academic focus yielded increases in global citizenship in a 4-week course. McKeown (2009) even coined the phrase "first time effect" to describe the profound transformational impact even one study abroad experience (regardless of length) may have on a student's intellectual development.

Internationalization efforts at home have also shown that students may develop intercultural competencies without the burden of traveling to a foreign country (Baldassar & McKenzie, 2016; Leask, 2004; Lilley, Barker, & Harris, 2015; Nilsson, 2003; Soria & Troisi, 2013). Jones (2013) argues that all students, not just those with international mobility, should enjoy an internationalized curriculum in order to develop transferable skills that will allow them to compete in the current job market. Lilley, Barker, and Harris (2015) suggest that "...learning to

become a global citizen is a process that occurs in response to particular facilitating situations that could be simulated through mobility comparable learning experiences ‘at home’” (p. 242).

In addition to trends in increased internationalization efforts in higher education, online learning is also on the rise. Allen and Seaman (2016) reported a multi-year trend in increased online enrollments in U.S. higher education while overall enrollment decreased. They also reported that more than one in four students (28%) take at least one online course and that over 60% of chief academic officers agreed that online education is critical for their institution’s long-term strategy (Allen & Seaman, 2016).

In this culture of technology acceptance and upward trend in online learning, educators have turned to technology to expand internationalization of curriculum in innovative ways. Roberts and Monroe-Baillargeon (2012) describe how technology such as web-based videoconferencing, learning management systems, and social media sites allow for new multicultural online learning environments. Specifically, Roberts and Monroe-Baillargeon (2012) state, “The benefits of multiculturalism and cross-cultural exchange, once only available to individuals with the resources to travel abroad, are increasingly available through information technology and creative pedagogy. Those professors who effectively integrate technology in their teaching will now have the ability to reach across borders to create virtual multicultural learning communities” (p. 41). Scovotti and Spiller (2011) utilized synchronous and asynchronous technology to provide MBA students in the U.S. and Germany the opportunity to collaborate on a real-world business challenge at a distance, and they found that introducing video conferencing enhanced productivity and student satisfaction.

Kenny and Lenz (2009) reported on a satellite-based project that allowed students in the classroom on the main campus to interact firsthand with their peers in the desert through a live broadcast from the field. One of the more interesting findings was that students reported increased attention levels when they were permitted to ask questions during the live broadcast (Kenny and Lenz, 2009). In a follow-up study that employed the same technology to broadcast from India, Kenny and Gunter (2015) found that the additional use of the text chat feature during the live broadcast appeared to increase student engagement and their sense of social presence. Howard and Gunter (2017) then initiated a series of formative case evaluations to develop a more cost-effective delivery mechanism for providing similar live broadcasts from the field with interactive chat. Advances in mobile technology now allow educators to take instruction outside of the classroom to facilitate learning in creative delivery methods with sound instructional strategies (Sung, Chang, & Liu, 2016). As a result, Howard and Gunter (2017) found that a valuable international learning experience could be provided to students online in the U.S. by connecting them with their peers on a traditional study abroad trip through web conferencing tools like Adobe Connect.

The purpose of this study is to continue the cyclical, design-based research started by Howard and Gunter (2017) to refine and further develop the web conferencing based delivery of internationally-focused instruction through a series of case evaluations. Three guiding questions drove this formative case evaluation: (1) Did the program accomplish its goals? (2) What was the impact of how it was implemented? (3) What changes to the design are necessary to firmly establish it as a valuable alternative to traditional study abroad? These guiding questions generated a set of evaluation questions that were then organized using the Five Pillars of the Online Learning Consortium (OLC) Quality Framework (Moore, 2005):

Access:

1. What is the potential impact of this program for providing students access to international learning opportunities?

Student Satisfaction:

2. What is the difference in student satisfaction with the overall experience between the online and abroad groups?
3. What were online participants' reactions to the web conferencing system?
4. What was the impact of technology on the students' ability to participate in remote instructional activities?

Faculty Satisfaction:

5. What were the instructor's perceptions about his teaching experience with this technology-mediated approach?

Learning Effectiveness:

6. What is the difference in student engagement with activities and experts in the field between students who travel abroad (abroad group) and those who participate via Web conferencing (online group)?
7. How were the learning experiences of the online and abroad groups similar and how were they different?

Scale:

8. How does the cost of this case compare to previous technology-mediated attempts?
9. How can this approach be improved?

## Methods

The Online Learning Consortium's Quality Framework was used and each of the Five Pillars that support successful online learning was evaluated through a combination of quantitative and qualitative methods including anonymous surveys, observations, student and instructor interviews and Morais and Ogden's (2010) global citizenship pre/post assessment (Moore, 2005). This formative case evaluation is the second in a series of iterative studies where the recommendations of the previous study are implemented and then evaluated. Based on Howard and Gunter's (2017) study with a global health management course in Brazil, the methodology was replicated in this study with the addition of a pre/post global citizenship assessment to address potential learning outcomes in a more formal class structure.

The instructional model that was evaluated mirrored Howard and Gunter's (2017), which employed the Adobe Connect web conferencing tool to provide online participants in the U.S. access to the live study abroad activities in Italy, including tours of historical sites, cultural venues, and communities led by local experts. The online facilitator used an iPad with Adobe Connect to link the abroad group with the online group which enabled discussions between the groups using the chat, audio, and video functions.

Once logged into the web conference, the online participants were able to view the video feed from the perspective of the online facilitator as though they were part of the group of students in the field. They could hear the live discussion, but their individual microphones remained muted until they were ready to speak to the group or type in the chat. All live sessions were recorded

and videos were captured and uploaded to the online course hosted in the university's learning management system to allow for convenient access between live sessions.

Ultimately, the instructor was responsible for delivering instruction for both the abroad and online groups. The online facilitator was responsible for all technical aspects of running the web conferencing tool and keeping the online students engaged in the tours and discussions during the live meetings. In some cases, the instructor was also the guide and led the discussions. At other times, the tours were led by local experts such as the live meeting at the Forum in Rome. For tours like this, the instructor started the meeting by situating the students' thinking and reviewing the learning objectives before turning the lesson over to the local expert. Throughout the tour of Rome, the online group was given the opportunity to interact by typing their questions for the guide through the Adobe Connect group chat. The online facilitator then asked these questions on their behalf as the students listened to the tour guide's responses and gathered information.

### **Study Population/Sampling**

The population for this study was 26 American students from a large U.S. university. The students were enrolled in two combined sections of the same intercultural communication course with a study abroad component to Italy. Ten students participated in the traditional study abroad trip while the other 16 participated online. Both sections received the same course content and were required to complete the same assignments. For the first three weeks of the 6-week intensive summer term, both sections met together in the same classroom and completed group activities with 2-3 students from each section per group. During weeks four and five, one section traveled to Italy (abroad group) while the other section joined the live meetings via technology (online group). During this time, one-hour live meetings were scheduled for each day. The final week of the course was online for both sections and was dedicated to completing the group project and final assignments.

### **Data Collection**

To explore the evaluation questions and effectively evaluate a study abroad program, Rubin and Matthews (2013) recommended gathering data from multiple data sources. Replicating Howard and Gunter's (2017) methodology, data sources included an anonymous student survey, instructor interview, session recordings, financial budgets, and online facilitator observations. For this study, additional researchers served as observers throughout the live meetings and reviewed the recordings when necessary. They also completed observation forms in order to record their experiences and capture what did and did not function well. This helped the researchers to properly identify technical challenges and perceptions of student engagement throughout the live meetings. Two additional sources were added: student interviews and Morais and Ogden's (2010) pre/post global citizenship assessment. Collectively, these sources were used to triangulate and evaluate the effectiveness of this web-based intervention and extract effective practices and recommendations for improvement.

**Instrumentation.** The anonymous online survey consisted of 45 Likert-scale questions with responses ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) and was delivered to both groups of students at the end of the course. The online students were asked additional questions about the web conferencing technology and their online experience, and both groups were asked the same set of questions about their perceived learning and satisfaction.

The questions were adapted from multiple sources including the National Survey of Student Engagement (NSSE) developed by the Indiana University School of Education (2014) and Picciano's (2002) survey instrument, which measured student satisfaction in an online environment. Also, researchers used the IBM Computer Usability Satisfaction PSSUQ Questionnaire for feedback on the technology (Lewis, 1993). In addition, Part I of Richardson and Swan's (2003) and Picciano's (2002) surveys were used to measure social presence in an online learning setting. The survey also contained 5 open-ended questions developed by the researchers to gather additional clarification.

In addition to the anonymous online survey, the instructor was interviewed after the trip to record his perceptions, students were interviewed, financial documents were compiled to evaluate cost, researchers recorded observations after each live event to note student participation and acknowledge areas for improvement, and researchers reviewed the recorded sessions in order to triangulate the data in an effort to provide a comprehensive formative evaluation (Maxwell, 1996). Finally, the Global Citizenship instrument developed by Morais and Ogden (2010) was also used as a pre-assessment with 52 questions (including demographics) and a post assessment with 45 questions to compare the two groups on ten factors organized under three dimensions: social responsibility, global competence, and global civic engagement.

**Data analysis.** In addition to reviewing qualitative data from open-ended questions on the feedback survey, a t-test was run on the same two subscales established by Howard and Gunter (2017). The learning effectiveness (LEARNEFF) subscale ( $\alpha = .92$ ) was based on twelve items, and the satisfaction with experience (SATEXP) subscale ( $\alpha = .86$ ) was based on six survey items. The Global Citizenship instrument (Morais & Ogden, 2010) was also used to compare the changes in perceptions of the two groups. After running a t-test for significance, Cohen's effect size was also calculated for practical significance.

For all qualitative data sources (instructor interview, student interviews, and observation forms) one of four researchers transcribed the interviews and independently open-coded to reveal emerging themes, noting anything that related specifically to the evaluation questions. Then a second researcher independently verified the transcriptions and performed a second independent round noting themes specific to each evaluation question. Finally, the team reviewed and agreed upon the themes.

## Results

### Access

**Evaluation Question 1. What is the potential impact of this program for providing students access to international learning opportunities?** The access to international learning opportunities for students seems to have been impacted in two ways: 1) use of technology, and 2) inspiration to travel abroad. Live meetings via technology provided access to an international experience for 16 online students who otherwise would not have been able to participate. It is important to note that the technology did not limit online enrollment to only 16 students -- that was the number of students who chose to register for the online section of this class. Additional online enrollment was possible in terms of the technology.

The average online attendance for the seven live meetings was approximately 75% with 11.5 students participating out of the 16 enrolled students. An online student shared the



significance of this experience, “All in all this class was a very demanding experience, but a class that has left an impact on me, and to me, that’s all you can really ask for in a course.”

According to the feedback provided, the use of technology to allow access to international learning opportunities was successful. All students reporting via the feedback survey were satisfied at some level with the Adobe Connect software used for the live meetings. One hundred percent agreed that even though they were not physically together in a traditional classroom, they still felt like they were part of a group in the live meeting, and two-thirds of students agreed that the live meeting provided a personal experience similar to the classroom. Finally, the online students reported that their level of learning that took place in this meeting was of the highest quality.

On the feedback survey, both online and abroad students agreed that this program helped them to:

- Think critically and analytically: 83% online students and 88% abroad students.
- Understand people of other backgrounds: 83% online students agreed and 100% of abroad students.
- Be an informed and active citizen: 100% of online students and 75% of abroad students.

These findings suggest that the use of technology in this case evaluation did increase student access to impactful international learning opportunities.

### **Student Satisfaction**

**Evaluation Question 2. What is the difference in student satisfaction with the overall experience between the online and abroad groups?** The qualitative data revealed two main categories for feedback on student satisfaction: 1) the concept of connecting students who travel abroad with those participating online, and 2) the setting of the live meetings. The overall experience for students who traveled abroad and those who participated online were similar in their interaction with others during the program (instructor, experts in the field, online facilitator, other students). There were some differences between the groups for student perception of learning quality and learning expectations.

The most recurring area of dissatisfaction for the abroad students was due to the setting (both location and time) of the final live meeting. It took place on the last evening of the trip during the group dinner. Originally the instructors planned for this to be a family-style dinner discussion. However, the restaurant was crowded and loud which made it impossible to do a traditional live meeting. Instead, the iPad was passed around the table so that group members abroad could directly communicate with their group members online. The abroad students did acknowledge that the live meeting was interactive with their online classmates; however, they also expressed frustration at not being able to focus on the food, wine, and people physically at the table in Italy. One of the students abroad commented, “The idea of this broadcast is great, however the location and timing was not. Students in Italy were hungry, wanted to eat and reflect with other students who travelled abroad.”

The data provided by the students via the feedback survey showed different levels of satisfaction with some major aspects of the program:

- My level of learning that took place in this meeting was of the highest quality. 100% of online students agreed with this statement while 62% of abroad students agreed.
- Overall this session met my learning expectations. 100% of online students agreed with this statement and 62% of abroad students agreed.

Other data provided by the students via the feedback survey show similar levels of satisfaction with other major aspects of the program:

- 100% of online students reported an excellent experience with the instructor and 100% of abroad students reported with a Very Good or Excellent experience.
- 100% of online students reported a Very Good or Excellent experience with Experts in the Field and 75% of abroad students reported an Excellent experience.
- 100% of both online and abroad students reported a Very Good or Excellent experience with the online facilitator.
- 100% of both online and abroad students reported a Good to Very Good experience with other students.

In addition, the satisfaction with experience (SATEXP) subscale ( $\alpha = .86$ ), which was based on six items in the feedback survey showed that there was no significant difference in satisfaction with the overall experience between the abroad group ( $M = 23.75$ ,  $SD = 4.86$ ) and the online group ( $M = 26.33$ ,  $SD = 2.25$ )  $t(14) = .25$ , ns. Despite some differences in student satisfaction between the groups for learning quality and learning expectations, the overall experience of interacting with others during the program were similar for students who traveled abroad and those who participated online.

**Evaluation Question 3. What were online participants' reactions to the web conferencing system?** According to the researcher observations, the web conferencing system was not as interactive as they had hoped and they noted the online students had more discussion in the chat with the online facilitator speaking softly as compared with the students physically present in the room who were mostly silent out of respect for the tour guide.

In the feedback survey, online students reported feeling comfortable using the Adobe Connect technology. They chose to communicate through the chat feature because it was easy to use and manageable with the online facilitator either repeating questions to the tour guide or immediately responding directly to the students. Researchers observed that at one point a student tested her microphone, but there was a lot of background noise which made it difficult to hear well.

The data provided by the students via the feedback survey (Question 8) showed different reactions to the web conferencing system.

- 100% of the online students agreed or strongly agreed that they felt comfortable conversing through this medium.
- The students felt comfortable introducing themselves in the online environment and agreed that the instructor created a feeling of an online community.
- The students overall felt that they were satisfied with the usability of the system because it was simple and effective to complete the tasks.

They also commented that the system had all the functions and capabilities that met their expectations. However, there was one student out of a total of six respondents that said that learning to use the system was not easy.

Some data showed that the live sessions met their learning expectations.

- The students were neutral that the online instructional activity stimulated their desire to learn.
- The live meetings allowed them to express their feelings and learn.
- The students did not find the online meeting threatening.

- Quality of interactions with the instructor, experts in the field, the online facilitator, and the other students were indicated overall as good or excellent.

One student responded that being able to see remarkable historical landmarks in real time surrounded by people they had previously met and were actively communicating with was really interesting and enjoyable.

In one of the interviews, a student said that it was interactive and the experience was great being able to connect live, ask questions, and see with their own eyes. Another noted that the scenery from Italy was probably their favorite part of viewing the online meetings. Students liked the interaction between not only people of different groups, but different cultures. They thought it was a cool concept to engage a group from around the world and hear different perspectives and points of views.

Student feedback indicated areas of improvement for the technical aspects of the web conferencing system. This feedback will be reviewed in Evaluation Question 9 and the Discussion sections of this article.

**Evaluation Question 4. What was the impact of technology on the students' ability to participate in remote instructional activities?** Technology does appear to have impacted the students' ability to participate. The online facilitator observed that the online students were very participative and started conversations with one another in the chat which they preferred to use over their microphones. They asked great questions and wanted to hear responses not only from the instructor, but also from their classmates too. Therefore, technology enabled the online group to connect remotely with other students, the instructor and online facilitator, and experts in the field.

Based on feedback survey Questions 11 and 12, online students reported that there were some limitations at times regarding the quality of the sound. There were times when the video streaming was not working smoothly which hindered the online group's participation and noise of various types interfered with the technology. One student suggested, "The last meeting shouldn't take place in an environment that is noisy. It was hard to interact this way. I would suggest next time hold it in a quiet setting." Another student commented, "There were a couple of moments where the Wi-Fi wasn't as great and so it wouldn't show a good connection or picture. Overall though the instructors were really great at getting the connection back and explaining what we missed." Online students also experienced a longer delay compared to the abroad group when responding to the instructor's questions: they had to first consider their response, type it, and then wait for the online facilitator to relay the message.

According to feedback survey Question 6, only one online student replied that they felt uncomfortable conversing through this medium. Overall, all the online students reported that they felt comfortable introducing themselves in the online environment and the instructor performed well with creating a feeling of an online community. One online student disagreed that an online meeting allowed for social interaction or provided them a reliable means of communication, however, overall, the online students replied in the survey that their experience in a live interactive session was enjoyable and it helped them stimulate their desire to learn.

While several online students expressed a desire to have joined the others abroad, one online student noted a benefit of technology, "I paid considerably less and was able to continue to take other classes..." They also felt emotions transferred through the live screen as if they were in

Italy. According to the student surveys, some online students said that the technology affected their learning because they could see and experience the difference between cultures halfway around the world.

One challenge of using technology to connect students in live meetings across cultures and time zones is the need to plan and coordinate schedules. One online student noted the importance of “knowing the schedule of them being abroad ahead of time, I had to really fix my schedule around it.” Also, in the feedback survey Question 18, one student abroad mentioned that at times it was hard to get organized regarding assignments with the online group.

### **Faculty Satisfaction**

**Evaluation Question 5. What were the instructor’s perceptions about his teaching experience with this technology-mediated approach?** The instructor reported the overall experience with the program as being positive. However, there were some areas of dissatisfaction. After reflecting upon the physical and online technicalities of the program, the instructor explained areas of concern and provided additional suggestions for improvement of future programs.

Pertaining to curriculum development, the instructor offered these suggestions for future improvement. He was dissatisfied with some of the outcomes of the group activities and would suggest that discussion prompts for students be prepared prior to the beginning of the study abroad experience. He felt that this would increase dialogue and facilitate connection between the abroad and online groups. The instructor suggested that this type of curriculum be designed ahead of time so that it is reinforced during group work to improve the learning experience of both the participants abroad and online. When in Italy with the students, the instructor would have prepared scripts for the live meetings and precisely mapped out the route of the abroad group prior to travel in order to create a more organized and less stressful teaching experience.

The instructor found it challenging to engage both the abroad and online groups simultaneously during live meetings. He explained, “Yeah, it was a real challenge for me because I found myself first catering a little bit more to the online group, like talking to the camera. And then some of the feedback from some of the in-country students noted that I was paying more attention to the camera. And then I tried to flip it, and I felt that I was not giving – I felt disconnected from the online students. For me, it was a real challenge trying to divide my attention between the two groups.”

Finally, the instructor expressed complete satisfaction with his online facilitator throughout the program and process of this research study. He was particularly pleased with her organization, technical skills, and overall contributions to the success of the online abroad program and its participants. He was also satisfied with the university’s study abroad office. The instructor expressed that the study abroad office handled the logistics of the travel portion of the course well and took his ideas and objectives for the course and made it a reality.

### **Learning Effectiveness**

**Evaluation Question 6. What is the difference in student engagement with activities and experts in the field between the abroad group and the online group?** Five categories of student engagement emerged from the qualitative feedback. The feedback for 1) quantity of questions, and 2) interaction with the technology, suggests that there were some differences in student engagement between the groups. These differences are explained in this section. Note that the feedback for the other three categories 3) quality of assignments, 4) communication between the

abroad and online groups, and 5) interaction with the instructor and experts in the field, indicates that there was not a noticeable difference.

**Quantity of questions = differences in student engagement.** According to the instructor interview, online students asked more questions than those abroad during the live meetings. In the student interviews, one of the abroad students said that they appreciated when the online students asked questions as it stimulated conversation and brought in fresh perspectives. Abroad students also liked when those online asked them questions instead of directing everything to the guide, instructor, or online facilitator.

**Interaction with the technology = differences in student engagement.** The technology appears to have created some perception of difference in engagement. A researcher noted in their observations that the abroad students who were randomly put ‘on the spot’ with the iPad in their direction seemed intimidated and would not talk as much as when there was no pressure with the camera. In the feedback survey, a student mentioned that they felt it hindered both the abroad and online groups because the technology detracted from the natural communication setting. It is important to note that some students commented that the technology was neither a help nor a hindrance and “was just kind of there.”

However, one hundred percent of the online students who participated in the feedback survey, agreed with the statement, “I enjoyed the online instructional activities.” The online students reporting via the feedback survey said that the Adobe Connect web conferencing system was a beneficial tool in three main ways:

- Video stream from Italy was Very Important or Critical
- Audio stream from Italy was Critical
- Text chat was Very Important or Critical

The feedback survey responses from both the online and abroad students indicate that the majority (100% online and 87% abroad) of both groups felt comfortable participating in the group discussion and felt comfortable interacting with other participants in the live meeting.

**Evaluation Question 7. How were the learning experiences of the online and abroad groups similar and how were they different?** While the students who traveled to Italy had a far more immersive experience, both groups demonstrated learning gains. The global citizenship pre/post assessment measures seven subscales: social responsibility, self-awareness, intercultural communication, global knowledge, involvement in civic organizations, and political voice (Morais & Ogden, 2010). Table 1 displays the subscales where each group demonstrated significant improvement including practical significance based on Cohen’s effect size. Both groups showed improvement in self-awareness and intercultural communication, but the students who traveled to Italy also showed improvement in global civic activism and global knowledge.

The abroad group demonstrated significant improvement on the following scales:		
	Cohen's effect size	Practical significance
Global Civic Activism	d = .54	Moderate
Self-awareness	d = .55	Moderate
Intercultural Communication	d = .63	Moderate to High
Global Knowledge	d = 1.48	Very High
The online group demonstrated significant improvement on the following scales:		
Self-awareness	d = .63	Moderate to High
Intercultural Communication	d = .52	Moderate

Table 1. Significant Improvements on Global Citizenship Pre/Post Assessment

When comparing the two groups, the online students appear to have improved more on the social responsibility scale. There was a statistically significant difference between the two student groups, students abroad ( $M = -1.22$ ,  $SD = 2.10$ ) and students online ( $M = .267$ ,  $SD = 1.27$ ),  $t(1, 22) = 4.69$ ,  $p \leq .05$ . Further, Cohen's effect size value ( $d = .86$ ) suggested a large practical significance. Conversely, the students abroad appear to have improved more on the global knowledge scale. There was a statistically significant difference between the two student groups, students abroad ( $M = 2.11$ ,  $SD = 2.26$ ) and students online ( $M = .40$ ,  $SD = 1.81$ ),  $t(1, 22) = 4.19$ ,  $p \leq .05$ . Further, Cohen's effect size value ( $d = .84$ ) suggested a large practical significance. There was no statistically significant difference between the two groups on the remaining five scales (self-awareness, intercultural communication, global knowledge, involvement in civic organizations, or political voice).

On the feedback survey, the learning effectiveness (LEARNEFF) subscale ( $\alpha = .92$ ) also showed no significant difference between the students who participated face-to-face in Italy ( $M = 52.88$ ,  $SD = 7.26$ ) and those who participated online ( $M = 52.67$ ,  $SD = 5.09$ ),  $t(14) = .95$ , ns. This subscale consisted of 12 items that asked about the quality of their interactions with the instructor, experts in the field, the online facilitator, and other students in addition to the impact on their knowledge, skills, and personal development in the following areas:

- Speaking clearly and effectively
- Thinking critically and analytically
- Acquiring job- or work-related knowledge and skills
- Working effectively with others
- Developing or clarifying a personal code of values and ethics
- Understanding people of other backgrounds (economic, racial/ethnic, political, religious, nationality, etc.)
- Solving complex real-world problems
- Being an informed and active citizen

During the instructor interview, he elaborated on how the learning experiences between the two groups were similar and different. For similarity, he felt that the, “experiences were the same in that the curriculum was the same. They both had to explore the projects and the theories from the same basic standpoint...” Also, the instructor observed that the “in-field experts, the way they interacted with the face-to-face students and the online students were very similar in my opinion. I didn’t notice a great difference.”

The instructor did think there were some differences in learning experiences. He explained:

So how I think they were different: the students who were in country got to use all five of their senses where of course the ones at home just got two -- sight and sound. And then from the student feedback based on culture shock, it gave some insight on how the experience could have been different as well. The students who were abroad talked about how changed they were... And the online students, they either had to stretch to answer that question and refer back to experiences they had from different travels on their own or they just said, I didn’t travel abroad so I didn’t experience culture shock.

Despite the similarities and differences of the learning experiences of the online and abroad groups, both provided evidence of learning gains.

**Scale**

**Evaluation Question 8. How does the cost of this case compare to previous technology-mediated attempts?** Every effort was made to minimize cost in order to develop a scalable, sustainable approach. The initial proposal for the pilot study made use of satellite technology, which also required a crew to operate. Because that budget was cost prohibitive, a new Wi-Fi based approach with Adobe Connect web conferencing software and one online facilitator was actually implemented. Table 2 compares the original proposed costs, the pilot study cost, and the actual cost of this study.

	Satellite Proposal	Brazil Pilot: Actual	Italy Study: Actual
Travel expenses:	<ul style="list-style-type: none"> <li>• 4 webcasts</li> <li>• 10 days/9 nights</li> <li>• 1 faculty member</li> <li>+ 3 grad. assistants</li> </ul>	<ul style="list-style-type: none"> <li>• 5 webcasts</li> <li>• 10 days/9 nights</li> <li>• 1 faculty member</li> <li>• Use existing University resources for hardware &amp; software</li> </ul>	<ul style="list-style-type: none"> <li>• 8 webcasts</li> <li>• 14 days/13 nights</li> <li>• 1 faculty member</li> <li>• Use existing University resources for hardware &amp; software</li> </ul>
Cost to broadcast:	\$8,085	\$3,400	\$5,699
Hardware:	\$19,000	\$180	\$245
Software:	\$14,700	\$0	\$0
<b>TOTAL:</b>	<b>\$41,785</b>	<b>\$3,580</b>	<b>\$5,944</b>

Table 2. Cost Comparison

Each course will carry a variable cost based on factors such as the duration or location, but it closely approximates the cost for an individual student enrolled in the travel option. For these studies, costs were reduced by utilizing an existing Adobe Connect license and equipment such as iPad, laptop, and webcam.

### **Evaluation Question 9. How can this approach be improved?**

**Critical Feedback.** In addition to positive feedback, the online survey and interviews provided clear areas for improvement. Some were more pedagogical in nature while others were technical. The technical areas of concern included audio and Internet connection quality. In the feedback survey, one student suggested, “have the tour guide wear a microphone of sorts just because it was really hard to hear at times.” Another responded with “The last meeting shouldn't take place in an environment that is noisy. It was hard to interact this way. I would suggest next time hold it in a quiet setting.” Three observers also noted concerns about background noise. For example, one reported “since the broadcast took place in a restaurant, noise disruptions were present for online students” and another recorded “this broadcast would have worked perfectly if it was done in a quiet setting without many distractions.” The online facilitator also noted in an observation form “I had to stay within a few feet of the tour guide to make sure online students could hear well. Possibly consider a better microphone in the future.”

During two of the live sessions the Wi-Fi disconnected briefly. While students were prepared for this possibility in advance, it is never desirable. In an interview one student explained, “Every now and then the live sessions would pause or cut out and I know that is just the way technology works but maybe with technological advances it would be possible to have a better connection in the future.” Whenever possible, the instructor and online facilitator visited the sites in advance to test the connection and prepare contingency plans.

One of the pedagogical concerns was related to efficient use of time and engaging students in constructive dialogue during the live sessions. The online facilitator observed that during the tours often there were stretches of time where the group in the field was walking from one stop to the next, and during that time she felt the need to improvise and fill that time with group discussion to keep the online students engaged and encourage student to student interaction. Student survey comments such as “have more interactive questions” and “It would have been nice if there was a little more participation from the students in Italy” justify the need for preparing discussion prompts in advance. One of the researchers suggested, “As an icebreaker, encourage dialogue between online students with those abroad regarding initial thoughts about the trip. This would also probably make students abroad feel more comfortable talking in front of a camera.” The instructor also reported challenges trying to balance the two different audiences and give them equal attention, and prepared discussion prompts may be directed to the entire group for a more inclusive experience.

The other pedagogical concern focused more on group dynamics. In this particular course, two students in the field were paired with three online students to complete a cultural comparative group project. In their interviews, several students who traveled abroad reported that they experienced challenges working with their online partners at a distance and would have preferred to work just with their fellow travelers with whom they had bonded. For example, one student stated, “I feel like it would've been easier for all of us in Italy to have done a project together and then everyone in Florida to have done a project together so we could talk face-to-face about our project.” While this would negate one of the primary learning objectives of the course (using



technology to collaborate at a distance), it does indicate that the group formation process was rushed prior to physically separating. In their interviews, several students requested more group time in class prior to the trip.

**Recommendations for improvement.** The feedback provided by both sets of students, the instructor, the online facilitator, and observers resulted in the following recommendations for improvement:

- **Improve audio quality.** Often background noise in the field made it difficult to hear the instructor or tour guide clearly. While some noisy environments like restaurants may add to the immersive cultural experience, it should not be allowed to negatively impact instruction. This could be improved by using a directed microphone or a lavalier microphone on the instructor or meeting in a private room rather than in the main dining room of a restaurant.
- **Test Wi-Fi strength in advance.** It may not always be possible to test in advance and sometimes the signal suffers during the live event even when the test went fine, but every effort should be made to minimize this risk. Testing signal strength in the various locations also gives the instructor and online facilitator an opportunity to work out backup plans, but they should also be prepared to improvise when unforeseen connection issues arise.
- **Prepare question prompts.** Often there are brief downtimes in the field when the group is moving from one location to another. Together with the instructor, the online facilitator could prepare discussion prompts in advance in order to make effective use of that time and promote student engagement.
- **Establish team roles, communication protocols, and dynamics.** Provide groups more time to connect and bond during the weeks prior to splitting up and assist with the group formation process. This may include requiring pre-travel group activities or assignments in class, providing roles for individual group members, and coaching or structured guidance as they work in their teams.

## Discussion

### Explanation of the case evaluation

The 6-week course “Communication, Culture and Technology: An Italian Case Study” combined a traditional study abroad experience with an innovative twist: live meetings for students who have chosen to join the group abroad virtually. The overall goal was to make study abroad more accessible to students in order to promote the acquisition of global competencies. Building upon the work of Howard and Gunter (2017), the introduction of technology brought the abroad experience into the homes of students who would otherwise miss out on a valuable international learning opportunity.

Two student groups were enrolled in the course: an abroad and online group. Both groups met together on campus for the first three weeks prior to traveling abroad. When designing the curriculum, both student groups needed to have the same course objectives. To accomplish this, the assignment activities of the course required that classmates work in groups composed of both abroad and online students to produce a module on some aspect of culture and communication.

### **Findings from the case evaluation**

Students liked that they were able to hear different perspectives and points of views. They thought it was a cool concept to engage with a group around the world to have them experience Italy from their professor's perspective and ask questions to the class.

Students reported the challenge of feeling emotionally connected to their group members who were not physically with them. The abroad students naturally bonded with one another through shared emotional experiences from their Italian travels. While the abroad students did collaborate with their online group members on the projects, the nature of the relationship seems to have been more information-focused than relationally-focused which does not naturally lead to bonding through shared emotional experiences.

A possible hindrance between the groups was that the online students liked to use chat and chose not to utilize a microphone during the broadcasts. Therefore, the online facilitator had to act as a liaison and connect the two groups by repeating the online student questions aloud to the abroad group. They were not directly talking to one another.

The online students asked more questions than those abroad during the live meetings. An explanation of this could be that the abroad students were with the instructor 24 hours a day and had access to ask questions at any time and not be limited to just the live meetings. Online students would either need to email the instructor with a question or ask during the live meetings.

Finally, the instructor found it challenging to engage both the abroad and online students simultaneously during live meetings. Stronger relationships seem to have been formed with the abroad students than the online students. The instructor suggests that the relationship-building aspect that comes from the travel abroad experience may not be able to be replicated via technology.

### **Recommendations for future case evaluations**

While this case evaluation included just one online section, it could be possible to increase the number of online sections to allow other related courses to join the live meetings for specific tours that are related to their coursework. When replicating similar programs in the future, this case evaluation generated several recommendations: 1) improve audio quality 2) test Wi-Fi strength in advance 3) prepare question prompts, and 4) establish team roles, communication protocols, and dynamics.

A Bluetooth microphone might improve the audio quality during the live meetings. Wi-Fi should be tested prior to broadcasts to determine its strength both indoors and outdoors. The instructor can plan alternative lessons in the event that the Wi-Fi does not permit broadcasting. The lesson should include question prompts to engage both abroad and online students during the live meetings. Finally, official roles for each group member could help the teams establish better dynamics. More relationship-building exchanges could help create a stronger bond between abroad and online group members as well as with the instructor. Also, allowing the student groups to interact directly via the iPad can allow the abroad students an opportunity to experience the role of the online facilitator as an additional benefit.

## Conclusion

The purpose of this study was to evaluate the effectiveness of an online delivery model for study abroad activities. Twenty-six undergraduate students studying intercultural communication were able to participate in a study abroad experience in Italy: 10 students participated in the traditional study abroad trip while the other 16 participated online. This case evaluation continues the cyclical, design based research started by Howard and Gunter (2017) to refine and further develop the web conferencing approach to internationalizing the curriculum through online instruction.

The study was driven by three guiding questions: (1) Did the program accomplish its goals? (2) What was the impact of how it was implemented? (3) What changes to the design are necessary to firmly establish it as a valuable alternative to traditional study abroad? These questions were evaluated through a combination of anonymous surveys, pre/post assessments, observations, and student and instructor interviews.

Overall, the program accomplished its goals and provided a valuable international learning opportunity. While the students who traveled to Italy had a more immersive experience, both groups demonstrated learning gains. Both groups showed improvement in self-awareness and intercultural communication. These findings expand the established history of study abroad programs by furthering demonstrating the benefits for students (Chieffo & Griffiths, 2004; McKeown, 2009; Spencer & Tuma, 2002; Tarrant, Rubin, & Stoner, 2014; Vandever & Menefee, 2006).

The way the study was implemented did have an impact. The students who traveled to Italy showed improvement in global civic activism and global knowledge. The online students were able to join the live tours and discussions, thus expanding their access to international experiences that normally would be closed to them. One online student thought that the live meetings were, “a good enough way to experience another culture while not having to spend the extra money.” Another student thought that the university “should offer more classes like this for people who don’t have the opportunity to go abroad. It’s a good opportunity to get the experience without being there.” Other students referred to the live meetings as a way to, “explore Italy side by side with those who went abroad.”

The program inspired students from both the abroad and online groups to travel and explore cultures. One student said, “This class has made my desire to travel stronger and I feel I am better prepared than before.” And another commented, “I would still do it again. I would still want to do the long dining restaurants...”

Finally, the research revealed some changes to the design that are necessary to firmly establish the online option as a valuable alternative to traditional study abroad. Future programs implementing a similar model that connects online and abroad students should 1) improve audio quality 2) test Wi-Fi strength in advance 3) prepare question prompts, and 4) establish team roles, communication protocols, and dynamics.

Based on these findings, the instructor and online facilitator for this case evaluation encourage future program leaders or facilitators with a passion for study abroad to consider implementing an online model to increase student accessibility for international learning experiences.

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# Improving Digital Library Experiences and Support with Online Research Guides

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## Abstract

With a goal of improving the development and delivery of effective online information literacy resources, the purpose of this study was to look at how program level and the timing of the introduction of a Literature Review library guide within the program influenced online business student perceived value of the resource. A population of undergraduate business students (N=355) and online MBA students (N=319) were introduced to a Literature Review library guide during specific points in their programs. Students were asked to complete an online survey that included 17 closed-ended items designed to measure perceived usefulness, satisfaction and likeliness to use the guide again. The survey also included two open-ended questions asking students to discuss those elements of the guide they found most valuable and whether they wanted any additional features included in the guide. The data collection strategy required faculty post information about the Literature Review library guide and the survey in their courses at two specified times in the course. A low response rate (3.5%) may have resulted from inconsistencies in how faculty shared information about the guide and the study in their courses. Although the small sample size (n=24) limited the planned analysis, and results indicated no statistical significance between groups, descriptive findings were reported, and trends were used to revise the resource and inform future development of library research guides. Overall, students reported being satisfied with the resource and found it usable. Graduate students were more likely to report elements of the guide that supported effective search and evaluation strategies were valuable; whereas, undergraduate students tended to value the links to writing resources. Student feedback also suggested that the earlier the guide was introduced in the program, the more likely students would use the resource. Adopting a model that embeds resource guides early in academic programs and aligns guide content with the curriculum should lead to increased use of the resource.

*Keywords:* Digital library services, student perceptions, distance learning, LibGuides, business students

Brewer, L., Rick, H. & Grondin, K.A. (2017). Improving digital library experiences and support with online research guides. *Online Learning*, 21(3), 135-150. doi: 10.24059/olj.v21i3.1237

## Introduction

The traditional role of a library has been to provide crucial resources and services for student needs beyond providing books and serials. While web-based content and electronic media are available at students' fingertips, the web-based content may not provide the support that students need to complete their programs. Students struggle to find scholarly resources to support their academic work. For online students, these struggles can become overwhelming. Many students fall into search habits that may assist them in completing an assignment, but will not build

lifelong learning skills or information literacy skills needed for future employment. Digital libraries play an important role for students; librarians are educators that procure content and provide instruction on how to use and evaluate resources.

University libraries have been slowly building robust digital collections to support their students. Digital library collections can be difficult to navigate, and many are developed on an infrastructure that is not intuitive to those conducting research. Cothran (2011) strongly argues for “librarians to focus on improving the usability and accessibility of library resources by linking library databases and Google Scholar, instead of simply discouraging students’ Google Scholar usage” (p. 298). Without some intervention with a library-trained professional, students may find obstacles accessing library content.

Not all libraries offer for credit courses or provide embedded librarians to support the curriculum. Academic libraries have been exploring new ways to include library instruction that engages students during their times of need. By building course materials that support the learning process and providing information literacy instruction in the learning management system (LMS), students should have a better experience using the library resources, be more likely to find the appropriate library content, and build information literacy skills necessary for lifelong learning. Librarians will be better able to strategically build content that supports the online learner if they understand students’ perceptions of the resources.

Buehler (2004), Shank and Dewald (2003), and Bowen (2012) have identified value in embedding library content in the LMS system, which brings the library to the students and faculty where they “work.” Improving the library’s connection with other university systems, like the LMS, can result in an increased return on investment in the library collection. The work completed by Buehler (2004), Shank and Dewald (2003), and Bowen (2012) did not examine students’ perceptions of the library content or the role of timing when students will get access to library instruction and content.

If librarians are not able to be in the classroom to teach information literacy skills, students will likely resort to their previous information seeking skills, which may not lead to locating the most appropriate resources to support their work. Information literacy support and materials must be embedded within the curriculum to support student learning and to be recognized and prioritized in academic plans. As noted by Khan and Qutab (2016) “The librarians must understand that users always know their information needs, but they do not know where to find these information” (p. 312).

Librarians are required to create materials that students find supportive, useful, and that students will value for their research tasks. When students cannot locate or access the material they need, they can become disenfranchised. Factors that impact how students perceive online materials include slow downloads, difficulty reading online due to other technology options such as games, a distraction from social media, and emails. Students tend to use specific journals because of familiarity. By understanding how online students make meaning about their experiences with the library and the library’s resources, librarians and academic affairs personnel can better promote online student learning.

If students do not believe that a resource is valuable, they will not use that resource. Wu and Chen (2012) found graduate students often use library resources and that graduate students recognize library resources are important for their classwork. Students can be confused about how to find information and what resources may be needed to complete their work; the library provides



students with more than subscription databases, books, and serials. Resources that explore topics, present information literacy in a new way, or support an assignment can be perceived as valuable to students in their research process.

Early work by Beagle (2000) identified that librarians need to take an active role in the instructional design of information literacy teaching and resource creation. Additional works by Gilbert, Knutson, and Gilbert (2012), Ouellette (2011), and Liu and Luo (2011) indicated student perceptions of the library resources impacts student learning, collection development, and suggested patterns related to how students engage and perceive resources. One of the ways the library takes an active role is to assess the unique needs of their student body.

This study was conducted at a large institution with a diverse, primarily online population. According to the National Center for Education Statistics (2015), as of Fall 2015, 165,743 students were enrolled; 133,211 were undergraduate students and 32,532 were graduate students. Ninety-five percent of graduate and ninety-eight percent of undergraduate students were enrolled solely in distance education. The University has eleven colleges and schools. The Business programs graduate more students than any other University program with 4,393 graduating with a Bachelor's in Business Administration and Management and 2,772 graduating with an MBA in 2015. The Business programs were selected for this study because they represent the largest group of students and thus the resources had the potential to have to benefit the greatest number of students while under study. Each ground campus at the University has a Student Resource Center that provides assistance with writing and mathematics, while University Library does not have a ground presence and is entirely virtual. The University resources used in this study, including the writing resources, were all completely online resources.

This study was designed to obtain a descriptive evaluation of online students' experiences with a University library resource designed to support their research activities. Researchers created a survey to capture students' perceived usefulness, satisfaction and likeliness to use the library resource provided in their course. Data was collected without student identifiers to promote honest feedback. The remainder of this paper will include a brief literature review, the research questions guiding the study, as well as the method of data collection and results. Implications for further research will be discussed.

### **Literature Review**

Murray (2015), Catalano (2016), and Haddow (2012) have shown that having a librarian work with students increases retention and increases the information literacy benchmark for the University. When moving curriculum to an online platform regardless of the learning management system (LMS), the ability to integrate a librarian in the classroom experience can become almost impossible. "Research in virtual reference environments reveals that leading factors for non-use include unawareness of the service, satisfaction with other information sources, and lack of confidence in the chat librarian's ability" (Liu & Luo, 2011, p. 231). While librarians and faculty build many different types of instructional materials and resources to support their students, they may not look at how the resource is being used, where the resource is placed within the course or program, or care about how often students use the resource.

Historically, librarians have developed and made available library guides and pathfinders as a service to library patrons and to support information literacy instruction. While library guides

can take the form of paper handouts or electronic tools, it is important to understand what library guide characteristics students perceive as valuable to their academic experiences and success. Students from a variety of backgrounds come to the University with diverse experiences that may influence their library research skills. Librarians build guides without having information about students' previous experience in using the library or baseline of their information literacy skills. Librarians also aim to design the guides to support multiple learning styles. Bellard (2007) identified that while the majority of graduate students self-reported their library skills as fair or better, many could not tell the differences between a library catalog and a database and were also unable to identify subject specific databases. Bellard's study offered the participants an optional library workshop, and the students who attended the workshop reported a higher comfort level with library resources and a majority of the student participants felt that library instruction should be part of the curriculum.

Green and Browser (2002) found that a collaborative teaching environment including a faculty librarian helped reduce graduate student anxiety. Students felt that the faculty and the librarian each had unique areas of expertise that were helpful as they went through the dissertation process. Both Rempel (2010) and Green and Browser (2002) found that students benefit from librarian involvement, especially when working on the literature review.

### **Using Guides**

Research around the utilization of library guides has identified that when library guides are used, these guides do improve research skills, GPA and retention (May & Leighton, 2013; Wakeham, Roberts, Shelley, & Wells, 2012). However, most utilization studies have focused on how the library guides are built and embedded (May & Leighton, 2013; Wakeham, Roberts, Shelley, & Wells, 2012), and not on how student perception of the guide may relate to student decisions to use the resources. Previous research also has not examined how student perceptions might be influenced by when an online library resource is introduced within a course or program.

### **Timing**

An important piece of planning for library research skills instruction is the timing of the instruction. Many studies have looked at the benefits of offering instruction at the student's point of need. Rempel (2010) conducted a longitudinal study of graduate students who attended a literature review workshop presented by the library. The workshop was offered to students when they were new to their program, and the students found the workshop was an effective use of time. It is also important to consider programmatic requirements when determining the point of need. For example, Rempel (2010) and Neves and Dooley (2011) point out those students who are required to submit a project proposal benefit from library instruction at an earlier time than those who do not have this requirement. Additionally, students who had to come up with a topic tended to start their literature review almost a full year after starting their graduate research. Those students would probably benefit from library instruction at a later time. Mahaffey (2012) concluded that students valued having a research guide when they needed the resource.

Liu and Luo (2011) focused on how often graduate and undergraduate students used their digital library. Their research showed that graduate students requested earlier access to the online library and content to ensure that they were current in the field. The undergraduate students in this study noted that the library was difficult to use and the material was older. This discrepancy in experiences based on student level may be explained by under-developed research skills of undergraduate students or a lack of complexity in their research needs.

## Perception

Most of the perception research on online library guides revolves around the perceptions between print versus electronic resources (Liu, 2006, Lombardo & Miree 2003). Other perception research has been completed on the adequacy of the library resources for both ground and online (Spahr, 2015). Student and faculty perception data can be helpful in assessing library instruction, materials or to re-evaluate services. However, additional information about student satisfaction with the timing of the introduction of the library resources may also support informed decisions about information literacy instruction in the online environment.

## Theory

A social constructivist framework suggests learning is constructed through social interactions (Vygotsky, 1978). For this study, online students interact with the information literacy resource, a library guide about literature reviews, and students make meaning of these interactions. The meanings that online students attribute to their experiences interacting with the literature review library guide will likely influence their future interactions with the University Library. If we better understand online student experiences with the University Library, and with this particular online library resource, we may be better able to support the development of effective online information literacy resources.

## Research Questions and Hypotheses

This study was directed by two research questions, and each question was associated with a hypothesis.

- RQ1: How does program level influence online students' perceived value of a "Literature Review" online library guide?
- H1: There will be no significant difference between undergraduate business and MBA students' perceptions of the value the "Literature Review" online library guide.
- RQ2: How does the timing in which the "Literature Review" online library guide is introduced to students influence their perceived value of the resource?
- H2: The earlier the "Literature Review" online library guide is introduced to students, the greater the students will value the resource.

## Method

### Population and Sample

The population for this study is online undergraduate business students and online MBA students. Online undergraduate students were solicited from one research course introduced early in the program (N=83) and from the program's capstone course (N=561). The MBA sample was recruited from a research course introduced early in the program (N=232) and from the program's capstone course (N=314). The purposive sample consisted of all students enrolled in all sections of these four courses (N=1190) with start dates during September and October 2016. Enrollment numbers were calculated by those students who were included on the final class rosters after the School's drop/add dates for these courses.

### Method of Data Collection

Data was collected using online surveys made available to students with the Literature Review library guide within the four business courses. The online survey included 17 closed-

ended items that had been used by the University Library to assess usability and design for other projects. These items were revised slightly to measure student experiences with the Literature Review library guide. The 17 items were designed to measure perceived usefulness, satisfaction and likeliness to use again using 5-point Likert scales where the higher the value indicated the greater the usefulness, satisfaction, and likeliness to use again. Also, two open-ended questions were asked of all students:

- What element of the Literature Review library guide do you think was most valuable and why?
- Is there anything you'd like to see included in Literature Review library guide that was not currently part of the resource?

All faculty teaching these four courses with start dates between September 13 and October 18, 2016, were sent an email before their section start date informing them about the Literature Review library guide and study. The faculty had not seen the resource before this initial email. The email was sent from the School of Business leadership and asked the teaching faculty to create two announcements in their online course sites. A template for both announcements was provided. The announcement explained that the University Library was piloting the new online library resource in this particular course and the resources were designed by the University Library to support students with the development of a literature review. The announcement went on to explain that the resource was an optional supplement to the course and that interested students who chose to use the resource would also be asked to voluntarily complete a short survey to provide feedback about their experience using the resource. The announcement also included a link to the short 5 to 10-minute online survey. The online business courses are five weeks in length and faculty were asked to post two announcements about the guide and the survey in their classes during week 2 and week 5.

The study was designed to manage concerns about human research subjects. Participation was voluntary and a standard informed consent document was included before students gaining access to the online survey. In addition to using anonymous survey URLs, researchers asked to waive documentation of informed consent as a mechanism to maintain the anonymity of all student participants.

### **Limitations with Response**

A few issues impacted student response patterns. The researchers developed the text for the faculty course announcements about the Literature Review library guide and the associated student survey, as well as instructions for faculty with regards to how and when to share the information with their classes. However, the researchers had to rely on department administrators to share this information with faculty and for faculty to post the announcements in their classes on schedule. A review of class websites indicated many of the faculty did not post one or both of the announcements (Table 1).

While there were 1190 students enrolled in these courses, only 684 received at least one notice about the Literature Review library guide, and only 226 students received both scheduled notices. The overall response across courses and including students enrolled in courses where at least one notice was posted was only 3.5% (n=24). Response varied by course, with the highest response from students enrolled in the early undergraduate course (14%) and the lowest

rate of response coming from students enrolled in the undergraduate later course (n=1). A more thorough examination of response patterns did show that in courses where the faculty member did post two announcements, there was a higher response rate (Table 1).

<b>Courses</b>	<b>Final Roster</b>	<b># Students Either Notice</b>	<b># Students Both Notices</b>	<b>% Students Receiving Both Notices</b>	<b>Total # Response</b>	<b>Total % Response</b>	<b>Total % Response Students Receiving Both</b>
U - E	83	70	39	47%	12	14%	31%
G - E	232	133	47	20%	6	3%	13%
U - L	561	295	89	16%	1	0%	1%
G - L	314	186	51	16%	5	2%	10%

Table 1. Recruitment and Response Patterns. “U” is the “undergraduate” courses and “G” is the “graduate” courses. “E” is the “early” courses and “L” is the “late” courses.

Since access to the Literature Review library guide resource was only made available through the faculty announcements, it was not surprising to see that data from the library guide’s analytics also showed somewhat higher resource views when the faculty shared the information with their students (see Figure 1). It also appeared that page hits were higher after the first notice than after the second notice. The early increased number of resource page hits might have also been related to faculty accessing the resource themselves before posting the information in their classes. It was impossible to connect page hits to individual students, faculty or identified courses in this study.

### **Method of Data Analysis**

Initially, descriptive statistics were run on all items. Limited response and small group sample sizes (see Table 1) precluded hypothesis testing and as a result, the findings presented focuses on response frequencies when examining group differences.

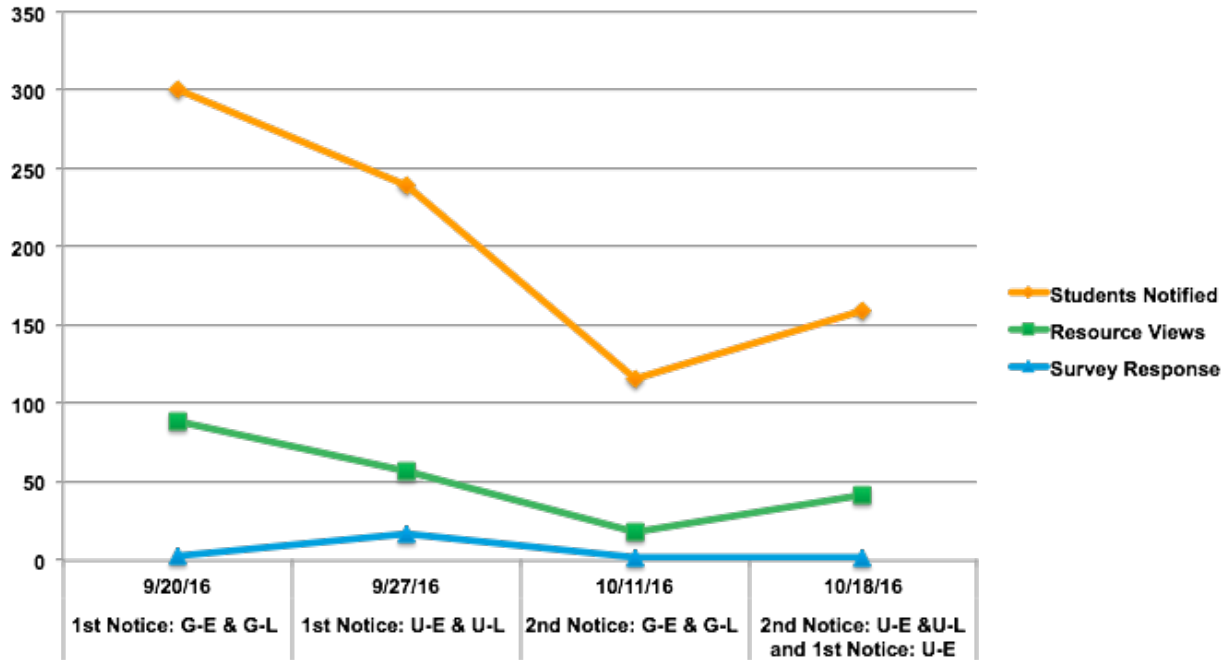


Figure 1. Resource Views and Survey Response

## Results

Although the study was designed to examine mean differences between groups (undergraduate students versus graduate students and students enrolled in courses early in the program versus student enrolled in later courses), the low response rate resulted in no statistical significance between groups. Findings were examined for descriptive purposes and the trends, though not statistically significant, were used to revise the resource and to inform future development of University Library guides.

### Satisfaction with Resource

Across undergraduate and graduate business research courses, and across courses that were taken early in the programs and courses that were taken later in the programs, students indicated they were very satisfied with the Literature Review library guide ( $\bar{X}=4.08$ ) and that they would very likely use the Literature Review library guide again ( $\bar{X}=4.04$ ).

There were almost no differences in how undergraduate and graduate students rated how likely they were to use the Literature Review library guide again (undergraduate  $\bar{X}=4.08$ , graduate  $\bar{X}=4.00$ ) or how satisfied they were with their experience with the Literature Review library guide (undergraduate  $\bar{X}=4.15$ , graduate  $\bar{X}=4.00$ ).

### Perception of Usability

Similarly, students across levels and courses indicated they were satisfied with the way the Literature Review library guide performed ( $\bar{X}=4.22$ ), the look and feel of the guide ( $\bar{X}=4.09$ ), navigation ( $\bar{X}=4.00$ ) and the design intuitiveness ( $\bar{X}=3.96$ ). Students across levels and courses also tended to agree that the Literature Review library guide was easy to use ( $\bar{X}=3.78$ ), that they

imagined most people would learn to use the guide very quickly ( $\bar{X}$ =3.65), and that they found the various elements of the guide well integrated ( $\bar{X}$ =3.58).

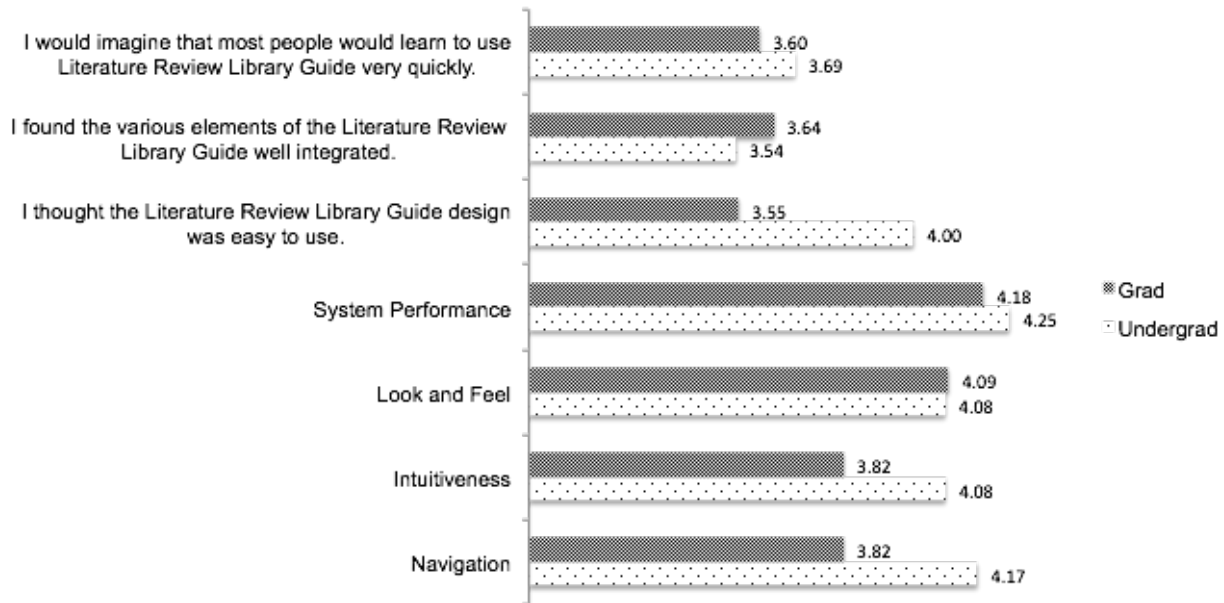


Figure 2. Usability Items - Undergraduate vs. Graduate Students (means reported)

Examining patterns in perceived usability across the undergraduate and graduate business students suggest minimal differences except with regards to the question about how easy the Literature Review library guide was to use, where the undergraduates were more likely to agree ( $\bar{X}$ =4.00) as compared to the graduate students ( $\bar{X}$ =3.55). Similar patterns were found around the questions about perceived intuitiveness (undergraduate  $\bar{X}$ =4.08, graduate  $\bar{X}$ =3.82) and about the design and navigation (undergraduate  $\bar{X}$ =4.17, graduate  $\bar{X}$ =3.82) of the resource.

When asked about what students found most valuable about the Literature Review library guide, undergraduate students reported, “The layout of the site was very easy to read and navigate” and “Everything is pretty easy. No complaints so far.” Some graduate students reported similar comments, such as explaining what they felt was most valuable was “The ease of information” and “The ease of use...because it means it will be user-friendly and more people will be able to use it as well.” However, one graduate student explained when asked what could be improved about the site, “A direct link would be most efficient. The way I was taught to access the resource was like a treasure map.” And another graduate student explained, “I would like more information explaining what each of the databases is and what it is best used for.”

### Value of Content

Students across levels and courses also reported they would likely use the Literature Review library guide often ( $\bar{X}$ =3.83). When asked whether they would use the various resources within the Literature Review library guide, students tended to agree that they would likely often use the Managing References ( $\bar{X}$ =4.24), the Writing Resources ( $\bar{X}$ =4.19), the Evaluate Sources ( $\bar{X}$ =4.00), the Develop a Search Strategy ( $\bar{X}$ =4.00) and the Start Writing ( $\bar{X}$ =3.95) resources.

Although all students tended to indicate they found the resources in the Literature Review library guide important by explaining that they would likely use the features often, when examining differences between undergraduate and graduate students on their perceptions of the specific resources included in the Literature Review library guide, graduate students appeared to value a few of the writing and reference resources more highly than their undergraduate peers. For example, graduate students were more likely to report that they would often use the Writing Resources (graduate  $\bar{X}$ =4.56, undergraduate  $\bar{X}$ =3.92) and the Managing References (graduate  $\bar{X}$ =4.50, undergraduate  $\bar{X}$ =4.00) (Figure 3).

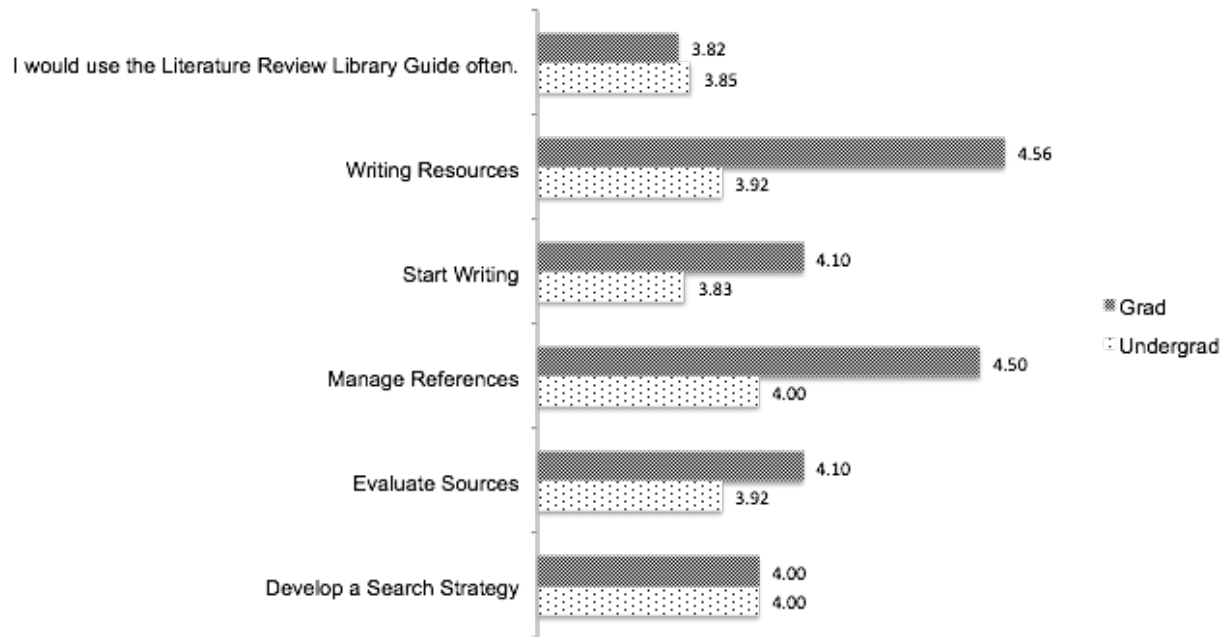


Figure 3. Content Items - Undergraduate vs. Graduate Students (means reported)

Undergraduate students indicated that specific features from the University Writing Center, which was available from the Literature Review library guide, were helpful. For example, one student said, "...I think the center of writing excellence has helped me out the most". Another undergraduate said, "I like to have access to the APA template," and another suggested, "The resource management is the most valuable to me it helps you cite resources... Awesome!". In contrast, the graduate students focused on elements related to searching the literature. For example, one graduate student reported that they found the most valuable feature to be to "Evaluate sources, it allowed me to find credible sources." Another graduate student explained: "The most valuable element was Develop a Search Strategy. Assignments can have thousands of articles, books, etc. to reference. If you educated on how to narrow and redefine your search, you increase your chances of locating relevant data."

### Timing and Literature Review Library Guide

This study was designed to examine whether the timing of introduction of the Literature Review library guide into the academic programs was related to students' reported use of the guide and their satisfaction with the guide. Timing was considered in relation to courses (early in the



program and later in the program) as well as to programs (undergraduate business and graduate business).

When looking at response patterns related to the timing of the introduction of the Literature Review library guide, those students enrolled in courses earlier in their program were much more likely to indicate they would use the resource again (early  $\bar{X}=4.17$ , late  $\bar{X}=3.67$ ) and that they were satisfied with their experience (early  $\bar{X}=4.17$ , late  $\bar{X}=3.83$ ). Because the response set was so small and because there was only one undergraduate response from the later course, it should be noted that the “late” respondents were nearly all graduate students. The conflation of graduate student level with the “later” course response should be considered when looking at the comparison of early students and late students on the specific usability and content items in this study.

All students were asked how likely it was that they would use the Literature Review library guide had it been introduced at a different point in their degree program. Students enrolled in the earlier courses indicated that they were less likely ( $\bar{X}=3.61$ ) to use the resource more had it been introduced later in the course. In contrast, the students enrolled in the later courses indicated they were highly likely ( $\bar{X}=4.50$ ) to use the resource more had it been introduced earlier in their program. The timing of the introduction of the Literature Review library guide within academic programs may be related to whether or not students use the resource. In particular, the response patterns suggest that students would like to be introduced to this resource earlier in their academic programs. One graduate student enrolled in the later research course explained:

This does not answer your question, but I wanted to provide additional feedback. I would suggest this guide is required resource students should review. I am currently in my last course and have sent questions to the librarians and found their responses very helpful. If I were aware of this resource, I would have taken time to utilize it and apply suggestions it provides.

## Discussion

### Guide Design

While both undergraduate and graduate students expressed satisfaction with the guide and indicated that they would use it again, the study has identified the need to revise the guide based on students’ perceptions of usability. The fact that ease of use, ability to quickly learn how to use the guide and integration of elements were all rated slightly lower than other variables of the guide point to areas for improvement. Further development of the Literature Review library guide will be completed with additional usability testing to ensure that the guide meets students’ preferences for information literacy framework with a clean design, consistent and meaningful language, and a limited number of links and pages on those guides (Ouellette, 2001). While keeping these preferences in mind, ensuring that the guides have the appropriate content that meets the curriculum outcomes for information literacy instruction will need to be assessed. Finding the balance between providing enough information and avoiding the tendency to overwhelm students with too much information will require additional student feedback, curriculum design, and mapping of curriculum outcomes. A good method to support this might be to follow Ouellette’s (2001) recommendation to break guides down into sub-disciplines. While the Literature Review library guide is not associated with a particular discipline, and it is focused specifically on resources for completing a literature review, the guide could be further streamlined and broken down into “bite-sized” guides and embedded at students’ point of need.

Only minimal differences between undergraduate and graduate business students' perceptions of usability of the guide were found. However, graduate students reported ease of use and intuitiveness and navigation slightly lower than undergraduates, and this pattern may be due to different expectations on the part of the two student groups as well as different academic needs. Future research could explore this area further. Also, a future approach to addressing unique undergraduate and graduate student needs may involve building two separate Literature Review library guides, one for an undergraduate audience and the other for a graduate audience. Using a service design approach to guide development will help identify if separate guides are a better option, help create guides that are more supportive of differing student needs, and better contribute to the success of these two groups of students (German, 2017).

Developing a better understanding of the base knowledge, needs, and expectations of different groups of students will help with future guide design. Students place a high value on electronic resources and are often confused by the language that librarians use (Ouellette 2001, Wu & Chen, 2012). Given that students may not understand what resources are available in their library, or how to navigate to those resources, guides should be designed with the goal of supporting student needs. For example, libraries should aim to make electronic resources easily noticeable, make them easy to find, and clearly describe resource content. Knowing that students are more likely to use a resource that is recommended by faculty, and that they are more likely to report greater success and satisfaction when faculty or a librarian recommended that resource specifically for an assignment, will inform future guide development as well as placement of the guide (Ouellette, 2001 & Spahr, 2015).

### **Content Relevance**

Comparing undergraduate and graduate business students' responses around the value of content also suggests a potential need to model this guide differently for undergraduate and graduate students. Graduate students were more likely to report that they would use the Writing Resources and Managing References pages often than undergraduates. Undergraduate students indicated in the open-ended question that the content of the University Writing Center page was helpful. A possible reason for this is the undergraduate students are still learning the process of writing, while graduate students conceivably need less help in this area. In contrast, the graduate students focus on the elements related to searching the literature such as content on how to evaluate sources and how to develop a search strategy.

### **Timing of Guide Introduction**

The fact that students who were introduced to the guide in courses later in their program reported that they were highly likely to have used the guide had it been introduced earlier in their program was unsurprising and supports the results indicating the students found the guide valuable. It is also not surprising that students who were introduced to the guide early in their program were less likely to report that they would use the guide more had it been introduced at a later time. The students recognized that this guide provided more value at certain times in their program and that they would have had a greater need for the guide earlier in their program. Rempel (2010), Neves and Dooley (2011), Mahaffey (2012), and Shank and Dewald (2010) identified that the earlier information literacy instruction is introduced and more often the students are exposed to information literacy concepts, the higher the probability the students will apply the skills in their coursework. The library guides need to be embedded at the appropriate time. "The closer the link

between course assignments and library resources to help with those assignments, the greater likelihood that students will access library information” (Shank & Dewald, 2003, p. 41).

One way to help determine if a guide is embedded at the correct point when students need the information is to look at the use analytics. The LibGuides platform provides data on the number of views at the guide, page, and link or asset level. It would be valuable to know the number of unique user views, repeat visitors, and session length to gain a more comprehensive understanding of use. Google Analytics is one tool that can provide this data and this tool will be integrated for future evaluation of guide use. If the number of unique visitors increases shortly after a guide is introduced in the curriculum, this can indicate that the guide is findable. Looking at data for repeat visitors can help determine if the content of the guide is valuable and meeting student learning outcomes.

### **Future Research**

Future research on course specific guides will be conducted with continued evaluation of student perceptions of usability, the value of the content, and timing of guide introduction while additionally evaluating usage. These guides will be built for doctoral studies supporting research methods, supporting doctoral writing, and publication processes for their doctoral work. This study will include additional data collection points such as student end of course surveys, faculty end of course surveys, and student data (grades, continued course enrollment, and GPA). By engaging the faculty in the process, we are looking at having more student use of the project.

Students noted that they would have used the guides more if they were introduced earlier within their program. Future work needs to include identification of library resource needs, identification of when in a program the resource is introduced, and where the resource is embedded within the structure of the course.

After the completion of this initial study, the University Library has begun building library guides that are embedded in the first six courses that are taken by all undergraduate students. The guides are being built to support signature assessment assignments in a series of courses developed to promote student success. These guides fit the definition of Micro-Level Library Courseware Involvement (MiLLCI) as described by Shenk and Dewald (2003). MiLLCI can be advantageous by allowing student access to focused library content at the point of need within the LMS. Embedding the guides directly into the curriculum should increase use of the guides and the associated library resources.

Library resource design can benefit from ongoing, gradual user experience testing (Pennington, 2015; Sonstebly & DeJonghe, 2013; Tidal, 2012). Usability design can help librarians develop awareness of the problems that their students encounter and help them build library resources more focused on their students' needs (Pennington, 2015; Sonstebly & DeJonghe, 2013; Tidal, 2012). These findings suggest that additional user testing of the library guides should be completed. As changes are made to the design of the library pages, it is advantageous to make sure that the students are still able to follow steps to find resources on the library guide page with minimal disruption. Future research will involve completing usability tests with small groups of students who will be impacted by the design changes and then ask these students to show their steps, and the researchers will observe what they do. By conducting this research with students with different demographics, additional customization of the library guide to meet individual student needs.

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## Introduction to Section II

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This section of the new issue contains six articles from the general pool of papers submitted to the journal. In these articles authors investigate theoretical frameworks, retention, modality preferences, and language learning in online settings.

The first of two papers addressing theory is by Jessica Pool, Gerda Reitsma, and Dirk Van den Berg of North-West University in South Africa. In this qualitative study the authors investigate an emerging construct within the Community of Inquiry (CoI) framework. This investigation builds on research my colleagues and I initiated into the construct of “learning presence”, the self- and co-regulatory learning behaviors students demonstrate in online and blended learning environments. The authors found that a lack of self-regulation, including time-management, coordination, and management of tasks, required a higher level of teaching presence on the part of the instructor in the blended learning setting that was the context of the study.

The next paper in this section is by Anthony Picciano of the Graduate Center of the City University of New York. This work is an ambitious attempt to review learning theory to develop a new theoretical framing for online education. Building on behaviorism, cognitivism, and social constructivism as a foundation, the author argues for a multimodal model that expands on his previous “Blending with Purpose” approach and adds several new components including community, interaction, and self-paced, independent instruction. The result is a more comprehensive descriptive theory for online pedagogy based on instructional intent.

The following two papers in this section look at retention in online courses and programs. The first of these, focusing on the course level, is by Whitney Alicia Zimmerman and Glenn Johnson of The Pennsylvania State University. Introductory statistics can be a challenging course for undergraduate students and completing the course online can be even more daunting. In this paper the authors investigated malleable factors that predict completion of such a course with a goal to focus on issues that may be impacted through targeted interventions. Results suggest several interventions may be effective including reducing test anxiety, increasing existing content knowledge early in the course, and improving students’ perceptions statistics instructors.

A second paper dealing with retention is by Chris Sorensen and Judy Donovan of Ashford University. In this study the authors attempt to better understand undergraduate online program level retention in a for-profit institution. They conducted a mixed methods investigation in which they examined evidence using survey methods, interviews, content analysis, and classroom observations. They conclude that retention in the online program they studied was contingent on a combination of adequate support, student ability to balance multiple priorities and stronger academic performance earlier in a program. They reference specific interventions likely to address these issues.

The next paper, by Gary Blau and Rob Drennan of Temple University, seeks to understand how student perceptions of specific methods used in online courses (e.g. recorded lectures, discussion boards) impacts their acceptance and endorsement of online learning more generally. This survey-based study finds that student who preferred the specific methods used for online or hybrid classroom delivery also had higher perceived favorability of online/hybrid courses and higher intentions to recommend online/hybrid courses. These results suggest that it may be more than the flexibility and convenience that draws students to online education. The pedagogy and its implementation make a difference as well.

The final paper in this issue is by Alireza Shakarami, of Islamic Azad University in Iran and Karim Hajhashemi and Nerina Caltabiano of James Cook University in Australia. This mixed-methods study investigates net generation language learners who are increasingly engaged in online learning environments. The study focuses on compensatory strategies used by ESL students in online settings to overcome the absence of cues traditionally encountered in face-to-face language learning contexts. The authors conclude that compensatory strategies were repeatedly used by study participants, but that modifications in the strategy was necessary in communications of the students in online their language learning tasks.

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# Revised Community of Inquiry Framework: Examining Learning Presence in a Blended Mode of Delivery

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## Abstract

This paper presents a study grounded in the Community of Inquiry (CoI) framework using qualitative content analysis and focus group interviews in an effort to identify aspects of learning presence in a blended learning course. Research has suggested that the CoI framework may need additional emphasis based on the roles of strategic learners in online environments. Consequently, this qualitative study investigated the extent to which learning presence, the fourth presence of the CoI framework, manifested itself in a blended mode of delivery. The specific focus was on learning presence and how it precipitated in a blended-learning environment. Findings from the study indicated that a lack of self-regulation skills, such as time-management, coordination, and management of tasks, influenced the learning presence and required a stronger teaching presence. We concluded that self-regulation skills are supportive of effective learning in a blended learning environment.

*Keywords:* blended learning, community of inquiry, learning presence, self-regulation skills

Pool, J., Reitsma, G., & van den Berg, D. (2017). Revised community of inquiry framework: Examining learning presence in a blended mode of delivery. *Online Learning, 21*(3), 153-165 doi: 10.24059/olj.v%vi%i.866

## Introduction

Online learning has become part and parcel of higher education, compelling educators to confront existing presuppositions about teaching and learning in higher education. A new landscape has come into existence in education where physical and virtual environments are blended to support learning in university courses (Stacey & Gerbic, 2008). According to Hadjerrouit (2007), this Blended Learning (BL) approach is becoming the most prominent delivery mechanism in higher education. However, it does present specific challenges for both lecturers to design and students to utilise the best of online and face-to face learning environments.

The Community of Inquiry (CoI) framework is a useful model for describing, explaining and improving online education (Shea & Bidjerano, 2009). With the exception of authors such as Shea and Bidjerano (2012) and Shea, Hayes, Smith, Vickers, Bidjerano, Pickett, Wilde, Goza-Cohen and Shoubang (2012), a lack of research regarding the role that self-regulation skills of students as part of learning presence play in a blended learning environment is evident. Research conducted by Shea, Hayes, Vickers, Gozza-Cohen, Uzuner, Metha, Valtcheva and Rangan (2010) points out that previous analysis of data regarding the CoI framework (social, teaching and cognitive presence) contained information that did not fit into the originally established CoI framework. Social presence refers to the ability to connect with members of a community on a

personal level, whereas cognitive presence is the process of constructing meaning through collaborative inquiry. Teaching presence is the integrating force that structures and leads the educational process in a constructive, collaborative and sustained manner (Garrison & Arbaugh, 2007; Garrison & Cleveland-Innes, 2005; Garrison & Vaughan, 2008). Shea and Bidjerano (2010) believe that the CoI framework needs to include the roles of strategic learners in online environments. Based on their research, learner self-regulation seems to serve as a basis for a new form of presence within the CoI model, described by Shea and Bidjerano (2010) as learning presence.

Online education requires a greater degree of self-directedness and self-reliance than traditional face-to-face modes of delivery (Dyanan, Cate, & Rhee, 2008; Shea & Bidjerano, 2012). Despite the many promising features of online and BL instruction, such modes of delivery may have a limited capability to engage students in learning experiences unless students are self-motivated, active learners who demonstrate strong organizational skills in their learning habits (Banerjee, 2011). Students in online courses face challenges that require persistence and determination, typically required of self-directed learners (Dyanan, Cate, & Rhee, 2008; Shea & Bidjerano, 2012). Given the on-going expansion of the BL environments Shea and Bidjerano (2012) suggest that we gain insight into successful student self-regulation skills in online environments in order to develop a profile of how students learn online and thus also in a blended environment.

### **Purpose and Research Question**

Extensive research (Dyanan et al., 2008; Hayes, Smith, & Shea, 2015; Lee, Tsai, Chait, & Koht, 2014; Shea & Bidjerano, 2012; Shea et al., 2012) regarding learning presence as an additional construct of the CoI framework has revealed two important gaps that are addressed in this article. Firstly, the existence and establishment of learning presence has been primarily examined in fully online courses and not explicitly in blended learning courses. Secondly, a review of the literature indicated that quantitative methods of research have been the primary method to investigate the manifestation of learning presence in online learning contexts.

The purpose of this article is to report on the manifestation of learning presence in *a blended mode of delivery* using *qualitative analysis*, namely document analysis of social media communication (Facebook threads) and focus group interviews. We were guided by the following research questions:

- To what extent did learning presence establish itself in a blended learning environment in a university course for teacher training students?
- How did the students demonstrate self-directed learning skills as part of their learning presence in the blended learning environment?

To answer the research question, the article is structured as follows: The conceptual-theoretical framework that was used as theoretical basis for the research is discussed. Thereafter follow the empirical report, an outline of our findings, a discussion of the findings in view of the conceptual-theoretical framework, and limitations of the study. The findings of the study include implications for lecturers in higher education.

### Conceptual-Theoretical Framework

The openness of blended learning demands a strong theoretical framework, which informs the integration of face-to-face and online learning. The Community of Inquiry framework is a means to investigate effective online and blended learning environments in higher education (Garrison, Anderson, & Archer, 2000). This framework is a valid and trustworthy instrument to measure the quality of online learning through its focus on the important presences (social, teaching, cognitive and learning presence) that contribute to the quality of online courses (Shea, Pickett, & Pelz, 2003; Shea, Sau Li, Swan, & Pickett, 2005). Lecturers can therefore use it to support the design, implementation and evaluation of effective online and blended learning environments. A cognitivist approach to explore the manifestation of learning presence was utilised in this investigation. The conceptual framing of learning presence by Shea, Hayes, Smith, Vickers, Bidjerano, Gozza-Cohen, Shou Bang, Pickett, Wilde and Tseng (2013) reflects learner self-regulation processes in online educational environments.

The cognitivism learning theory focuses on how students organise and retrieve information as part of learning (Merriam, Caffarella, & Baumgartner, 2007). Meta-cognition, the learners' understanding of their own learning and learning processes, therefore becomes more significant (Ashwort, Brennan, Egan, Hamilton, & Saenz, 2004). Cognitivism focuses on learner-centred strategies, as opposed to teacher-centred strategies, so it allows *more freedom for students to choose the type of learning that suits them best* (Ashwort, Brennan, Egan, Hamilton & Saenz, 2004). The manifestation of learning presence was investigated to give insight into how students' cognitively thought about and directed their learning experiences in such a blended module.

### Learning Presence

The assumption according to the CoI framework is that higher-order learning is best supported in a community of learners who are engaged in building understanding and critical reflection. The philosophical foundation of the CoI indicates that certain collaborative interactions create “distance presence”, resulting in the emergence of a community of inquiry (Garrison, 2009; Garrison, Cleveland-Innes, & Shing Fung, 2010). The face-to-face component in blended learning helps to create a community, however this community should be sustained in the online component of the blended course.”

Recent research on the CoI framework suggests that not enough focus has been placed on the role, involvement and experience of students in online learning (Shea & Bidjerano, 2010; Shea et al., 2012). These studies involved further investigation of the CoI framework and the identification of a fourth presence, learning presence, which was not included in the original CoI framework (Bliss & Lawrence, 2009; Shea & Bidjerano, 2010; Shea et al., 2010).

Given the self-directed nature of online learning, it is imperative for learners to have self-regulation skills. Zimmerman (2002, p. 65) defines self-regulation as “the self-directive process through which students transform their mental abilities into academic skills”. According to Zimmerman, self-regulation refers to self-generated thoughts, feelings and behaviours that are oriented towards attaining goals. Shea and Bidjero (2010) point out that self-regulated online students monitor their time and cognitive strategies, regulate their own study environment, and exercise control over their interactions with peers to maximize learning. The three indicators they associate with self-regulated learning include (Shea et al., 2012):

- Forethought and planning, wherein students plan, coordinate, and delegate online tasks to themselves and other students
- Monitoring, wherein students check with online classmates for understanding, completion of tasks, and their performance on completed tasks
- Strategy use, wherein students seek, offer, or provide help to complete online activities as well as where students articulate gaps in their knowledge.

Learning presence, according to Shea et al. (2012), refers to students' proactive use of specific processes such as goal setting, strategy selection and personal monitoring of effectiveness. It indicates the exercise of control rather than compliance and passivity. It articulates popular beliefs about the importance of self-direction in online and blended learning environments. Understanding the factors that influence the success of online learning environments has significant implications for designing effective online communities (Shea & Bidjerano, 2010). The rationale for investigating learning presence is to examine the distinct roles that successful online students may adopt.

### **Learning Presence as a Construct in the Revised Community of Inquiry Framework**

Results from the study from Shea and Bidjerano (2010) indicated that a clear correlation between constructs of the CoI Framework and self-regulation. According to Knowles (1975):

Self-regulation is a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources, choosing and implementing appropriate learning strategies, and evaluating learning outcomes. (p18)

Long (1994) added to this students' mental processes for the purpose of gaining knowledge and understanding, solving problems, and developing or strengthening a skill.

These results suggest the addition of learning presence as a new conceptual element to the framework (Shea et al., 2012) (see Figure 1). The revised community of inquiry model (Figure 1) indicates that teaching and social presence are linked to student learning presence. Teaching presence and social presence are important factors to the extent to which students believe that they achieve effective learning, and the effort they spend depends partly on their sense of self-directedness. Based on these studies, learning presence can be accomplished via expanded teaching presence. Teaching presence contributes to the effectiveness of online learning through the development of self-regulation skills in learners who are meta-cognitively, motivationally and behaviourally active participants in their own learning process (Shea & Bidjerano, 2012).

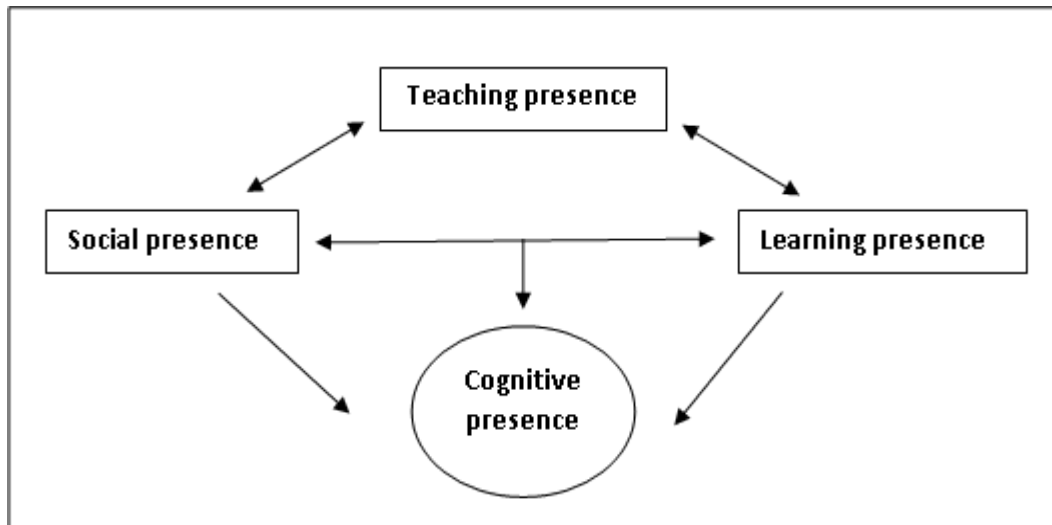


Figure 1: Revised Community of Inquiry model (Shea et al., 2012)

### Relationship Between the Presences in the Revised Community of Inquiry Framework

The CoI Framework outlines the processes required to enable knowledge construction in online environments through the development of teaching, social and cognitive presence. Consistent with previous research,(Garrison & Vaughan, 2008) the three presences (social, cognitive and teaching) are interconnected and have an influence on one another. The interconnectedness between the three presences supports the finding that teaching presence has a regulatory and mediating role and that it merges all elements in a balanced and purposeful relationship. Teaching presence is essential in establishing a sense of social presence by engendering an atmosphere of meaningful communication, cohesive discourse and personal connections. It sets the stage for purposeful discourse and reflective learning processes. In this sense, social presence is a mediating factor that provides context for the educational process. The relationship between teaching presence and cognitive presence becomes clear when students are assigned engaging tasks requiring them to move through the phases of cognitive presence (triggering event, exploration, integration and resolution) as elements of practical inquiry. Once students are engaged, teaching presence has a significant influence in facilitating and directing student learning, which has shown to be crucial in reaching resolution phase and thus achieve a successful learning experience(Garrison & Vaughan, 2008). We are of the opinion that successful learning will only happen if the lecturer actively and effectively structures the course in such a way that the direct instruction and facilitation of discourse leads to higher order learning, which then would result in practical inquiry (cognitive presence). Learning presence represents an important mediator of the links between teaching, social and cognitive presence and therefore aspects of learning presence should not be considered separate from the CoI.

## Methods

### Research Context

The context for this study was a fourth year methodology course for final year teacher training students. Originally, the course was a full-time on-campus course delivered by means of traditional face-to-face interaction, with students engaging with the largest component of the course content during structured face-to-face contact sessions. These contact sessions took the form of two one-hour contact sessions per week, with all sessions being formally planned, structured and facilitated by the lecturer, although with active student participation during the sessions

### Research Design

A design-based research approach (Amiel & Reeves, 2008; Anderson & Shattuck, 2012) was followed throughout the redesigning process to develop and establish communities of inquiry in the blended learning course. Part of the design-based research involved descriptive qualitative research, of which we report on in this study.

### Participants

The target population for this study was a group of teacher training students ( $N=58$ ) enrolled as full-time students at the Faculty of Educational Sciences at a comprehensive university in South Africa. These students came from two different specialisation areas: Computer-aided Technology (CAT) and Learning Area Technology (TE – Design and Technology). Informed consent was obtained from each student before the data was used for this study. Ethical clearance was received from the university's ethical committee.

### Data Collection and Analysis

Data collection started with a semi-structured interview with the lecturer responsible for the module. The purpose of the interview was to gain an understanding of the manner in which the face-to-face module was presented. The contact-based, face-to-face course was re-designed into a blended learning course at the start of the semester. The researcher, in collaboration with the lecturer and campus academic support staff, moved a significant portion of the learning activities to the online environment. Guidelines offered by Garrison and Vaughan (2008) for establishing a community of inquiry were followed during the design and implementation of the course. These guidelines included the sustainment of a community through expression of group cohesion, and the development of collaborative relationships where students are supported to assume responsibility for their learning,

During the course students were required to communicate on a Facebook page which was specifically created as an online platform. The nature of the threads included formal and informal communication between the lecturer and students as well as students with each other. The Facebook threads were collected throughout the course with the purpose to inform the researchers on the establishment of Communities of Inquiry as well as to guide further refinements to the blended learning course. The threads were analysed as a form of document analysis which is a qualitative research method involving the interpretation of a variety of relevant documents to give voice and meaning to a central topic (Fraenkel & Wallen, 2003). In addition, 2 focus group interviews with 7 participants per group were conducted near the end of the semester to provide additional information on their participation and collaboration in the blended course.

The interview schedule consisted of 14 questions of which question 1-4 addressed the teaching presence, 5-9 addressed social presence and question 10-14 addressed cognitive presence. The focus group interviews, facilitated by the researcher, were audio recorded and lasted between 30 and 60 minutes. The transcribed data were checked for accuracy by an independent researcher (Merriam, 2009). Both sets of data (interviews and Facebook threads) were analysed using *priori* codes, derived from the literature and *posteriori* codes that emerged from the data were utilised (Creswell & Piano, 2011). During the data analysis the researchers systematically made sense of the data through selecting, categorizing, comparing, synthesizing and interpreting the data. Students participated voluntarily and with consent. A co-researcher co-coded the interviews to verify dependability, a form of reliability in qualitative data coding (Delpont & De Vos, 2011).

### Discussion

Although learning presence was not tested in the original CoI survey, we wanted to investigate the extent to which learning presence manifested itself in this blended module using qualitative research methods. The reason for examining learning presence is to shed light on the distinct roles that successful online students may adopt in an online learning environment.

The data showed evidence of learning presence in the way that students communicated with each other, took responsibility for own learning and organising their learning activities. Learning presence is associated with self-regulation skills which include time-management, self-discipline, setting goals, self-reliance and dividing up tasks (Banerjee, 2011; Brunner, Brendenlier, Stoter, Hohlfeld, & Von Ossietzky, 2015). Similar concepts for learning presence emerged during the coding process of the qualitative data, including time management, self-discipline, task driven, setting goals and segmenting tasks. What emerged from the data was that students struggled with self-regulation requirements expected of them in a blended learning environment, making the learning process more challenging for them.

In the online learning environment, students missed the personal attention of the lecturer that is typically part of the face-to-face environment. Most students mentioned that they felt lost in the online environment where they had to use self-regulation measures such as forethought and planning, coordinating and delegating online tasks to themselves and other students, as can be seen from these student comments:

Sandy: I missed the personal aspect of the lecturer because we were not used to completing most activities online. The online environment caused frustration because we thought we had to do everything by ourselves and we are not used to doing everything by ourselves. For four years we only had contact lessons and saw the lecturer face-to-face and now everything feels different.

Bob: I would open my phone and then close it to go back later to the group discussion, and then when I go back later it is too late to raise my opinion, because by then the other group members already decided what must be done.

An important aspect of self-regulation is time management. A number of students reported that time management was a very big challenge for them and, as is evident from the responses below, students lack these skills:

Susan: So, I believe time management was the problem. I feel we always had the learning management system (eFundi) with our other subjects. The problem was just time management.

Sandy: I was very confused and it was very challenging in terms of time management.

Jennifer: Your time management had to be a hundred percent accurate.

Jennifer: We go on eFundi then we see there that an assignment or something must be submitted now, but then it is eleven o'clock and I see it had to happen [be submitted] at twelve o'clock.

Bob: Time management is a big factor in a blended learning course.

Coordinating activities and dividing tasks were another challenging requirement for the students. Half of the students reported that getting their groups together were time consuming and frustrating. Segmenting tasks is also associated with time-management skills and, therefore, learning presence. Responses from students explain their difficulties:

Mary: The online component was not the problem, but to get portions of the work to other members of the group. That was a problem.

Stephanie: I think the arrangement of group activities was a challenge. Groups had to get together...it often fell during class time when we have other classes. Not everyone has the same classes, so they can use that time and now you can't join them. Then you arrive afterwards and then they have finished working. So it was kind of difficult because the normal, scheduled period for the subject was not sufficient to do a group assignment.

Suzie: Sometimes you arrange for the group to get together for example, meet at eleven; then it happens that only three or two of the five shows up and then arranging group work was really difficult.

Taylor: I spent most of the time on my phone making arrangements with other group members and then they just don't show up.

In contrast, some students reported on the successful coordination, dividing of tasks and arrangement of group activities through the use of the LMS:

Bob: We made plenty use of e-mails to divide the work. Each one sends the part he did back and then the other one just check if it is correct. Then it gets sent to the group leader and he/she submits it.

Student-student communication and coordination through email conversations were further evident in these responses:

Jess: Can you mail me your group work to this email address... then I will email ours to you to send to the rest of the group.

Bella: Fine with us. You can mail us your comments then we can start working on the mind map.

One student pointed out that some of the frustration and uncertainty on how to complete activities were due to the lack of self-discipline. Although support in the form of scheduled contact sessions and online consultation hours was provided to students to be able to function in the online environment, not all students made effective use of it.



Self-discipline is an important skill needed to monitor one's use of the guidance provided. Students could experience the personal one-on-one attention and guidance provided by the lecturer during the contact sessions, but attending contact sessions in a blended learning module is dependent on the students' self-discipline and self-regulation, as is evident from the following student's remark:

Tino: You can also deduce, from the students' comments in the online environment, when students did not attend the scheduled contact lectures. Many students did not understand what to do because they weren't in class. The help [assistance] provided in the contact lectures, along with the online instructions, made it really easy to complete activities successfully.

Analysis of the Facebook threads, showed that students did engage in strategic efforts such as task-driven skills through the setting of goals, as the following extract from the Facebook page illustrates:

Anna: Hi all, we need to get together to discuss the question that need to be completed for the Tuesday online session. When do you want to get together and where?

Margaret: Why can't we discuss it on Facebook?

Anna: Go and read under week 2 period one in the study guide and tell me what you think.

Botha: Hi all, we may have to get together on Sunday or Monday somewhere to finish the group questions.

Anna: Yes definitely. Preferably Monday morning early, if you can because it needs to be submitted at 2.

Anna: Okay let's get together at 9. Outside the education library.

Margaret: Fine with me

Margaret: Hi all, I have submitted the answer. It looks good!

The online component in this blended learning module required a greater degree of self-directedness and self-reliance for students to take responsibility for their own learning. The analysis of the Facebook threads indicated that most of the students struggled to take responsibility for their own work and learning, as is evident from the following students' remarks:

Carrie: No one has ever shown me how to use the chat function on eFundi. So I don't know how the chat room works on eFundi and that is why I didn't even bother to take a look.

Bob: I don't even have Facebook, so I missed quite a bit.

Taylor: ... then they just don't show up. It was a bit frustrating, because not everyone wants to produce work of the same quality. For some it is important; for others it is not important. This made the group work a bit frustrating.

Learners' self-regulation in online environments should be examined given the online, social and self-directed nature of online learning. This study indicated that the presence of the lecturer is still very important for the students. Banerjee (2011) reported the same findings where he wrote that the majority of students still expect to meet regularly in the classroom environment for lecture based classes. The lack of self-discipline skills in utilising the two environments typical of blended learning effectively was consistent with previous research (Banerjee, 2011; Shea & Bidjerano,

2012; Traver, Volchok, Bidjerano, & Shea, 2014) and also evident in the findings of this study. Evident from the literature (Shea et al., 2012) as well as the findings from this study indicates that learning in an online environment requires specific time- and task-management skill which students struggled with. Banerjee (2011) reported on similar findings. However, there were evidence in the Facebook threads of students engaging to some extent in strategic self-regulation, such as setting goals and being task driven.

### **Conclusion**

In this article, learning presence, a fourth presence in the CoI framework conceptualised by Shea (2010), as it emerged in a blended learning course for teacher training students was investigated through qualitative research and described. We focussed on self-regulated learning as a component of learning presence.

Results indicate that learning presence was established in this blended learning course, but it was influenced by the self-regulation skills of the students. The lack of self-regulation, including time-management skills, and the ineffective coordination and management of tasks were identified as challenges experienced by students in the online part of the blended learning. It proved imperative for students to have self-regulation skills in a blended learning environment.

The lack of self-regulation skills made the role of the teacher more important. We therefore concluded that teaching presence plays an important role in blended learning, especially when students are exposed to blended learning for the first time, causing them to need initial support and guidance. As their self-regulation skills improve, learning presence may become more significant and teaching presence may play a less significant role.

### **Limitations**

In this study, only the students' experiences were reported. The lecturer's viewpoint on how students engaged with the course in a blended learning environment will provide additional enriching results.

The data were also limited to what was available to the researchers on Facebook and the focus group interviews. Data from students who did not participate in the Facebook discussions or in the focus group interviews were not included and may have provided additional meaningful evidence.

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# Theories and Frameworks for Online Education: Seeking an Integrated Model

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## Abstract

This article examines theoretical frameworks and models that focus on the pedagogical aspects of online education. After a review of learning theory as applied to online education, a proposal for an integrated *Multimodal Model for Online Education* is provided based on pedagogical purpose. The model attempts to integrate the work of several other major theorists and model builders such as Anderson (2011).

*Keywords:* Online education, online learning, blended learning, learning theory, theoretical frameworks, model building, multimodal model

Picciano, A. G. (2017). Theories and frameworks for online education: Seeking an integrated model. *Online Learning, 21*(3), 166-190. doi: 10.24059/olj.v21i3.1225

## Introduction

In a provocative chapter of *The Theory and Practice of Online Learning*, Terry Anderson (2011) examines whether a common theory for online education can be developed. While recognizing that as a difficult, and perhaps fruitless, task, he nonetheless examines possibilities and proposes his own theory which he admits is not complete. The purpose of this article is to examine theoretical frameworks relevant to the pedagogical aspects of online education. It starts with a consideration of learning theories and funnels down to their specific application to online education. The article concludes with a proposal for an integrated model for online education based on pedagogical purpose.

## Learning Theory

Learning theory is meant to explain and help us understand how people learn; however, the literature is complex and extensive enough to fill entire sections of a library. It involves multiple disciplines, including psychology, sociology, neuroscience, and of course, education. Three of the more popular learning theories—behaviorism, cognitivism, and social constructivism—will be highlighted to form the foundation for further discussion. Mention will also be made of several other learning theories that are relevant to online education. Before reviewing these theories, it will be worthwhile to have a brief discussion of the term *theory* itself.

Theory is defined as a set of statements, principles, or ideas that relate to a particular subject. A theory usually describes, explains, and/or predicts phenomena. The definition of theory also varies depending upon disciplines, especially when related to the term *model*. As noted by Graham, Henrie, and Gibbons (2013), the two terms are used interchangeably and generally refer to the same concept. However, a model is more frequently a visual representation of reality or a concept. In this discussion, the terms theory and model will be used interchangeably. The purpose

of a theory or model is to propose the answers to basic questions associated with a phenomenon. Graham, Henrie and Gibbons (2013) reviewed this issue as related to instructional technology and recommended a three-part taxonomy first proposed by Gibbons and Bunderson (2005) that includes theories that:

- *Explore*: “What exists?” and attempts to define [describe] and categorize;
- *Explain*: “Why does this happen?” and looks for causality and correlation, and work with variables and relationships.
- *Design*: “How do I achieve this outcome?” and describes interventions for reaching targeted outcomes and operational principles (Graham, Henrie and Gibbons, 2013, p. 13).

This taxonomy will serve as an overall guiding principle for the discussion of learning theories and models in this article.

### **Behaviorism**

As its name implies, behaviorism focuses on how people behave. It evolved from a positivist worldview related to cause and effect. In simple terms, action produces reaction. In education, behaviorism examines how students behave while learning. More specifically, behaviorism focuses on observing how students respond to certain stimuli that, when repeated, can be evaluated, quantified, and eventually controlled for each individual. The emphasis in behaviorism is on that which is observable and not on the mind or cognitive processes. In sum, if you cannot observe it, it cannot be studied.

The development of behaviorism is frequently associated with Ivan Pavlov, famous for his experiments with dogs, food, and audible stimuli, such as a bell. In his experiments, dogs learned to associate food or feeding time with the sound of the bell and began to salivate. Pavlov conducted his experiments in the early 1900s and they were replicated by many other researchers throughout the 20<sup>th</sup> century. John B. Watson, among the first Americans to follow Pavlov’s work, saw it as a branch of natural science. Watson became a major proponent of Pavlov and is generally credited with coining the term *behaviorism*. He argued that mind and consciousness are unimportant in the learning process and that everything can be studied in terms of stimulus and response.

Other major figures associated with behaviorism are B.F. Skinner and Edward Thorndike. Skinner is particularly well known, primarily because he introduced what he referred to as operant conditioning which emphasized the use of both positive and negative reinforcement to help individuals learn new behaviors. This was quite different from Pavlov, who relied on simple reflexive responses to specific stimuli although both Pavlov and Skinner promoted repetitive behavior that leads to habit formation. Skinner had a significant influence on early computer-assisted instructional (CAI) models as developed by Pat Suppes and others. A common aspect of early CAI programs was the reliance on encouragement and repetition to promote positive learning activities.

### **Cognitivism**

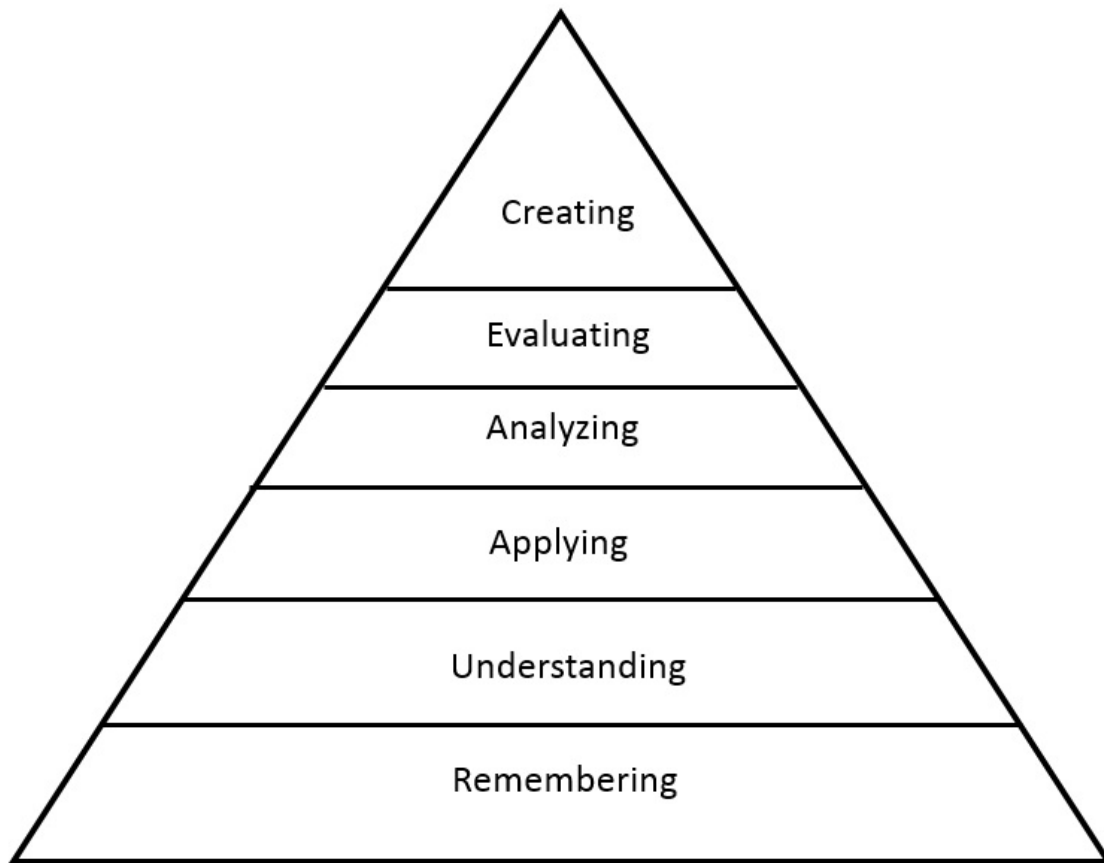
Cognitivism has been considered a reaction to the “rigid” emphasis by behaviorists on predictive stimulus and response (Harasim, 2012, p. 58). Cognitive theorists promoted the concept that the mind has an important role in learning and sought to focus on what happens in between the occurrence of environmental stimulus and student response. They saw the cognitive processes of the mind, such as motivation and imagination, as critical elements of learning that bridge

environmental stimuli and student responses. For example, Noam Chomsky (1959) wrote a critical review of Skinner's behaviorist work in which he raised the importance of creative mental processes that are not observable in the physical world. Although written mainly from the perspective of a linguist, Chomsky's view gained popularity in other fields, including psychology. Interdisciplinary in nature, cognitive science draws from psychology, biology, neuroscience, computer science, and philosophy to explain the workings of the brain as well as levels of cognitive development that form the foundation of learning and knowledge acquisition. As a result, cognitivism has evolved into one of the dominant learning theories. The future of cognitivism is particularly interesting as more advanced online software evolves into adaptive and personalized learning applications that seek to integrate artificial intelligence and learning analytics into instruction.

Behaviorism led to the development of taxonomies of learning because it emphasized the study and evaluation of multiple steps in the learning process. Behaviorists repeatedly studied learning activities to deconstruct and define the elements of learning. Benjamin Bloom (1956) was among the early psychologists to establish a taxonomy of learning that related to the development of intellectual skills and to stress the importance of problem solving as a higher order skill. Bloom's (1956) *Taxonomy of educational objectives handbook: Cognitive domains* remains a foundational text and essential reading within the educational community. Bloom's taxonomy is based on six key elements (see Figure 1) as follows:

- **Creating:** Putting elements together to form a coherent or functional whole, and reorganizing elements into a new pattern or structure through generating, planning, or producing.
- **Evaluating:** Making judgments based on criteria and standards through checking and critiquing.
- **Analyzing:** Breaking material into constituent parts, and determining how the parts relate to one another and to an overall structure or purpose through differentiating, organizing, and attributing.
- **Applying:** Carrying out or using a procedure through executing or implementing.
- **Understanding:** Constructing meaning from oral, written, and graphic messages through interpreting, exemplifying, classifying, summarizing, inferring, comparing, and explaining.
- **Remembering:** Retrieving, recognizing, and recalling relevant knowledge from long-term memory.





*Figure 1.* Bloom's Taxonomy

Bloom, in developing his taxonomy, essentially helped to move learning theory toward issues of cognition and developmental psychology. Twenty years later, Robert Gagne, an educational psychologist, developed another taxonomy (events of instruction) that built on Bloom's and became the basis for cognitivist instructional design (Harasim, 2012). Gagne emphasized nine events in instruction that drive the definitions of objectives and strategies for the design of instructional material. (See Figure 2)

1. **Gain attention:** Use media relevant to the topic.
2. **Describe the goal:** Provide clear objectives to the overall course goals.
3. **Stimulate prior knowledge:** Review previously presented material and concepts and connect them to the material to be addressed in the current module.
4. **Present the material to be learned:** Readings, presentations, demonstrations, multimedia, graphics, audio files, animations, etc.
5. **Provide guidance for learning:** Discussions to enable learners to actively reflect on new information in order to check their knowledge and understanding of content.
6. **Elicit performance:** Activity-based learning such as group research projects, discussion, homework, etc.
7. **Provide feedback:** Immediate, specific, and constructive feedback is provided to students.
8. **Assess performance:** Assessment activity such as a test, research project, essay, or presentation.
9. **Enhance retention and transfer:** Provide opportunities for additional guided practice or projects that might relate learning to other real-life activities.

*Figure 2.* Gagne's Nine Events of Instruction

### **Social Constructivism**

Parallel to behaviorism and cognitivism was the work of several education theorists, including Lev Vygotsky, John Dewey, and Jean Piaget. Their focus on social constructionism was to describe and explain teaching and learning as complex interactive social phenomena between teachers and students. Vygotsky posited that learning is problem solving and that the social construction of solutions to problems is the basis of the learning process. Vygotsky described the learning process as the establishment of a “zone of proximal development” in which the teacher, the learner, and a problem to be solved exist. The teacher provides a social environment in which the learner can assemble or construct with others the knowledge necessary to solve the problem. Likewise, John Dewey saw learning as a series of practical social experiences in which learners learn by doing, collaborating, and reflecting with others. While developed in the early part of the 20<sup>th</sup> century, Dewey's work is very much in evidence in a good deal of present-day social constructivist instructional design. The use of reflective practice by both learner and teacher is a pedagogical cornerstone for interactive discussions that replaces straight lecturing, whether in a face-to-face or online class. Jean Piaget, whose background was in psychology and biology, based his learning theory on four stages of cognitive development that begin at birth and continue through one's teen years and beyond. Seymour Papert, in designing the Logo programming language, drew from Jean Piaget the concept of creating social, interactive microworlds or communities where children, under the guidance of a teacher, solve problems while examining social issues, mathematical and science equations, or case studies. Papert's approach of integrating computer technology into problem solving is easily applied to many facets of instructional design.

## Derivatives of the Major Learning Theories

A number of theories and models have roots in one or more of the above frameworks. In the latter part of the 20<sup>th</sup> century, the major learning theories, especially cognitive theory and social constructivism, began to overlap. For example, Wenger and Lave (1991) and Wenger (1998) promoted concepts such as “communities of practice” and situated learning. Their position was that learning involves a deepening process situated in, and derived from, participation in a learning community of practice. Their work is very evident in many studies, including those related to online education.

Information processing learning theory is a variation of cognitivism that views the human mind as a system that processes information according to a set of logical rules. In it, the mind is frequently compared to a computer that follows a set of rules or program. Research using this perspective attempts to describe and explain changes in the mental processes and strategies that lead to greater cognitive competence as children develop. Richard Atkinson and Richard Shiffrin (1968) are generally credited with proposing the first information processing model that deals with how students acquire, encode, store (in short-term or long-term memory), and retrieve information.

One of the more popular and controversial theories relates to learning styles and posits that individuals learn differently depending upon their propensities and personalities. Carl Jung argued that individual personality types influence various elements of human behavior, including learning. Jung’s theory focuses on four basic psychological dimensions:

1. Extroversion vs. Introversion
2. Sensation vs. Intuition
3. Thinking vs. Feeling
4. Judging vs. Perceiving

While each unique dimension can influence an individual learning style, it is likely that learning styles are based on a combination of these dimensions. For example, a learning style might include elements of extroversion, sensation, feeling, and perception as personality dimensions. Readers may be familiar with the Myers-Briggs Type Inventory (MBTI) which has been used for decades to assist in determining personality types, including how personality relates to student learning. The MBTI is based extensively on Jung’s theories and has been used to predict and develop different teaching methods and environments and to predict individual patterns of mental functioning, such as information processing, idea development, and judgment formation. It can also be used to foretell patterns of attitudes and interests that influence an individual’s preferred learning environment and to predict a person’s disposition to pursue certain learning circumstances and avoid others. Lin, Cranton & Bridglall (2005) remind us that much of the work of Carl Jung and the MBTI is applicable to learning environments, whether face-to-face or online. For example, the extrovert may prefer active, highly collaborative environments while the introvert would prefer less interaction and less collaboration. This suggests that instruction should be designed to allow both types of individuals—the outgoing social organizer as well as the introspective reflective observer—to thrive.

Howard Gardner has developed a theory of “multiple intelligences” that proposes that intelligence is not merely a singular entity but consists of multiple entities used by individuals in different proportions to understand and to learn about the world. Gardner has identified nine basic

intelligences: linguistic, logical/mathematical, spatial, musical, bodily kinesthetic, interpersonal, intrapersonal, naturalistic, and existential (see Figure 3). Gardner's theory has received criticism from both psychologists and educators who view these "intelligences" as talents, personality traits, and abilities. His work has also been questioned by those who propose that there is, in fact, a root or base intelligence that drives the other "intelligences." Gardner does not necessarily disagree with this latter position but maintains that other intelligences can be viewed as main branches off the base root intelligence. This theory has important pedagogical implications and suggests the design of multiple learning modalities that allow learners to engage in ways they prefer, according to their interest or ability, and to challenge them to learn in other ways that are less related to their preferences, interests, or abilities. Gardner's work also addresses the common concern that too much teaching and learning is linguistically based (reading, writing, and speaking) and that the other intelligences are underutilized.

Modern neuroscience research also suggests that students learn in different ways depending upon a number of factors including age, learning stimuli, and the pace of instruction. Willingham (2008) suggests that learning is a dynamic process that may evolve and change from one classroom to another, from one subject to another, and from one day to another. This research also supports the concept that multiple intelligences and mental abilities do not exist as mere "yes/no" entities but within continua which the mind blends in a manner consistent with the way it responds and learns from the external environment and instructional stimuli. Conceptually, this suggests a framework for a multimodal instructional design that relies on a variety of pedagogical techniques, delivery approaches, and media.

Lastly, Malcom Knowles (1998) deserves mention as the individual who distinguished between andragogy (adult learning) and pedagogy (child learning). Adults, whether seeking to enhance their professional skills or to satisfy curiosity about a subject, learn differently than children. Courses designed for adults should tap into their social contexts and experiences. Knowles' insights are especially important for higher education, where online technology is used extensively for adult students in traditional and continuing education programs, competency-based learning, and career/professional development.

In sum, a number of theories have been, and will continue to be, applied to instruction, including online and blended learning. Several theories specifically related to online education will now be examined.

1. **Verbal-linguistic intelligence:** well-developed verbal skills and sensitivity to the sounds, meanings, and rhythms of words
2. **Logical-mathematical intelligence:** ability to think conceptually and abstractly, and capacity to discern logical and numerical patterns
3. **Spatial-visual intelligence:** capacity to think in images and pictures, to visualize accurately and abstractly
4. **Bodily-kinesthetic intelligence:** ability to control one's body movements and to handle objects skillfully
5. **Musical intelligences:** ability to produce and appreciate rhythm, pitch, and timber
6. **Interpersonal intelligence:** capacity to detect and respond appropriately to the moods, motivations, and desires of others
7. **Intrapersonal intelligence:** capacity to be self-aware and in tune with inner feelings, values, beliefs, and thinking processes
8. **Naturalist intelligence:** ability to recognize and categorize plants, animals, and other objects in nature
9. **Existential intelligence:** sensitivity and capacity to tackle deep questions about human existence such as: What is the meaning of life? Why do we die? How did we get here?

**Source:** Gardner, H. (1983). *Frames of Mind: The Theory of Multiple Intelligences*. New York: Basic Books.

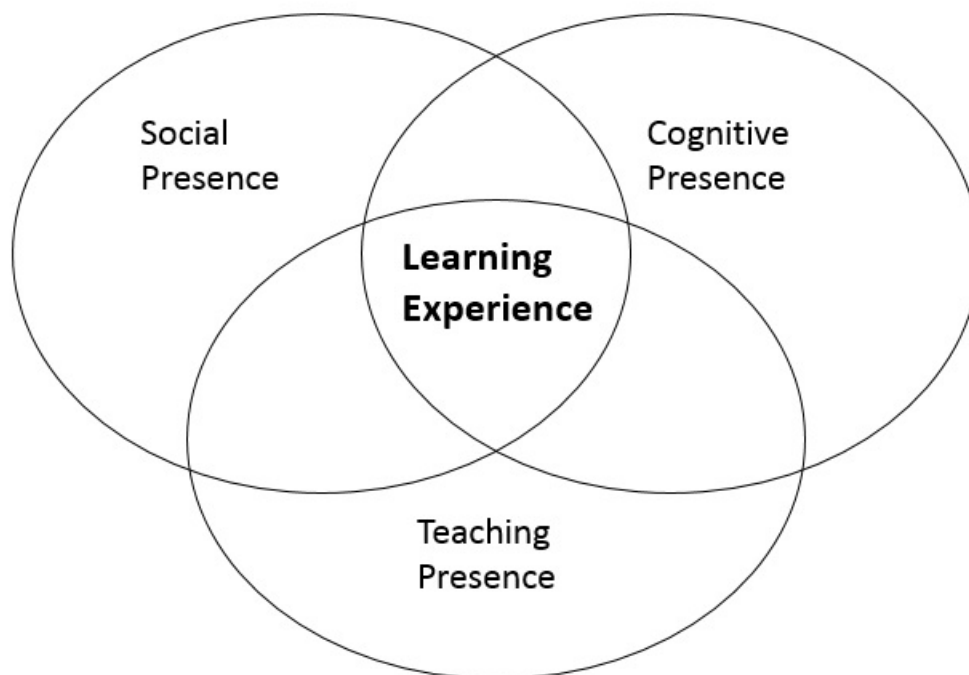
Figure 3. Gardner's Multiples Intelligences

### Learning Theories for Online Education

Just as no single learning theory has emerged for instruction in general, the same is true for online education. A number of theories have evolved, most of which derive from the major learning theories discussed previously. In this section, several theories will be examined in terms of their appropriateness for the online environment.

#### ***Community of Inquiry (CoI)***

The "community of inquiry" model for online learning environments developed by Garrison, Anderson & Archer (2000) is based on the concept of three distinct "presences": cognitive, social, and teaching (see Figure 4). While recognizing the overlap and relationship among the three components, Anderson, Rourke, Garrison, and Archer (2001) advise further research on each component. Their model supports the design of online and blended courses as active learning environments or communities dependent on instructors and students sharing ideas, information, and opinions. Of particular note is that "presence" is a social phenomenon and manifests itself through interactions among students and instructors. The community of inquiry has become one of the more popular models for online and blended courses that are designed to be highly interactive among students and faculty using discussion boards, blogs, wikis, and videoconferencing.



*Figure 4.* Community of Inquiry (Garrison, Anderson, Garrison and Archer, 2000)

### **Connectivism**

George Siemens (2004), one of the early MOOC pioneers, has been the main proponent of connectivism, a learning model that acknowledges major shifts in the way knowledge and information flows, grows, and changes because of vast data communications networks. Internet technology has moved learning from internal, individualistic activities to group, community, and even crowd activities. In developing the theory, Siemens acknowledged the work of Alberto Barabasi and the power of networks. He also referenced an article written by Karen Stephensen (1998) entitled “What Knowledge Tears Apart, Networks Make Whole,” which accurately identified how large-scale networks become indispensable in helping people and organizations manage data and information.

Siemens describes connectivism as:

the integration of principles explored by chaos, network, and complexity and self-organization theories [where] learning is a process that occurs within nebulous environments of shifting core elements – not entirely under the control of the individual. Learning (defined as actionable knowledge) can reside outside of ourselves (within an organization or a database), is focused on connecting specialized information sets, and the connections that enable us to learn more and are more important than our current state of knowing” (Siemens, 2004).

Siemens noted that connectivism as a theory is driven by the dynamic of information flow. Students need to understand, and be provided with, experiences in navigating and recognizing oceans of constantly shifting and evolving information. Siemens proposed eight principles of connectivism (see Figure 5). Connectivism is particularly appropriate for courses with very high enrollments and where the learning goal or objective is to develop and create knowledge rather than to disseminate it.

1. Learning and knowledge rests in diversity of opinions.
2. Learning is a process of connecting specialized nodes or information sources.
3. Learning may reside in non-human appliances.
4. Capacity to know more is more critical than what is currently known.
5. Nurturing and maintaining connections is needed to facilitate continual learning.
6. Ability to see connections between fields, ideas, and concepts is a core skill.
7. Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities.
8. Decision making is itself a learning process. Choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality. While there is a right answer now, it may be wrong tomorrow due to alterations in the information climate affecting the decision.

*Figure 5.* Siemens' Eight Principles of Connectivism

### **Online Collaborative Learning (OCL)**

Online collaborative learning (OCL) is a theory proposed by Linda Harasim that focuses on the facilities of the Internet to provide learning environments that foster collaboration and knowledge building. Harasim describes OCL as:

a new theory of learning that focuses on collaborative learning, knowledge building, and Internet use as a means to reshape formal, non-formal, and informal education for the Knowledge Age” (Harasim, 2012, p. 81).

Like Siemens, Harasim sees the benefits of moving teaching and learning to the Internet and large-scale networked education. In some respects, Harasim utilizes Alberto Barabasi's position on the power of networks. In OCL, there exist three phases of knowledge construction through discourse in a group:

1. **Idea generating:** the brainstorming phase, where divergent thoughts are gathered
2. **Idea organizing:** the phase where ideas are compared, analyzed, and categorized through discussion and argument

3. **Intellectual convergence:** the phase where intellectual synthesis and consensus occurs, including agreeing to disagree, usually through an assignment, essay, or other joint piece of work (Harasim, 2012, p. 82).

OCL also derives from social constructivism, since students are encouraged to collaboratively solve problems through discourse and where the teacher plays the role of facilitator as well as learning community member. This is a major aspect of OCL but also of other constructivist theories where the teacher is not necessarily separate and apart but rather, an active facilitator of, knowledge building. Because of the importance of the role of the teacher, OCL is not easy to scale up. Unlike connectivism, which is suited for large-scale instruction, OCL is best situated in smaller instructional environments. This last issue becomes increasingly important when seeking commonality among online education theories.

Many other theories can be associated with online education but, rather than present more theories and in keeping with one of the major purposes of this article, it is appropriate to ask whether an integrated or unified theory of online education is possible.

### **Can We Build a Common Integrated Theory of Online Education?**

As noted, Terry Anderson (2011) examined the possibility of building a theory of online education, starting with the assumption that it would be a difficult, and perhaps impossible, task. He approached this undertaking from a distance education perspective, having spent much of his career at Athabasca University, the major higher education distance education provider in Canada. While he acknowledged that many theorists and practitioners consider online learning as “a subset of learning in general” (Anderson, 2011, p. 46-47), he also stated:

online learning as a subset of distance education has always been concerned with provision of access to educational experience that is, at least more flexible in time and in space as campus-based education (Anderson, 2011, p. 53).

These two perspectives (subset of learning in general and subset of distance education) complicate any attempt to build a common theory of online education. Blended learning models, for instance, do not easily fit into the distance education schema, even though they are evolving as a prevalent component of traditional face-to-face and online education environments.

Anderson considered a number of theories and models but focused on the well-respected work of Bransford, Brown, and Cocking (1999) who posited that effective learning environments are framed within the convergence of four overlapping lenses: community-centeredness, knowledge-centeredness, learner-centeredness, and assessment centeredness. These lenses provided the foundational framework for Anderson’s approach to building an online education theory, as he examined in detail the characteristics and facilities that the Internet provides with regards to each of the four lenses. Second, he noted that the Internet had evolved from a text-based environment to one in which all forms of media are supported and readily available. He also accurately commented that the Internet’s hyperlink capacity is most compatible with the way human knowledge is stored and accessed. In this regard, he referred to the work of Jonassen (1992) and Shank (1993) who associated hyperlinking with constructivism. Finally, Anderson extensively examined the importance of interaction in all forms of learning and referred to a number of mostly distance education theorists such as Holmberg (1989), Moore (1989), Moore and Kearsley (1996), and Garrison and Shale (1990). The essence of interaction among students, teachers, and content is well understood and is referenced in many theories of education, especially constructivism.



Anderson's evaluation of interaction concludes that interactions are critical components of a theory.

With these three elements in mind (the Bransford, Brown, and Cocking lenses, the affordances and facilities of the Internet, and interaction), Anderson then proceeded to construct a model (see Figure 6). He did add one important element by distinguishing community/collaborative models from self-paced instructional models, commenting that community/collaborative models and self-paced instructional models are inherently incompatible. The community/collaborative models do not scale up easily because of the extensive interactions among teachers and students. On the other hand, the self-paced instructional models are designed for independent learning with much less interaction among students and teachers.

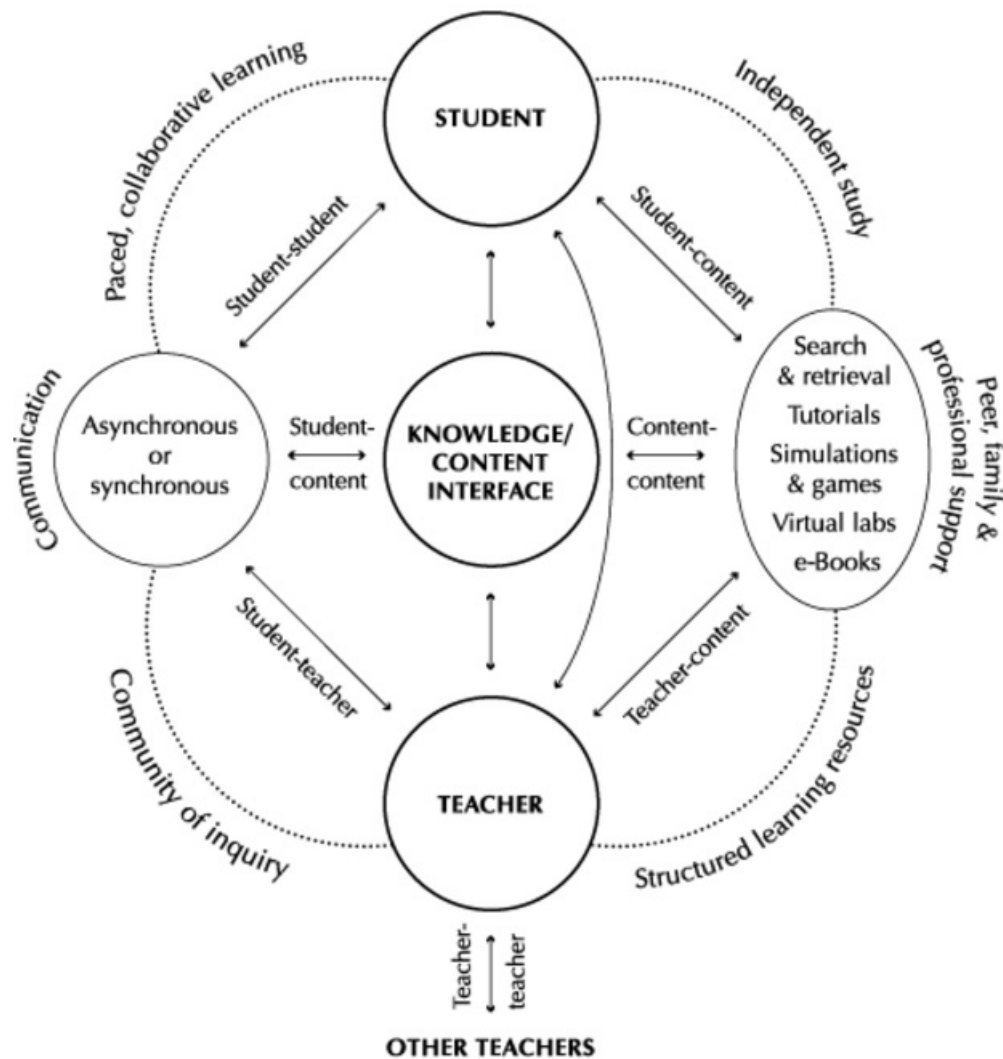


Figure 6. Anderson's Online Learning Model. Reprinted with permission by Anderson, T. (2011). *The theory and practice of online learning*. (2<sup>nd</sup> Edition). Edmonton, AB: AU Press.

Figure 6 illustrates:

the two major human actors, learners and teachers, and their interactions with each other and with content. Learners can of course interact directly with content that they find in multiple formats, and especially on the Web; however, many choose to have their learning sequenced, directed, and evaluated with the assistance of a teacher. This interaction can take place within a community of inquiry, using a variety of Net-based synchronous and asynchronous activities...These environments are particularly rich, and allow for the learning of social skills, the collaborative learning of content, and the development of personal relationships among participants. However, the community binds learners in time, forcing regular sessions or at least group-paced learning. The second model of learning (on the right) illustrates the structured learning tools associated with independent learning. Common tools used in this mode include computer-assisted tutorials, drills, and simulations (Anderson, 2011, p. 61-62).

Figure 6 demonstrates the instructional flow within the two sides and represents the beginnings of a theory or model from the distance education perspective. Anderson concluded that his model “will help us to deepen our understanding of this complex educational context” (Anderson, 2011, p. 68), which he noted needs to measure more fully the direction and magnitude of each input variable on relevant outcome variables.

Anderson also commented about the potential of the Internet for education delivery, and that an online learning-based theory or model could subsume all other modes with the exception of the “rich face-to-face interaction in formal classrooms” (Anderson, 2011, p. 67). This becomes a quandary for Anderson in trying to develop a common theory of online education in that it does not provide for in-person, face-to-face activity and is problematic for those who see online education as a subset of education in general.

### **An Integrated Model**

Anderson’s model assumed that none of the instruction is delivered in traditional, face-to-face mode, and so excluded blended learning models that have some face-to-face component. Is it possible, therefore, to approach the search for an integrated model for online education from the face-to-face education in general or even the blended learning perspective?

Bosch (2016), in a review of instructional technology, identified and compared four blended learning models using twenty-one different design components. These models emphasized, to one degree or another, the integration of pedagogy and technology in course design. Among the models was a Blending with Pedagogical Purpose Model (see Figure 7), developed by this author, in which pedagogical objectives and activities drive the approaches, including the online technology that faculty members use in instruction. The model also suggests that blending the objectives, activities, and approaches within multiple modalities might be most effective for, and appeal to, a wide range of students. The model contains six basic pedagogical goals, and approaches for achieving them, to form learning modules. The model is flexible and assumes that other modules can be added as needed and where appropriate. The most important feature of this model is that pedagogy drives the approaches that will work best to support student learning. The modules are also shown as intersecting but this is optional; they may or may not intersect or overlap depending upon the approaches used. For instance, some reflection can be incorporated into collaboration or not, depending upon how the collaborative activity is designed. It might be

beneficial to have the collaborative groups reflect specifically on their activities. Similar scenarios are possible for the other modules. Ultimately important is that all the modules used blend together into a coherent whole. The following paragraphs briefly review each of these modules.

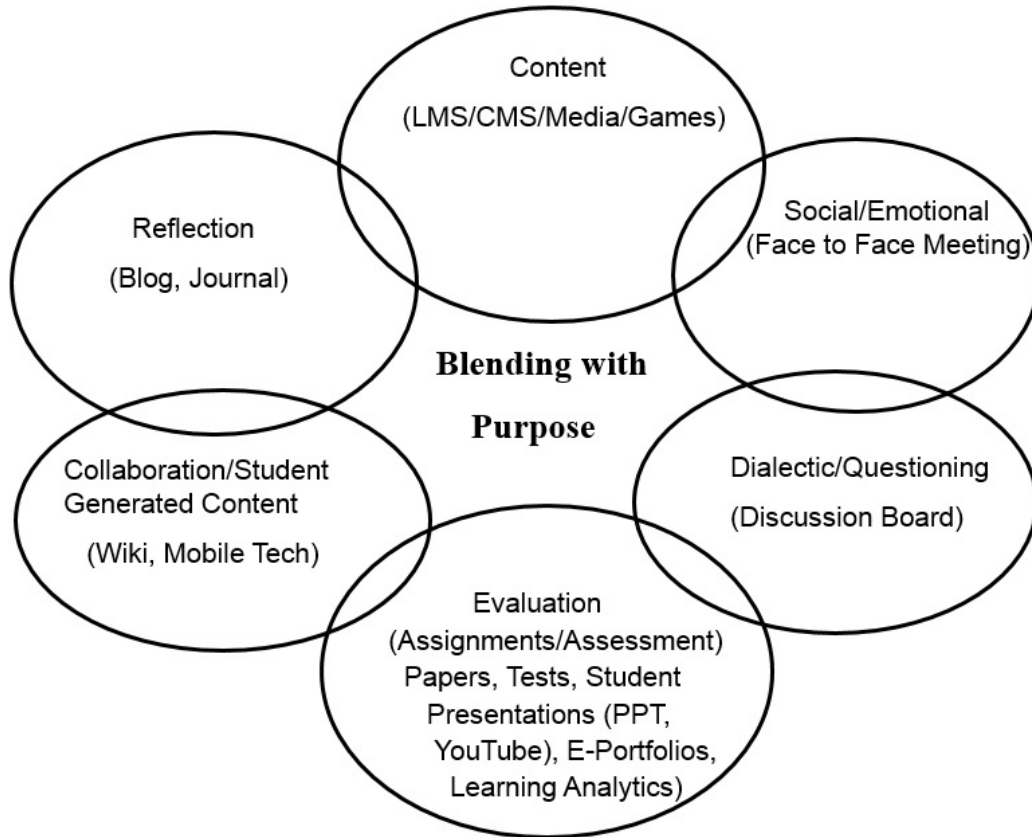


Figure 7. Blending with Pedagogical Purpose Model

**Content** is one of the primary drivers of instruction and there are many ways in which content can be delivered and presented. While much of what is taught is delivered linguistically (teacher speaks/students listen or teacher writes/students write), this does not have to be the case, either in face-to-face or online environments. Mayer (2009) has done extensive reviews of the research and has concluded that learning is greatly enhanced by visualization. Certain subject areas, such as science, are highly dependent upon the use of visual simulations to demonstrate processes and systems. The humanities, especially art, history, and literature, can be greatly enhanced by rich digital images as well. Course/learning management systems (CMS/LMS) such as *Blackboard*, *Canvas*, or *Moodle* provide basic content delivery mechanisms for blended learning and easily handle the delivery of a variety of media including text, video, and audio. Games have also evolved and now play a larger role in instructional content. In providing and presenting content, the Blending with Pedagogical Purpose model suggests that multiple technologies and media be utilized.

The Blending with Pedagogical Purpose model posits that instruction is not simply about learning content or a skill but also supports students *socially and emotionally*. As noted, constructivists view teaching and learning as inherently social activities. The physical presence of a teacher or tutor, in addition to providing instruction, is comforting and familiar. While perhaps more traditionally recognized as critical for K-12 students, social and emotional development must be acknowledged as important to education at all levels. Faculty members who have taught graduate courses know that students, even at this advanced level, frequently need someone with whom to speak, whether to help understand a complex concept or to provide advice about career and professional opportunities. While fully online courses and programs have evolved to the point where faculty members can provide some social and emotional support where possible and appropriate, in blended courses and programs this is more frequently provided in a face-to-face mode.

*Dialectics or questioning* is an important activity that allows faculty members to probe what students know and to help refine their knowledge. The Socratic Method remains one of the major techniques used in instruction, and many successful teachers are proud of their ability to stimulate discussion by asking the “right” questions to help students think critically about a topic or issue. In many cases, these questions serve to refine and narrow a discussion to very specific “points” or aspects of the topic at hand, and are not meant to be open-ended activities. For dialectic and questioning activities, a simple-to-use, threaded electronic discussion board or forum such as VoiceThread is an effective approach. A well-organized discussion board activity generally seeks to present a topic or issue and have students respond to questions and provide their own perspectives, while evaluating and responding to the opinions of others. The simple, direct visual of the “thread” also allows students to see how the entire discussion or lesson has evolved. In sum, for instructors who want to focus attention and dialogue on a specific topic, the main activity for many online courses has been, and continues to be, the electronic discussion board.

*Reflection* can be incorporated as a powerful pedagogical strategy under the right circumstances. There is an extensive body of scholarship on the “reflective teacher” and the “reflective learner” dating from the early 20<sup>th</sup> century (Dewey (1916), Schon (1983)). While reflection can be a deeply personal activity, the ability to share one’s reflections with others can be beneficial. Pedagogical activities that require students to reflect on what they learn and to share their reflections with their teachers and fellow students extend and enrich reflection. Blogs and blogging, whether as group exercises or for individual journaling activities, have evolved into appropriate tools for student reflection and other aspects of course activities.

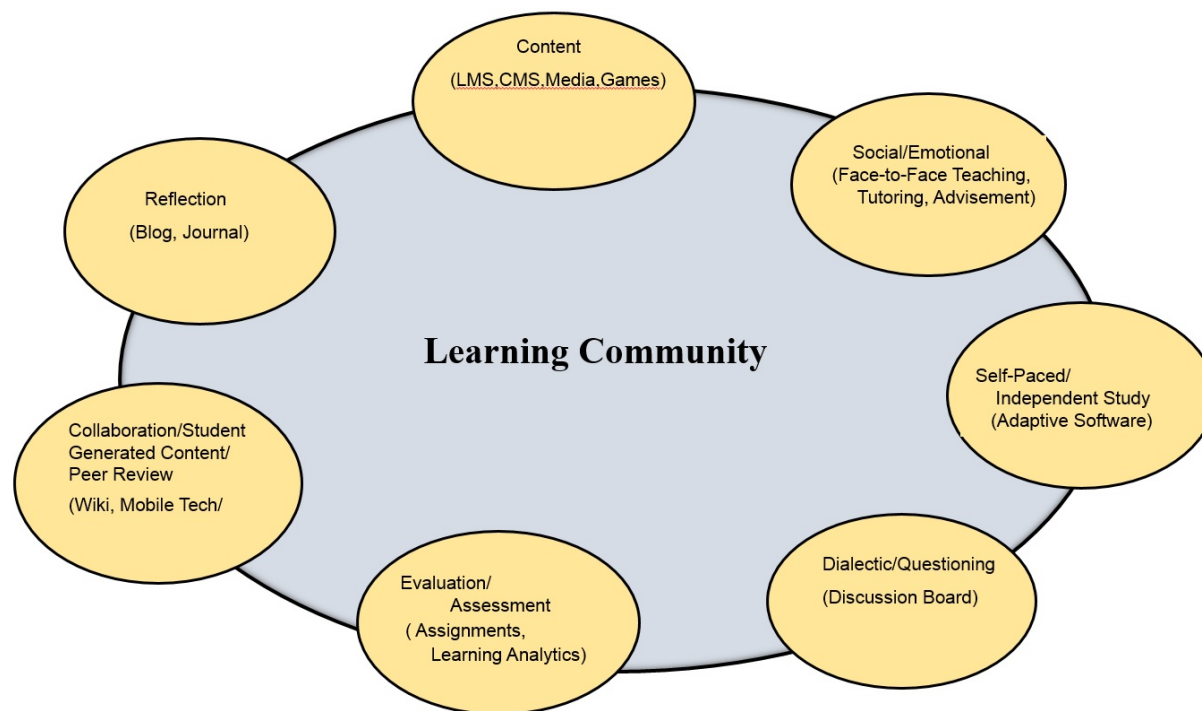
*Collaborative learning* has evolved over decades. In face-to-face classes, group work grew in popularity and became commonplace in many course activities. Many professional programs, such as business administration, education, health science, and social work, rely heavily on collaborative learning as a technique for group problem solving. In the past, the logistics and time needed for effective collaboration in face-to-face classes were sometimes problematic. Now, email, mobile technology, and other forms of electronic communication alleviate some of these logistical issues. Wikis, especially, have grown in popularity and are becoming a staple in group projects and writing assignments. They are seen as important vehicles for creating knowledge and content, as well as for generating peer-review and evaluation (Fredericksen, 2015). Unlike face-to-face group work that typically ended up on the instructor’s desk when delivered in paper form, wikis allow students to generate content that can be shared with others during and beyond the end

of a semester. Papers and projects developed through wikis can pass seamlessly from one group to another and from one class to another.

**Evaluation** of learning is perhaps the most important component of the model. CMSs/LMSs and other online tools and platforms provide a number of mechanisms to assist in this area. Papers, tests, assignments, and portfolios are among the major methods used for student learning assessment, and are easily done electronically. Essays and term projects pass back and forth between teacher and student without the need for paper. Oral classroom presentations are giving way to YouTube videos and podcasts. The portfolio is evolving into an electronic multimedia presentation of images, video, and audio that goes far beyond the three-inch, paper-filled binder. Weekly class discussions on discussion boards or blogs provide the instructor with an electronic record that can be reviewed over and over again to examine how students have participated and progressed over time. They are also most helpful to instructors to assess their own teaching and to review what worked and what did not work in a class. Increasingly, learning analytics are seen as the mechanisms for mining this trove of data to improve learning and teaching. In sum, online technology allows for a more seamless sharing of evaluation and assessment activities, and provides a permanent, accessible record for students and teachers.

The six components of the model described above form an integrated community of learning in which rich interaction, whether online or face-to-face, can be provided and blended across all modules. Furthermore, not every course must incorporate all of the activities and approaches of the model. The pedagogical objectives of a course should drive the activities and, hence, the approaches. For example, not every course needs to require collaborative learning or dialectic questioning. In addition to individual courses, faculty and instructional designers might consider examining an entire academic program to determine which components of the model best fit with overall programmatic goals and objectives. Here, the concept of learning extends beyond the course to the larger academic program where activities might integrate across courses. For example, some MBA programs enroll a cohort of students into three courses in the same semester but require that one or more assignments or projects be common to all three courses.

The critical question for our discussion, however, is whether this Blending with Pedagogical Purpose model can be modified or enlarged to be considered a model for online education in general. By incorporating several of the components from other theories and models discussed earlier in this article, this is a possibility. Figure 8 presents a Multimodal Model for Online Education that expands on the Blending with Purpose approach and adds several new components from Anderson and others, namely, community, interaction, and self-paced, independent instruction.



*Figure 8.* Multimodal Model for Online Education

First, the concept of a learning community as promoted by Garrison, Anderson & Archer (2000) and Wenger and Lave (1991) is emphasized. A course is conceived of as a learning community. This community can be extended to a larger academic program. Second, it is understood that interaction is a basic characteristic of the community and permeates the model to the extent needed. Third, and perhaps the most important revision, is the addition of the self-study/independent learning module that Anderson emphasized as incompatible with any of the community-based models. In this model, self-study/independent learning can be integrated with other modules as needed or as the primary mode of instructional delivery. Adaptive learning software, an increasingly popular form of self-study, can stand alone or be integrated into other components of the model. The latter is commonly done at the secondary school level where adaptive software programs are used primarily in stand-alone mode with teachers available to act as tutors when needed. Adaptive software is also integrated into traditional, face-to-face classes, such as science, where it is possible to have the instructor assign a lab activity that uses adaptive learning simulation software.

This Multimodal Model of Online Education attempts to address the issues that others, particularly Terry Anderson, have raised regarding elements that might be needed for an integrated or unified theory or model for online education. Whether or not this model finds acceptance is not yet clear. It is hoped that this article might serve as a vehicle for a critical examination of the model.

### Applying the Integrated Model

To provide a clearer understanding of the integrated model, several examples of its application follow. Figure 9A provides an example of the model as a representation of a self-paced, fully online course. The three major components [in green] for this course are: content as provided on an CMS/LMS, a self-paced study module, and assessment/evaluation. Other components of the model, such as a blog or discussion board to allow interaction among students, could be included but are not necessarily needed. This example is most appropriate for online programs that have rolling admissions and students are not limited by a semester schedule. Students proceed at their own pace to complete the course as is typical in some distance education programs. This example is scalable and can be used for large numbers of students.

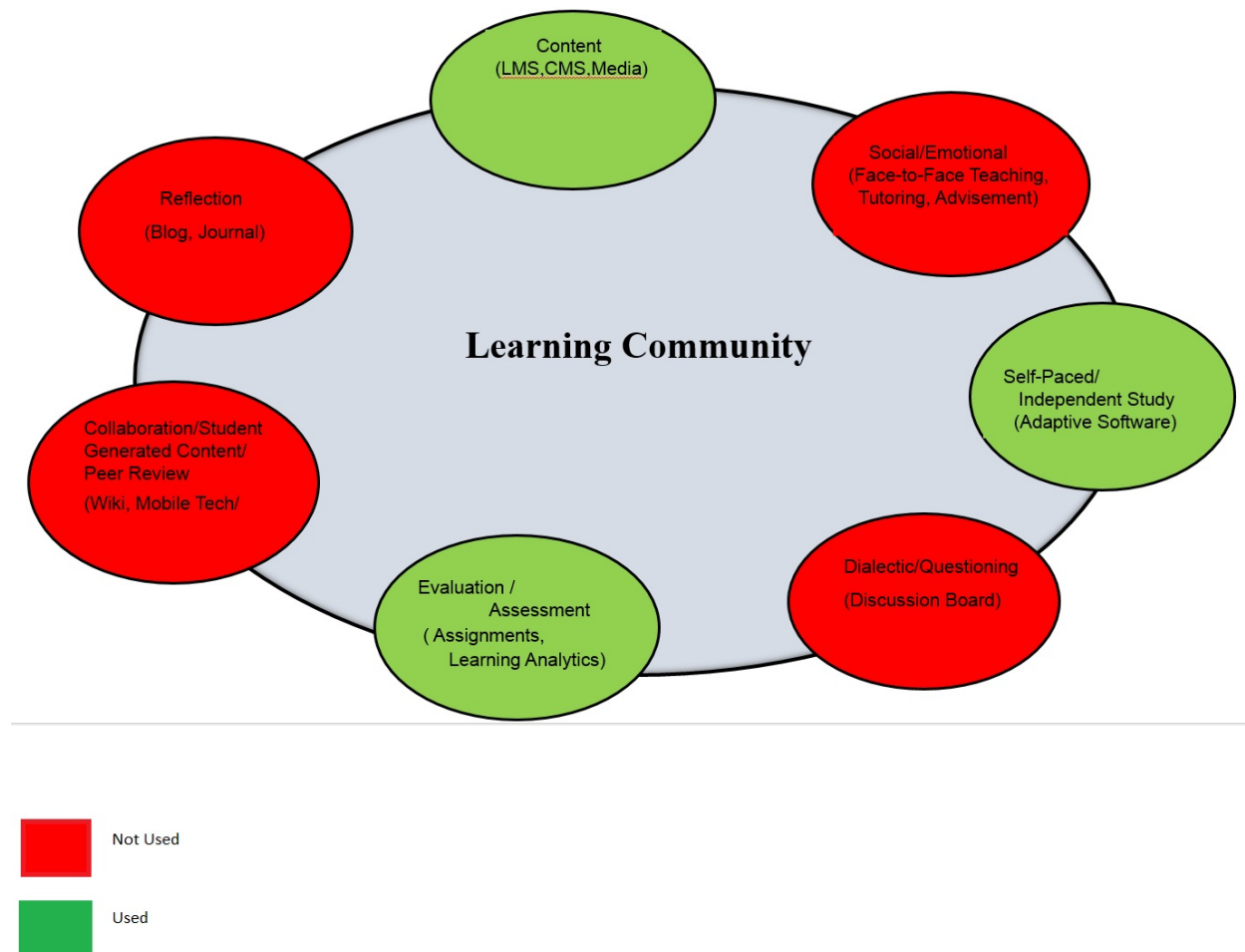


Figure 9A. Example of a Distance Education Course

Figure 9B provides an example of another course that is primarily a self-paced, online course similar to that described in Figure 9A but is designed to have a teacher or tutor available as needed. A discussion board is also included to allow for ongoing interaction among students and teacher. This course would follow a semester schedule and would have a standard class size although most of the instruction would be provided by the self-paced study module. A standard course organization would be used, with a teacher or tutor assigned to guide and assist with instruction. The teacher or tutor could help students struggling with any of the self-paced material. This type of course is increasingly common in secondary schools, such as in credit-recovery courses.

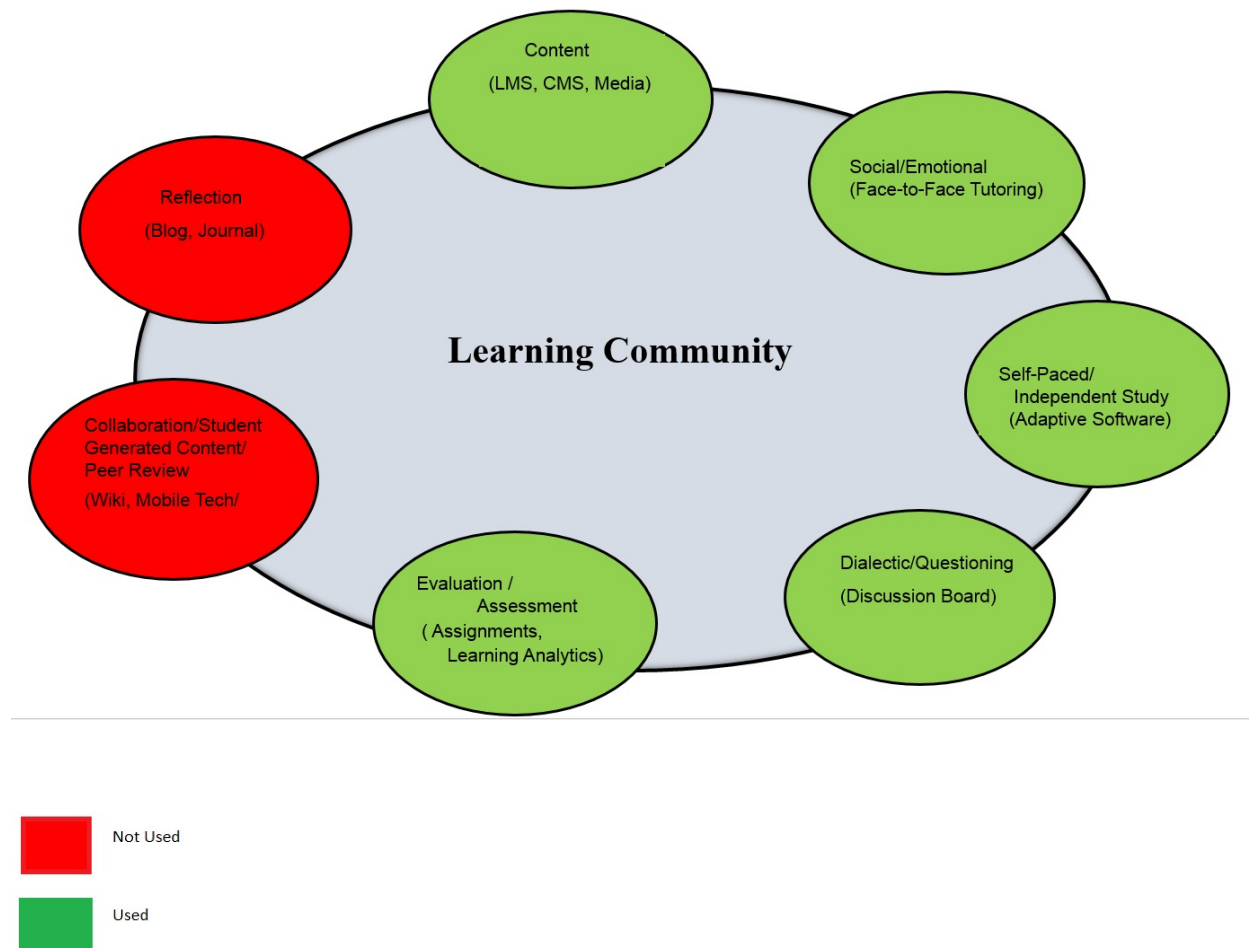
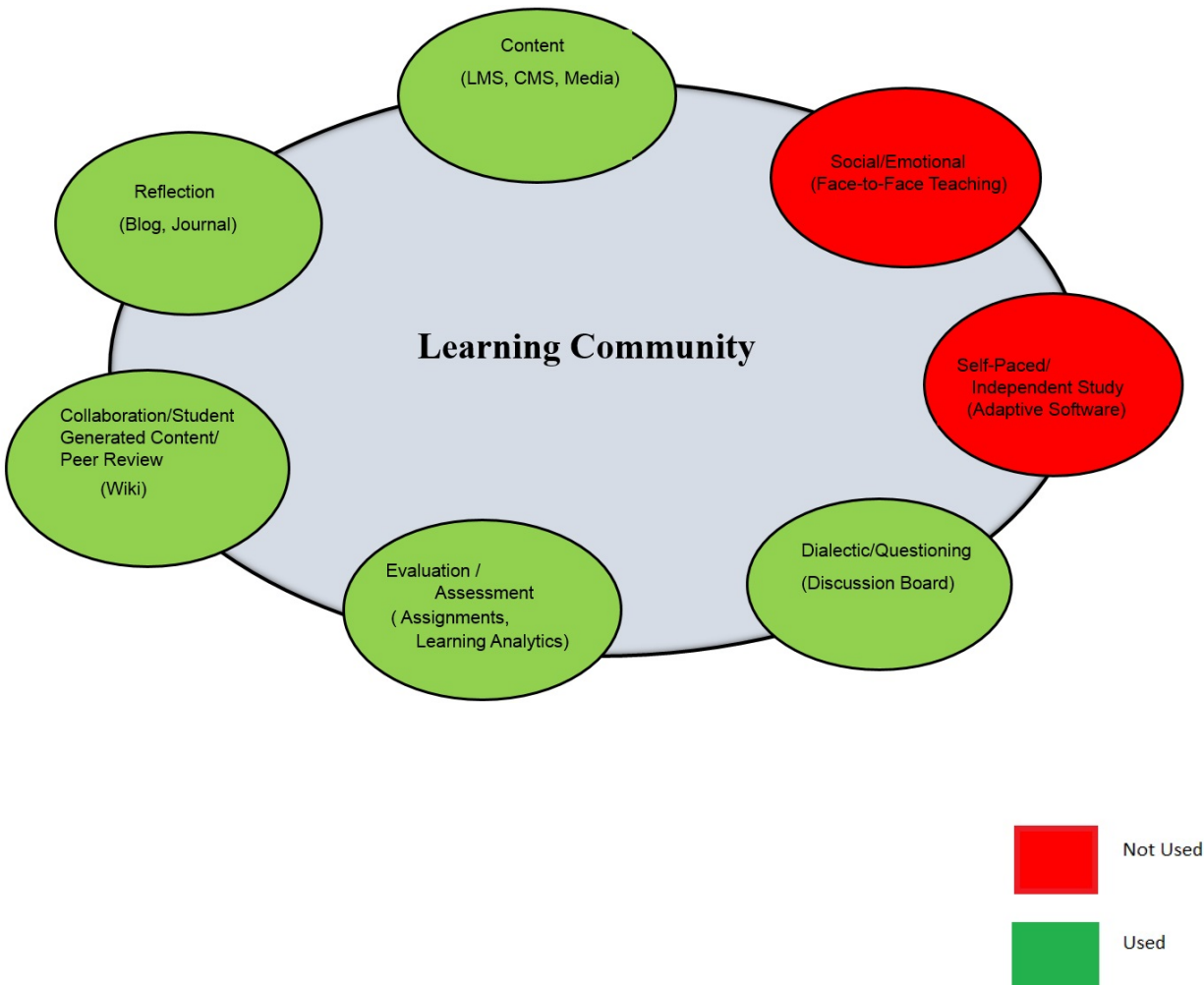


Figure 9B. Example of a Modified Distance Education Course

Figure 9C provides an example of a teacher-led, fully online course. Presentation of the course content is provided by a LMS or CMS along with other media and is used as needed by the teacher. The discussion board, blog, and wiki provide facilities for interaction among teachers and students, students and students, and students and content. In this course, the teacher could direct students to watch a fifteen-minute lecture available in the LMS database and then ask students to



respond to a series of questions on the discussion board. Student responses can then be used as the basis for an interactive discussion board activity among students, guided by the teacher. The model also provides for reflection and collaborative activities.



*Figure 9C.* Example of a Teacher-Led Fully Online Course

Figure 9D provides an example of a blended course with instruction provided primarily by a teacher. The other modules are used to extend and enrich instruction. The teacher is the major guide for instruction and would be supplemented by content as needed by a CMS/LMS. The course would meet in a face-to-face classroom although some instructional activity would also be conducted online, either on a discussion board, a blog, or a collaborative wiki. The teacher would establish beforehand portions of the course that would meet in the face-to-face and online modes.

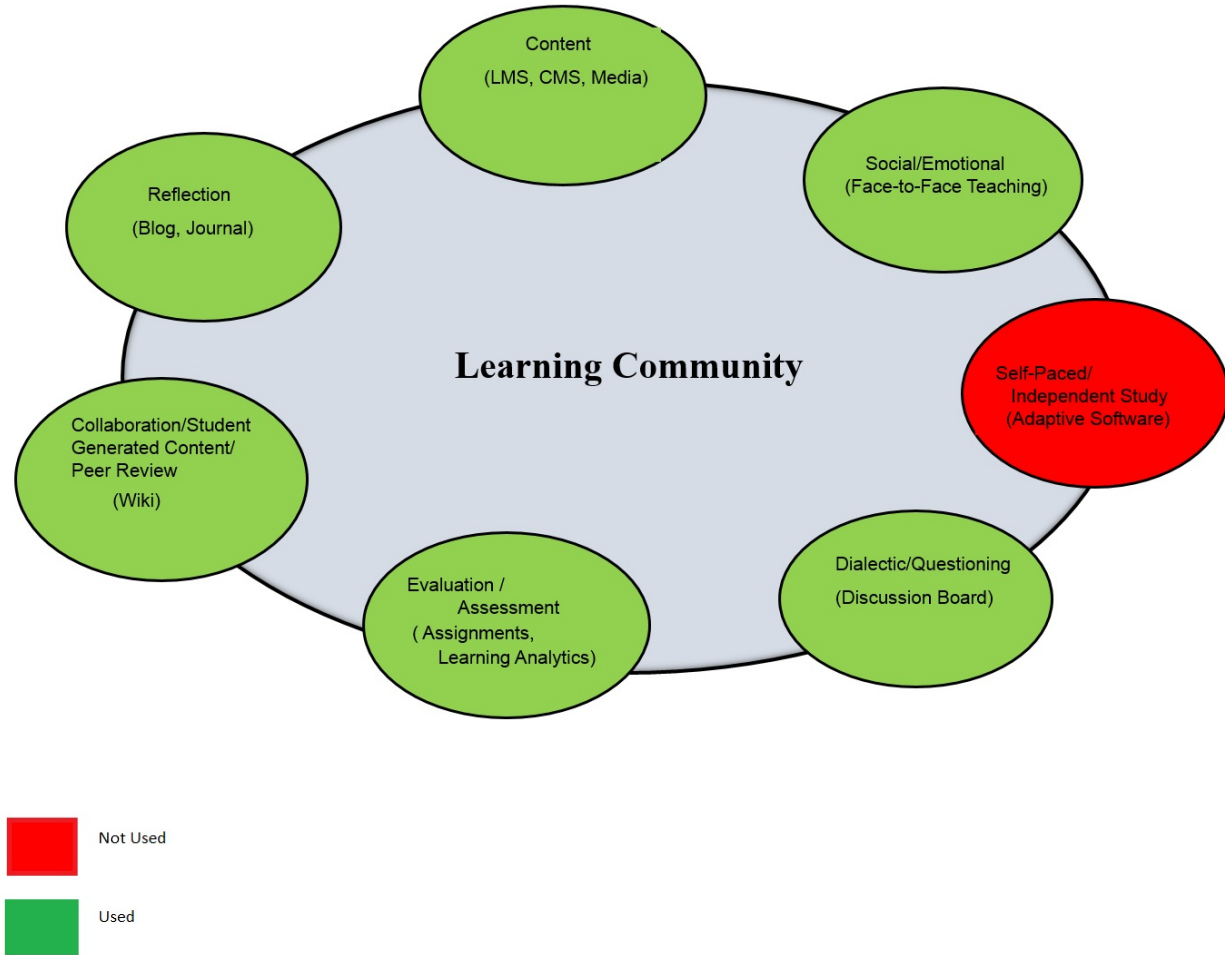


Figure 9D. Example of a Mainstream Blended Course

### Attributes and Limitations of the Multimodal Model

The proposed Multimodal Model for Online Education includes many of the major attributes of other learning and online education theories and models. For example, behaviorists will find elements of self-study and independent learning in adaptive software. Cognitivists might appreciate reflection and dialectic questioning as important elements of the model. Social constructivists will welcome the emphasis on community and interaction throughout the model. Connectivists might value the collaboration and the possibility of student-generated content. Perhaps the most significant element of the model is its flexibility and ability to expand as new learning approaches, perhaps spurred by advances in technology, evolve.

The model is not without limitations. Learning theories can be approached through a number of perspectives and disciplines. Behavioral psychologists, cognitive psychologists, sociologists, and teacher educators might emphasize the need for deeper considerations of their perspectives for an online learning theory. The multimodal model here represents an integrated composite of several such perspectives but is essentially a pedagogical model and, therefore, may have greater appeal to instructional designers, faculty, and others who focus on learning objectives.

## Conclusion

In this article, a number of major theories related to technology were presented, beginning with a review of major theories associated with learning. One critical question concerned whether an integrated or unified theory of online education could be developed. The work of Terry Anderson was highlighted. The article proposed an integrated model that described the phenomenon of pedagogically driven online education. Key to this model is the assumption that online education has evolved as a subset of learning in general rather than a subset of distance learning. As blended learning, which combines face-to-face and online instruction, evolves into the dominant form of instruction throughout all levels of education, it serves as the basis for an integrated model. It is likely that, in the not-too-distant future, all courses and programs will have some online learning components, as suggested in this integrated model.

Note: This article is adapted from a chapter in a forthcoming book by the author, tentatively entitled *Online Education: Theory and Practice*, available in 2018 from Routledge/Taylor & Francis, Publishers.

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# Exploring Factors Related to Completion of an Online Undergraduate-Level Introductory Statistics Course

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## Abstract

Data were collected from 353 online undergraduate introductory statistics students at the beginning of a semester using the Goals and Outcomes Associated with Learning Statistics (GOALS) instrument and an abbreviated form of the Statistics Anxiety Rating Scale (STARS). Data included a survey of expected grade, expected time commitment, and the first lesson quiz. At the end of the semester, whether each student completed the course with a grade of D or higher was recorded. It was hypothesized that students who successfully completed the course would have favorable ratings on each of these variables. While there were no significant differences between students who did and did not successfully complete the course in terms of anxiety, attitudes, or expected time commitment, students who completed the course had higher scores on the GOALS, higher expected grades, and higher scores on the first quiz of the semester. Stepwise logistic regression found that students' attitudes towards statistics teachers and scores on the first quiz of the semester could be used to predict whether students would successfully complete the course. Based on these findings, suggestions for online instructors are given.

*Keywords:* Statistics education, online education; retention

Zimmerman, W.A. & Johnson, G. (2017). Exploring factors related to completion of an online undergraduate-level introductory statistics course. *Online Learning, 21*(3), 191-205. doi: 10.24059/olj.v21i3.1017

## Introduction

Attrition rates in online courses can vary greatly (Carr, 2000). For the online introductory statistics course examined in the present study, the course completion rate was around 70% in previous semesters. This means that approximately 30% of students enrolled in the course at the drop/add deadline, which is typically early in the second week of the semester, either dropped or withdrew from the course or finished the semester with a grade of F. In order to improve the completion rate in this course, an understanding of the variables, related or unrelated, to successful course completion is required. Of particular interest in this study were variables that may be influenced by an intervention provided within the course. The goal of this research was not merely to predict which students would not successfully complete the course, but rather to identify variables related to course completion that may be the target of future interventions.

In a recent special issue of *Online Learning* that focused on learning analytics, James, Swan, and Daston (2016) examined variables related to retention in students taking only face-to-face courses, students taking only online courses, and students taking both face-to-face and online courses. While their primary purpose was to compare students in these three groups, they also provided data concerning retention rates for students enrolled in different types of institutions with

different demographic characteristics. They found that for students enrolled in a primarily online university, those with a Pell grant were more likely to be retained than those without a Pell grant. They also found that females were more likely to be retained, as well as students over the age of 26. While these results concerning types of courses taken and demographics do provide information that can be used to predict whether a student will be successful, these variables cannot be controlled by an instructor. In the present study, variables that may be influenced by instructors will be examined.

Many students enter their required introductory statistics course with high levels of anxiety and relatively negative attitudes (DeVaney, 2010; Onwuegbuzie, 2004; Zeidner, 1991). Misconceptions that an introductory statistics course is a mathematics course may be partially responsible for this, resulting in mathematics anxiety (Pan & Tang, 2005; Zeidner, 1991). In reality, the mathematical operations that students are required to perform in this course are limited, as online simulations and statistical software are often used. In interviews with students with high statistics anxiety, Malik (2015) found that this anxiety could lead students to feelings of defeat and poor performance in the course. This was often the case in the course featured in the present study; the majority of students who failed the course in the past did not submit numerous assignments. Instructors have also noted that some students have low grade expectations and are satisfied to earn the lowest grade necessary to fulfill their degree requirements (typically a C or D). On a positive note, DeVaney did observe that online statistics students' anxiety levels decreased from the beginning to end of the course and that their attitudes become more positive. This shows that attitudes and anxieties about statistics are subject to change over the course of one semester.

Two research questions concerning successful course completion were addressed in the present study, where successful course completion was defined as finishing the course with a grade of D or higher. The two research questions were:

- (1) Do students who successfully complete the course differ from those who do not successfully complete the course in terms of their attitudes, anxieties, expectations, and performance in the early weeks of the course?
- (2) What variables can be used to best predict successful course completion?

It was hypothesized that students who did successfully complete the course had more positive attitudes, lower levels of anxiety, higher expectations, and better performance in the early weeks of the course compared to students who did not successfully complete the course. The purpose of constructing a model to predict successful course completion was to identify the variables that have the strongest relationship with course completion and that may be used to design an intervention to improve course completion rate.

## **Literature Review**

The present study examined retention in an online undergraduate-level introductory statistics course. While the literature revealed no studies utilizing these specific parameters, studies examining retention in online courses were abundant, including many case studies that emphasized factors at the institutional level (e.g., Bloemer, 2009; Clark, Holstrom, & Millacci, 2009; Fasse, Humbert, & Rappold, 2009; Meyer, Bruwelheide, & Poulin, 2009). The present study, however, emphasized factors at the student level. More specifically, the emphasis was on student-level factors that could be targeted for intervention and influenced by online statistics instructors. Only



one study concerning retention in an online statistics course could be located. That study will be reviewed first. Then, studies concerning retention in online courses will be reviewed.

The one study that specifically addressed retention in an online statistics course compared face-to-face, hybrid, and online sections of an introductory statistics course at one community college. All three formats of the course used the same materials and were taught over four semesters. This study found no statistically significant differences among the three formats of the course in terms of mid-term exam scores ( $p = .596$ ), final exam scores ( $p = .305$ ), or average exam scores ( $p = .246$ ). Neither did the formats reveal proportional differences in terms of students who began the course who remained in the course to complete the mid-term exam ( $p = .203$ ) or final-exam ( $p = .089$ ). While course completion rates were slightly lower for the online sections of the course, online students who did complete the course actually had slightly higher exam scores and overall course grades compared to students in the face-to-face and hybrid sections, although none of these differences were statistically significant (Sami, 2011).

### **Retention in Online Courses**

The results of numerous studies examining completion rates in online courses vary greatly. Some researchers have compared the completion rates of online courses to traditional face-to-face courses. For example, Atchley, Wingenbach, and Akers (2013) compared the course completion rates of 5,778 students enrolled in online and/or traditional face-to-face sections of the same courses with the same instructors. Their results were statistically significant [ $\chi^2 (1) = 14.132, p < .001$ ] with the online students having a 93.3% completion rate and the traditional students having a 95.6% completion rate. They also compared completion rates by discipline and found a significant relationship between discipline and course completion [ $\chi^2 (13) = 96.974, p < .001$ ] although this study combined online and traditional courses, and statistics was not one of the disciplines examined.

The online course completion rate of 93.3% provided by Atchley, et al. (2013) is higher than the completion rates provided by others. Carr (2000) reported that across 35 online courses at one large community college the completion rate was 58%. Bälter, et al. (2013) examined an online mathematics course and an online programming course and found completion rates of 37% and 69% respectively. In the online course studied in the present research, the completion rate in recent semesters was around 70%. For case studies concerning institutions with high completion rates, see the October 2009 (volume 13, issue 3) issue of *the Journal of Asynchronous Learning Networks*.

In terms of student variables related to successful course completion, Bälter, et al. (2013) examined students' approaches to learning in relation to their course completion. They found that in a programming course, students who successfully completed the course scored higher on subscales measuring deep approaches to learning, such as seeking meaning and relating ideas. Students who successfully completed a mathematics course also scored higher on subscales concerning deep approaches, specifically, relating ideas, and scored higher on subscales concerning strategic approaches to learning, specifically, time management and achievement. They did not find a significant difference between male and female students in terms of course completion nor did they find a major effect based on prior experience in higher education.

Aragon and Johnson (2008) also studied student variables related to the successful completion of online courses. Their students were enrolled in online courses at a rural community college. They did not find significant differences between online students who did and did not

successfully complete their course in terms of age [ $t(303) = 1.09, p = .28$ ], ethnicity [ $\chi^2(1) = 0.49, p = .48$ ], financial aid eligibility [ $\chi^2(1) = 0.03, p = .87$ ], placement in developmental courses [reading:  $\chi^2(1) = 0.05, p = .83$ ; writing:  $\chi^2(1) = 2.84, p = .09$ ; or mathematics:  $\chi^2(1) = 1.29, p = .26$ ], or scores on a measure of self-directed learning readiness [ $t(303) = -0.58, p = .56$ ]. They did find a significant difference for gender [ $\chi^2(1) = 5.64, p = .02$ ] with a 66% completion rate for women and a 52% completion rate for men. On average, students who successfully completed courses were enrolled in more credits during that semester [ $t(303) = 9.33, p < .001$ ] and had higher overall grade point averages [ $t(303) = 4.45, p < .001$ ]. A sample of students who did not successfully complete a course was surveyed and five themes were identified: personal reasons and time constraints, course design and communication, technology, institutional issues, and learning preferences.

### **Factors Related to Student Success in Statistics**

In the present study, variables that could be impacted by interventions in an introductory statistics course were selected to be studied. Because instructors have no influence over gender, financial aid eligibility, family responsibilities, or employment status, these variables were excluded. Instead, emphasis focused on students' perceptions and behaviors. These included anxiety levels and attitudes concerning statistics, which have been studied in the field of statistics education but not in relation to attrition in online courses. Expected grade was included in this study because instructors have noted students' satisfaction with a C or D in the course. Intended time commitment was included because students have commented on mid-semester feedback surveys in previous semesters that the course was more time consuming than others. Finally, performance on the first quiz of the course was included as a measure of students' activity early in the semester. A pre-test of demonstrated knowledge was included to assess preexisting knowledge level differences among students who ultimately did and did not successfully complete the course.

## **Methods**

### **Participants**

In the fall 2015 semester 564 students were enrolled across 14 sections of an undergraduate-level introductory statistics course through one large, multi-campus university's online campus. The instructors of 12 sections agreed to have their students participate in the study. Instructors were not given any information concerning the purpose of the study. Data related to general research concerning course completion and student learning in relation to national norms were routinely collected from students. It was not unusual for instructors to ask their students to take surveys in this course. Of the 484 students enrolled in those 12 sections, 385 students completed the survey during the first week of class and 353 gave permission for their data to be used in research.

The demographic characteristics of the students who agreed to participate in this research study were not available. However, students who enrolled in this course were representative of the population of undergraduate students enrolled through the University's online campus. The average age of an undergraduate student is 31 years. In terms of sex, 52.7% of students are female and 47.3% are male. This course is a general education course and it required for many majors. Thus, the students enrolled in the course represent a wide variety of majors including business, communications, nursing, and criminal justice.

## Procedures

During the first week of the course students were asked to complete the Goals and Outcomes Associated with Learning Statistics (GOALS) instrument and an abbreviated form of the Statistics Anxiety Rating Scale (STARS). In addition to these two scales, which will be described in greater detail below, students were asked to identify their final grade and time commitment expectations. Students' grades on the first quiz of the course were also recorded. Final course grades were used to determine whether students successfully completed the course. A grade of D or higher was necessary to be classified as having successfully completed the course. Students who finished the course with a final grade of F and students who dropped or withdrew were classified as not having successfully completed the course.

## Instrumentation

**Goals and Outcomes Associated with Learning Statistics (GOALS).** The GOALS was used as a measure of demonstrated knowledge of introductory statistics concepts. The GOALS was completed online and consists of 20 multiple-choice items that test concepts commonly covered in introductory statistics courses such as variability, sampling variation, confidence intervals, and p-values. Each of the 20 questions is worth 5 points, with a possible range of scores from 0 to 100. The instrument was developed primarily at the University of Minnesota's Department of Educational Psychology as part of the Assessment Resource Tools for Improving Statistical Thinking (ARTIST) and eATLAS NSF-funded projects (Lock Morgan, 2015). Measures of internal consistency (e.g., Cronbach's alpha) could not be computed because individual student responses were not available; only composite scores were available. While no published manuscripts concerning the psychometric properties of the GOALS were reviewed, this is an assessment that aligns with the curriculum of the course in the present study.

**Statistics Anxiety Rating Scale (STARS).** An abbreviated form of the STARS was developed for this study. The original version of the STARS was created by Cruise, Cash, and Bolton (1985). Hanna, Shevlin, and Dempster's (2008) revision of the STARS was used as the starting point for the development of the abbreviated scale. Both Cruise et al.'s and Hanna et al.'s versions consisted of 51 items on six subscales: test anxiety, asking for help anxiety, interpretation anxiety, attitudes towards statistics teachers, self-concept, and worth of statistics. A shorter form was needed for this study due to time constraints; this was a part of a larger survey being taken by students in the course who were also completing other assessments during the same time period.

The six subscale model validated by Hanna, et al. (2008) served as the basis for the abbreviated form. Three items were selected on each of the six subscales resulting in a total of 18 items. These items were selected on the basis of Hanna et al.'s standardized factor loadings and on the basis of what was most logical, given that students in the present study were all enrolled in an online course. Items on the anxiety subscales (test, asking for help, and interpretation) were measured using a five-point anxiety scale ranging from "no anxiety" to "very strong anxiety." Items on the attitudes subscales (teachers, self-concept, and worth) were measured using a standard five-point Likert scale from "strongly disagree" to "strongly agree."

Because this abbreviated form of the STARS had not previously been used, it was necessary to evaluate its psychometric properties. Confirmatory factor analysis was used to examine the use of the six-factor structure as opposed to a more parsimonious two- or one-factor structure. The one-factor model included all 18 items on one factor. For the two-factor model, items on the anxiety subscales were combined to create the first factor and items on the attitudes

subscales were combined to create the second factor. The six-factor model used the original six subscale structure from Cruise et al. (1985) and Hanna et al. (2008). The three models were estimated using IBM SPSS Amos 23.0.0. Maximum likelihood estimations were used for all models. In the two- and six-factor models, all latent factors were allowed to correlate. No correlated errors were included in any of the models. The results of these analyses are presented in Table 1. All fit indices suggested that the most appropriate model for these data is the six-factor model.

Model	<i>Df</i>	$\chi^2$	RMSEA [90% CI]	CFI	ECVI [90% CI]	MECVI
One-Factor	135	1697.388*	.181 [.174, .189]	0.567	5.129 [4.762, 5.517]	5.146
Two-Factor	135	1075.866*	.141 [.134, .149]	0.749	3.369 [3.083, 3.676]	3.387
Six-Factor	120	211.383*	.048 [.037, .058]	0.974	1.004 [0.898, 1.132]	1.026

\* $p < 0.001$

*Note:* RMSEA = root mean square error of approximation; CI = confidence interval; CFI = comparative fit index; ECVI = expected cross-validation index; MECVI = modified expected cross-validation index; Sample size for all analyses was 353.

*Table 1.* Confirmatory Factor Analysis Results

## Results

### Descriptive Statistics

Of the 353 students who agreed to participate in the study, 254 (72.0%) successfully completed the course. Of the remaining 99 students, 38 (10.8%) stayed enrolled through the end of the semester but received a grade of F, and 61 (17.3%) students dropped or withdrew from the class before the end of the semester.

Descriptive statistics concerning all participants' responses to each of the STARS items are presented in Table 2. Higher scores on the anxiety subscales represent higher levels of anxiety. High scores on the attitudes subscales represent stronger agreement with the statement and thus, more negative attitudes.

Scale	Item Stem	N	Mean	SD
Test Anxiety	Studying for an examination in a statistics course	349	3.21	1.087
Test Anxiety	Doing an examination in a statistics course	350	3.42	1.179
Test Anxiety	Waking up in the morning on the day of a statistics test	349	2.91	1.271
Asking Anxiety	Contacting my statistics instructor for help with material I am having difficulty understanding	347	2.04	1.046
Asking Anxiety	Asking one of my instructors for help in understanding a printout	347	1.93	1.022
Asking Anxiety	Asking a fellow student for help in understanding a printout	350	2.00	1.037
Interpretation Anxiety	Making an objective decision based on empirical data	350	2.26	0.992
Interpretation Anxiety	Reading a journal article that includes some statistical analyses	351	1.81	0.865
Interpretation Anxiety	Trying to understand the statistical analyses described in the abstract of a journal article	348	2.55	1.030
Worth of Statistics	I feel statistics is a waste	349	1.82	0.809
Worth of Statistics	I wish the statistics requirement would be removed from my academic major	350	2.56	1.269
Worth of Statistics	I am never going to use statistics	350	1.88	0.907
Attitudes Towards Statistics Teachers	Statistics teachers are so abstract they seem inhuman	345	1.89	0.829
Attitudes Towards Statistics Teachers	Statistics teachers communicate in a different language	351	2.32	0.972
Attitudes Towards Statistics Teachers	Statisticians are more number oriented than they are people oriented	350	2.63	1.018
Self-Concept	I cannot even understand high school math; I don't see how I can possibly do statistics	352	2.07	1.151
Self-Concept	Since I never enjoyed math, I do not see how I can enjoy statistics	351	2.24	1.214
Self-Concept	I do not have enough brains to get through statistics	351	1.95	1.057

Table 2. Descriptive Statistics for STARS Items

Descriptive statistics for the six STARS subscales scores from all participants are presented in Table 3. Subscale scores were computed by adding each participant's response to the three items on each scale. If one or more items on a subscale were not answered, that individual's subscale score was not computed. With each item rated on a scale of 1 to 5, subscale scores could range from 3 to 15. Cronbach's alpha was used as a measure of internal consistency for each subscale. All alpha coefficients were judged to be sufficient, given that each subscale had only three items. The correlations between the six STARS subscales scores are presented in Table 4.

	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>Cronbach's Alpha</b>
Test Anxiety	347	9.54	3.110	.852
Asking Anxiety	343	5.97	2.828	.899
Interpretation Anxiety	347	6.63	2.468	.815
Worth of Statistics	346	6.26	2.563	.791
Attitudes Toward Statistics Teachers	343	6.81	2.299	.745
Self-Concept	350	6.27	3.102	.888

Table 3. Descriptive Statistics for Abbreviated STARS Subscales

		1	2	3	4	5
1. Test Anxiety						
2. Asking Anxiety	r	.441				
	n	341				
3. Interpretation Anxiety	r	.680	.470			
	n	343	339			
4. Worth of Statistics	r	.366	.287	.419		
	n	341	337	341		
5. Attitudes Towards Statistics Teachers	r	.274	.176	.243	.567	
	n	338	335	338	338	
6. Self-Concept	r	.491	.289	.531	.647	.498
	n	345	341	345	345	342

All  $p \leq .001$

Table 4. Correlations between Abbreviated STARS Subscales

Scores on the GOALS assessment at the beginning of the semester were approximately normally distributed with a mean of 33.508 and standard deviation of 11.455 (n=315). Only individuals' total scores were available to be analyzed. The variable concerning anticipated hours per week devoted to the course was slightly positively skewed with outliers; the median was 10 hours and the mean was 10.110 hours with a standard deviation of 5.030 hours (n=350). The

variable concerning expected final grade in the course was measured on an ordinal level scale and was highly negatively skewed; the median expected grade was B+ and the mode was A. Scores on the first quiz were negatively skewed with a mean of 77.106 and standard deviation of 21.111; the median was 83.926. Of the 344 participants enrolled in the course through the end of the second week of class when this quiz was completed, 17 (4.9%) did not complete the quiz and received a grade of 0.

### Research Question 1

The first research question was “Do students who successfully complete the course differ from those who do not successfully complete the course in terms of their attitudes, anxieties, expectations, and performance in the early weeks of the course?” Because the STARS subscales were moderately correlated with one another, a multivariate analysis of variance (MANOVA) was used to compare the students who did and did not successfully complete the course. The remaining variables were analyzed separately. Note that with the exception of within the MANOVA, no corrections were made for multiple tests. Thus, the results of the statistical analyses may be liberal.

STARS subscale scores were compared for participants who did and did not successfully complete the course using a MANOVA. The overall test was not statistically significant [Wilks' Lambda = .922,  $F(6, 316) = 0.624$ ,  $p = .711$ , partial eta squared = .012]. There were also no significant differences between the participants who did and did not successfully complete the course on any of the six STARS subscales. While students who did successfully complete the course had lower scores on every subscale, signifying lower anxiety and more positive attitudes, the differences were all small (Cohen's  $d$  ranging from 0.115 to 0.194).

The scores of students who completed the GOALS in the first week of class were compared for students who did and did not successfully complete the course. The results were statistically significant [ $t(313) = 1.660$ ,  $p = .049$ ]. However, the effect size of this difference was small among participants who did successfully complete the course, scoring 0.213 standard deviations higher than the participants who did not successfully complete the course.

The expected grades of participants who did and did not successfully complete the course were compared using a Mann-Whitney U test. This test was statistically significant [ $z = 2.097$ ,  $p = .018$ ]. Students who successfully completed the course had higher expected grades. For those who did successfully complete the course the median expected grade was A- and the mode was A. For those who did not successfully complete the course the median expected grade was B+ and the modes were B and A-.

For both groups, expected hours per week devoted to the course were slightly positively skewed with outliers. A Mann-Whitney U test was used to compare the students who did and did not successfully complete the course on this variable. The results of this test were not statistically significant [ $z = 0.343$ ,  $p = .366$ ]. The median for participants who did successfully complete the course was 10 hours per week and the median for participants who did not successfully complete the course was 9.50 hours per week.

Finally, scores on the first quiz of the course were compared for the two groups. Scores for both groups were negatively skewed with outliers who did not complete the quiz and therefore scored a 0. A Mann-Whitney U test was also used for this analysis. There was a statistically significant difference ( $z = 4.351$ ,  $p < .001$ ). The median score for participants who did successfully

complete the course was 85.714 ( $N = 254$ ) and the median score for participants who did not successfully complete the course was 78.571 ( $N = 90$ ).

To summarize the results concerning the first research question, there were no significant differences between participants who did and did not successfully complete the course in terms of any of the six STARS subscales. Participants who did complete the course had scored better on the GOALS, however the difference was small. The expected grades of participants who completed the course were higher than those of participants who did not successfully complete the course. There was not a difference between the two groups of participants in terms of the hours per week they expected to devote to the course. The largest effect size between the two groups of students related to their performance on the first quiz of the course. Students who successfully completed the course had higher scores on the first quiz.

### **Research Question 2**

The second research question was, “What variables can be used to best predict successful course completion?” To examine how the available variables could be used to predict successful course completion, backward stepwise (Wald) logistic regression methods were used. This allowed for the specification of a simple model that could be used to predict a student’s probability of successful course completion.

The initial model contained the six STARS subscales, GOALS score, expected grade, expected hours per week devoted to the course, and grade on the first quiz. The final model consisted of the attitudes towards statistics teachers, subscale of the STARS, scores on the first quiz of the course, and a constant. This model was statistically significant [ $\chi^2 (2) = 22.267, p < .0001$ ]. Prediction success overall was 76.5% (97.6% for those who did successfully complete the course, 11.6% for those who did not successfully complete the course).

To summarize the results concerning the second research question, a model for predicting successful course completion was constructed using logistic regression. While the resulting model was statistically significant, the sensitivity of the test was less than desirable. In other words, the model was only able to correctly identify 11.6% of the students who would not successfully complete the course. Its level of specificity, however, was very good in that the model was able to correctly identify 97.6% of students who would successfully complete the course.

### **Limitations**

A number of limitations were identified during data collection and analysis. First, of the 484 students enrolled in the sections of the course involved in the study, only 353 students (72.9%) completed the survey and gave permission for their data to be used for research purposes. There was a relationship between giving permission to participate in the study and course completion [ $\chi^2 (1) = 25.150, p < .001, \text{Cramer's } V = .228$ ]. Of the students who gave permission, 72.2% completed the course while only 47.7% of students who did not give permission, either because they did not submit the survey or because they stated that they did not want to be included in the study, completed the course. Thus, the results may be influenced by the available data. Again, this suggests that active engagement in the early weeks of the course is an important predictor of successful completion of the course.

Second, the GOALS score, which was used as a measure of knowledge during the first and last weeks of the course, has not been validated for use as a pre-test. This is a limitation of the



study because the validity and reliability of scores from this assessment is unknown. Only students' composite scores on this assessment were available for analysis and, thus, it was not possible to compute any measures of internal consistency such as Cronbach's alpha. In the future, a measure of knowledge that has been specifically validated for use as a pre-test should be selected.

### Discussion

The results provided evidence that students who successfully completed the online undergraduate-level introductory statistics course in this study had higher GOALS scores, higher expected grades, and higher scores on the first quiz of the semester compared to the students who did not successfully complete the course. Here, the implications of these results are discussed. Suggestions for future research, including interventions to improve successful course completion, are discussed.

Students who successfully completed the course had lower levels of anxiety and more positive attitudes at the beginning of the course compared to students who did not successfully complete the course. However, the differences between students who did and did not successfully complete the course were relatively small and not statistically significant. Future research should examine anxiety and attitudes on a more task-specific level. This might be achieved, for example, by focusing at the question-level as opposed to the scale-level. In this study students gave the highest anxiety ratings to the question "Doing an examination in a statistics course." Anecdotally, students also experienced anxiety while taking the course's weekly quizzes. This anxiety may prevent some students from taking the quizzes which, in turn, decreases their likelihood of successfully completing the course. An intervention targeting anxiety during quizzes and exams may emphasize test-taking strategies and general anxiety reduction.

Students who successfully completed the course had, on average, higher scores on the GOALS assessment. This, along with the variability of the GOALS scores, suggests that some students entered the course with some pre-existing content knowledge and that those students are more likely to be successful than students who entered the course with less content knowledge. While instructors have no control over their students' prior coursework, they could provide students with materials to review before the course begins. For example, students may be given the option of reading review materials or working through Khan Academy (<https://www.khanacademy.org/>) lessons designed for high school students that cover some of the course topics at a more introductory level, such as basic measures of central tendency (i.e., mean, median, and mode) or interpreting graphs (e.g., bar charts and scatterplots). Instructors should reach out to students who score poorly on the measure of demonstrated knowledge during the first week of the course in order to reassure students that they are not expected to score highly on an assessment of information that they have not yet been taught. This should help to ensure that the experience of struggling through such an assessment did not have a negative impact on students' confidence. To further offset these issues, GOALS will be replaced by a different measure of demonstrated knowledge in the future. Currently, the use of open-ended prompts that ask students to interpret situations similar to those addressed in the course are being explored (Zimmerman, et al., 2016).

The median expected grade was higher for the students who successfully completed the course. There are a number of reasons why a student could have a low-grade expectation at the beginning of the semester. For example, they may begin the course with the belief that they do not

have the ability to do well. This is sometimes attributed to students' beliefs about their mathematics abilities (Azar & Mahmoudi, 2014) which may be addressed by showing students that the introductory statistics course is not a mathematics course. The mathematical operations required in the course are limited to addition, subtraction, multiplication, division, square roots, exponents, and possibly factorials. Students may also begin the course with low grade expectations because they anticipate putting forth only enough effort to obtain the minimum required grade. The minimal grade that students must achieve in order for the course to be counted toward their graduation requirements varies by major but is typically a C or D. If a student's major requires a C in the course in order for it to count toward graduate requirements, then the student may be aiming for a C. The issue with this is that the course material is somewhat cumulative and becomes more difficult as the semester progresses. A student aiming for a C during the first half of the semester may find it difficult to maintain that C through the end of the semester when the content becomes more challenging. As a result, instructors should reach out to students who begin the course with low grade expectations to determine if they are experiencing low self-efficacy or if their strategy is to do the minimal amount of work to pass the course. The appropriate intervention varies by the cause of the low-grade expectation. For instance, for students planning to do the minimal amount of work, instructors may point out that exam grades tend to decline from the first to the second midterm and again to the final exam. They may also share anecdotal evidence from previous semesters. Instructors should remind students that those who fall behind for more than one or two weeks rarely catch up. On the other hand, students with low self-efficacy may benefit from activities that build their confidence. For example, easy early activities that gradually become more difficult may prevent students from giving up. In this course, students also stated that attending group review sessions with peer leaders was helpful, both to recognize that other students share their feelings and to work through content at an appropriate pace.

Students who do poorly on the first quiz of the semester or who do not complete the first quiz of the semester are at high risk for not completing the course. Of the students who completed the first quiz of the semester, 75.8% successfully completed the course while only 35.3% of students who did not complete the first quiz successfully completed the course. Students who do not complete the first quiz are less than half as likely to successfully complete the course compared to students who do complete the first quiz. Instructors should reach out to students who do not complete the first quiz to determine why they did not complete it and develop an intervention to target each individual's issues since such students are beginning the course with a low grade and are missing out on this learning opportunity. While it is possible for students to avoid the first quiz and catch up, we see that the majority of students who miss the first quiz never do so and fail to successfully complete the course.

In terms of predicting which students will and will not successfully complete the course using data collected in the first two weeks of the semester, students' attitudes toward statistics teachers and scores on the first quiz were identified as statistically significant predictors. While the sensitivity of that model to identify students who would not successfully complete the course was poor, the specificity of the model was good. In other words, students who successfully completed the course were correctly classified, but students who did not successfully complete the course were not consistently correctly classified. It may be better to be optimistic and to predict that a student will successfully complete the course when he or she will not than to be pessimistic and to predict that a student will not successfully complete the course when they may. If instructors know that a student is not likely to be successful they may interact with the student differently (Rosenthal & Jacobson, 1966). Thus, it is preferable to overestimate success in the course. When

reaching out to a poorly performing student, an instructor should do so with the perspective that the student can be successful as to not further discourage the student.

The STARS subscale of attitudes towards statistics teachers was a statistically significant predictor of course completion, although the MANOVA, comparing students who did and did not successfully complete the course in terms of their STARS subscales scores did not identify a statistically significant difference in terms of this variable. The mean ratings of participants who did complete the course were 0.194 standard deviations lower than the mean ratings of participants who did not successfully complete the course. Note that the attitudes items were all worded in a way that higher ratings are associated with more negative perceptions. Thus, students who successfully completed the course had less negative (i.e., more positive) views of statistics teachers. This study used an abbreviated form of the STARS wherein the attitudes towards statistics teachers subscale consisted of the following three statements to which students rated their level of agreement on a scale of 1 to 5 (1 = strongly disagree, 5 = strongly agree): “Statistics teachers are so abstract they seem inhuman,” “Statistics teachers communicate in a different language,” and “Statisticians are more number oriented than they are people oriented.” For the first statement, students who completed the course gave a mean rating of 1.84 (SD = 0.806, N = 250) while students who did not complete course gave a mean rating of 2.01 (SD = 0.881, N = 95) for a difference of 0.206 standard deviations. For the second statement, students who did not complete the course gave a mean rating of 2.28 (SD = 0.962, N = 253) while students who did not complete the course gave a mean rating of 2.43 (SD = 0.995, N = 98) for a difference of 0.154 standard deviations. For the third statement, students who completed the course gave a mean rating of 2.58 (SD = 1.004, N = 252) while students who did not complete the course gave a mean rating of 2.73 (SD = 1.051, N = 98) for a difference of 0.147 standard deviations. For all three items, students who successfully completed the course gave more positive ratings. The effect sizes were consistent across all three items and were relatively small in each case. Based on students’ perceptions of statistics teachers, several suggestions for instructors emerge. The use of individual emails and instructional videos for the class may help to “humanize” the instructor. Instructors of introductory courses should also consider their language choices with students and avoid excessive jargon that may reinforce perceptions of statistics as a special and inaccessible language, or statisticians as number oriented. Instructors of introductory courses who can communicate the content in a language that novice learners can most easily comprehend may be most effective in improving their students’ perceptions of individuals in the field of statistics.

## Conclusions

The results of this study suggest that indicators, as early as the first week of the course, may be used to identify students who are at-risk for not successfully completing the course. The purpose of this study, however, was not to simply identify the students who are likely to fail to be successful in the course but rather to identify variables that provide meaningful opportunity for interventions. A number of interventions were suggested, including those with the goals of reducing test anxiety, increasing existing content knowledge at the beginning of the course, and improving students’ perceptions statistics teachers. Future research should develop interventions that can be used in online introductory statistics courses targeting one or more of these areas and report on their effectiveness at improving course completion rates as well as other outcomes such as exam performance and student satisfaction.

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# An Examination of Factors That Impact the Retention of Online Students at a For-profit University

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## Abstract

Online learning has continued to grow in recent years. However, retaining students in online courses and programs has posed a challenge. Whether the university is public, private, offers both face-to-face and online programs, or is 100% online, retaining students in online programs can be an issue. This study reflects the widespread desire at a large online for-profit university to improve student retention rates. The goal of the research was to provide further insight into why students may decide to drop out of online programs. Participants consisted of former undergraduate students at the university in the College of Education who dropped out without providing a specific reason for doing so. The study used a non-experimental mixed methods approach collecting data from university databases, an online survey, interviews, and classroom walk-throughs. Data analysis employed techniques such as frequency calculations, a MANOVA, and qualitative content analysis. Results from the MANOVA revealed statistically significant results when examining student Grade Point Average and last course grade. Furthermore, data collected from the online survey, interviews, and classroom walk-throughs revealed common reasons for why students may drop out of online programs.

*Keywords:* Online learning; higher education; for-profit colleges and universities; student retention; adult learners; undergraduate

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. doi: 10.24059/olj.v21i3.935

## Introduction

Over the years, online learning has become a widely accepted and sought out modality by students. We have seen an increase in the number of online universities available as well as more online options for students at traditional universities. Despite the popularity and growing demand for online programs, retaining students in such programs has been problematic. Currently, online universities are scrutinized for having lower retention rates as compared to their more traditional counterparts. This study focuses on an online university within the for-profit sector. In general, the average retention rate for for-profit undergraduate programs is 46.2% (National Student Clearinghouse Research Center, 2014). The overall undergraduate retention rate at the university examined in this study is 38.9%. In contrast, online programs in traditional public and private universities have retention rates of 68.2% (public) and 72.9% (private) (National Student Clearinghouse Research Center, 2014).

The purpose of this study was to provide further insight into why students may decide to drop out of online programs, with a specific goal of identifying potential factors that might

influence a student's decision to drop out. At the university in question, an attempt to contact students and find out why they have discontinued their studies was made. Results from a 2014 withdrawal survey at the university identified the following as common reasons for students' discontinuing their studies: personal or family emergencies, needing a break from school, financial burdens from needing to retake course, changes in personal financial situation, and lack of internet access. Unfortunately, these reasons only reflect approximately 29% of the students who dropped out. The other 71% of students who dropped out did not complete the survey. These students are categorized as "Missing in Action" (MIA). The research presented here focuses on these MIA students.

To improve retention rates, a better understanding as to why students drop out of online education is needed. As some researchers suggest, dropping out is a process rather than an event and as a result, it may be caused by a combination of factors (Mansfield, O'Leary, & Webb, 2011). If it can be better understood why students drop out, attempts to intervene to help students overcome a hurdle, possibly anticipate which students may be at risk, and offer additional support can be implemented.

### Literature Review

Online learning in higher education continues to grow faster than on-campus courses, but overall online programs struggle with a lower retention rate (Brown, Keppell, Hughes, Hard, & Smith, 2013). "Dropout rates from e-learning courses were documented around 25%–40% as compared to 10%–20% in on-campus courses" (Levy, 2004, p.186). In 2014, it was *reported that of all first-time, full-time students who entered a bachelor's program in 2006, 59% had completed the degree in 2012* (The National Student Clearinghouse Research Center, 2014).

Improving student retention rates has been an issue of interest to higher education for many years. Efforts to identify factors or variables that influence students' decision to leave college are ongoing. O'Keefe (2013) identifies such at-risk factors as mental health and disability issues, first year and first-generation college students, part-time as compared to full-time students, socioeconomic status, and ethnicity. Boles, Cass, Levin, Schroeder, and Smith (2010) believe the success of their online undergraduate program is attributable to the higher average student age of 34. Another study found male students are more likely to drop out than female students (Levy, 2004).

Other correlations have been reported in the research. It has been reported that students' sense of belonging to a community, engagement, and interactions with faculty are all related to retention (Lee & Choi, 2011). Where students are in terms of program completion has been correlated to retention, as well as student status (lower level or upper level) (Levy, 2004). Boles et al. (2010) believe small class sizes of 25 students or less can contribute to higher retention rates. In addition, factors such as goal commitment, social integration, and academic integration have been identified as correlating to retention, as well as perception of outside factors, intrinsic motivation, and students' relationships with their instructors (Mansfield et al., 2011).

Lee & Choi (2011) examined ten years of research targeting retention in online courses. Through coding of 35 empirical studies, the researchers identified almost 70 "dropout factors," or reasons why students discontinued taking online courses. They sorted and combined these into three groups.

1. Student factors include academic background, relevant experience, skills, and psychological attributes.
2. Course/program factors include course design, instructional support, and interactions.
3. Environmental factors include work commitment and supportive environment.

While some factors surfaced in the research findings more than others, Lee and Choi (2011) point out that the presence of one impacting factor is not enough to cause a student to desist in a course. Factors are inter-dependent, and it is the “interaction of numerous factors that eventually lead to a student to complete or not complete a course” (Lee & Choi, 2011). This is further supported by Mansfield et al. (2011) who describe dropping out as a process that occurs over time.

A final point is that retention can be difficult to measure or define. Mansfield et al. (2011) point out that accurate retention rates need to identify students who enroll to complete a course or two, but never intended to complete a degree program. Busy students might choose to drop a course for the present, but plan to re-enroll when things slow down, or drop because they want to take the course with another professor (Levy, 2004). Different ways of measuring and defining retention also attempts to compare different institutions’ retention rates.

Student retention is vital for the well-being of students, programs, institutions, and even society. Current research appears to be moving away from trying to identify potential dropouts by factors such as demographics, or program of study, instead realizing that each student, program and institution is unique (Willging & Johnson, 2009). Research shows that demographic factors such as age, gender, Grade Point Average (GPA), hours worked, etc. may not significantly differ between students who dropped out and those who persisted (Levy, 2004). As retention is still an issue, successful ways of measuring and improving student retention will continue to be sought. The research presented here aims to offer additional insight into the question: What factors may influence a student’s decision to drop out of an online for-profit academic program?

## **Method**

This research project utilized a non-experimental mixed-methods research design. This design was most appropriate as there were no interventions or manipulations and several data collection techniques were used. The research was investigative and exploratory in nature.

### **Population and Sampling**

The undergraduate student population in the College of Education (COE) at the university in question consists of 70% female and 30% male students. Sixty-three percent of the students indicated being employed. In terms of race, 41% are Caucasian, 41% African American, and 18% Asian, Hispanic, Mixed, or did not indicate race. Finally, 43% are first-time college students (Nettles, 2015). This study sampled from this general population and examined former COE online undergraduate students who dropped out during the 2013-2014 academic year and did not provide a specific reason for why they dropped out. The initial sample consisted of 396 students. Two sampling techniques were used based on the mixed methods nature of the study. First, non-random convenience sampling was used which focused on identifying students who dropped out without providing specific reasons for doing so at the University. The convenience sampling was followed by random sampling from the group of 396 students during one of the stages of data collection.



## Data Collection and Analysis

Data was collected via several methods and both quantitative and qualitative analysis techniques were employed. It is believed that by using a mixed-methods approach to the data collection, a more comprehensive picture of student retention can be created (Green, Caracelli, & Graham, 1989). Specifically, data was collected from University databases, an online survey, interviews, and classroom walk-throughs. Data analysis consisted of frequency calculations, a MANOVA, and content analysis. The following summarizes the steps that were carried out to collect and analyze data.

**Step 1: Identified Larger Sample.** First, an initial and larger sample of participants was identified through convenience sampling. This initial sample consisted of 396 COE students who dropped out during the 2013-2014 year and did not provide a specific reason for why they dropped out. For each of these students, the following data was collected: the number of courses taken before dropping out, GPA, the instructor's name, and final grades for the last two courses taken.

**Step 2: MANOVA.** Students were grouped into three groups based on the number of courses taken prior to dropping out; group one being 3 or less, group two being 4 to 10, and group three being 11 or more. A MANOVA was then conducted between the three groups and the following dependent variables: GPA, grade in the second-to-last course, and grade in the last course.

**Step 3: Survey.** An online survey consisting of 12 items was sent out to the 396 students. Survey items were multiple choice and short answer. Surveys were anonymous except for individuals who indicated a willingness to be interviewed and who included contact information in their responses.

**Step 4: Interviews.** The final item on the survey asked students if they would be willing to be interviewed. Of the students who indicated they were willing to be interviewed on the survey, six were selected. The selection process began with in-depth research of each student, including number of classes, grades, and any comments made that indicated their reason for dropping out. Students who had only taken a few classes and did not pass them were not selected. The examination of these students revealed they dropped for repeated class failures. Instead, students who had been successful in their classes and had completed several classes at the institution with passing grades were chosen for an interview to determine why they had dropped out. Questions asked by the researchers were specific to each student and based on answers that were provided on the survey or how that student performed in the classroom. Sample interview questions are located in Appendix A. Interviews were conducted via phone or through the exchange of emails.

**Step 5: Classroom Walk-Throughs.** Based on the data collected in step one, a list of "most frequently last courses taken" was created by the researchers. This list consisted of six undergraduate online courses. For each course, 10 students (60 students in total) were randomly selected (data was organized in an Excel database which allowed the researchers to use a random number generator function to select the students) and classroom walk-throughs were conducted to look for potential evidence that could have contributed to the student dropping out. Previous research carried out by Lee and Choi (2011) was used to provide guidance on what the evidence might look like.

## Results

Data was collected from university databases, an online survey, interviews, and classroom walk-throughs. Analysis of the data consisted of frequency calculations, a MANOVA, and content analysis.

### MANOVA

Students were grouped in three groups based on the number of courses they had taken prior to dropping out. A MANOVA was conducted between the three groups and the following dependent variables: GPA, grade in the second to the last course, and grade in the last course. Table 1 presents the average GPAs and course grades for each group on the three variables being examined.

Variables and Groups	N	M (SD)
GPA		
<i>Group 1</i>	111	2.17 (1.05)
<i>Group 2</i>	158	2.16 (.789)
<i>Group 3</i>	104	2.47 (.849)
Second to Last Course Grade		
<i>Group 1</i>	111	48.47 (38.77)
<i>Group 2</i>	158	56.02 (28.27)
<i>Group 3</i>	104	54.85 (26.49)
Last Course Grade		
<i>Group 1</i>	111	62.92 (25.59)
<i>Group 2</i>	158	45.84 (25.99)
<i>Group 3</i>	104	50.06 (29.52)

*Table 1.* Descriptive Statistics for each Dependent Variable by Group. Note: Number of students is less than the original 396. Only students in which all three variables could be recorded were used in the MANOVA analysis.

Results from the MANOVA showed a statistically significant difference between the three groups and the three dependent variables,  $F(6,738) = 11.19$ ,  $p < 0.05$ ; Wilks  $\Lambda = 0.846$ ,  $\eta^2 = 0.08$ . Follow-up least significant difference (LSD) tests revealed specific significant differences between GPA and the last course grade. Table 2 presents the groups in which significant differences were visible.

Variables and Groups	Difference in Means
GPA	
<i>Group 1 and Group 3</i>	-0.3
<i>Group 2 and Group 3</i>	-0.31
Last Course Grade	
<i>Group 1 and Group 2</i>	17.08
<i>Group 1 and Group 3</i>	12.86

Table 2. Groups with Significant Differences on GPA and Last Course Grade

### Survey

Eighteen participants completed the survey. Age of the participants ranged from 25 to 50. Approximately 72% were female and 17% were male (two did not indicate gender). Approximately 28% identified themselves as Caucasian, 22% as African American, 5.5% as Asian, 5.5% as Hispanic, 5.5% Native American, and 17% as Other (two did not indicate race). Of the 12 items on the survey, three items were of particular interest in regards to better understanding why students may have decided to drop out. These items were:

1. What were your reasons for originally enrolling at the University?
2. Please select the primary reasons for why you decided to discontinue your studies at the University.
3. Is there anything that the University, its faculty, or its staff could have done to increase the likelihood of continuing your education with the University? If so, what?

Items 1 and 2 provided for a multiple-choice response, while item 3 called for a short answer response. Table 3 summarizes the results for the first question and Table 4 summarizes the results for the second question.

Rank	Reason	Percent Agreed
1	Flexibility to complete course work on my own schedule	72%
2	[The] University offered a degree that was aligned to my career goals	44%
3	Affordable education compared to other universities	28%
3	Flexible acceptance standards	28%
5	Other: Convenience	11%

Table 3. Reasons for Enrolling in the University

N= 18

Rank	Reason	Percent Agreed
1	I became too busy with work and/or family	39%
2	I felt like I was not receiving the necessary support from faculty and advisors	38%
3	I felt like the course material was too difficult	28%
3	I was unable to continue due to financial reasons	28%
5	I felt like I was not receiving a quality education	22%
5	Other: Just need a break, technology issues, disability worsened, misled/misplaced in program	22%

*Table 4.* Reasons for Discontinuing Studies at the University

N= 18

In regard to the third survey question, there was one dominant theme: Support, specifically, support in four areas: Course, Financial, Staff/Institutional, and Motivational. From a course standpoint, one student said, “More support and advice on how to complete assignments properly.” Another student mentioned financial concerns: “Set me up a payment option.” Unhappy with the support he/she was receiving from university staff, one student stated: “Yeah, they need to LISTEN and pay attention to what the student is wanting to do for their career!!!! I am really disappointed in the counseling that I got!”

Finally, another student who wanted additional motivational support simply stated, “Motivate me more.”

## Interviews

Of the students who indicated a willingness to be interviewed on the survey, six were selected. Sample interview questions are located in Appendix A. Interviews were conducted via phone or through email exchange.

After speaking with one student, the researcher discovered the primary reason the student had dropped out was because he “was not getting a teaching certificate” upon graduation. This student has since enrolled in another online university that does issue teaching certificates. Another student stated:

The reason I haven't finished my education is simply because my financial aid was applied incorrectly. Normally all my classes are paid for out of my financial aid and then I'm sent any remainder. However, this last time one class was apparently not paid for. I was expected to pay for the class all of a sudden [...] I don't have money sitting around [...]

One student shared via email:

I emailed my advisor numerous of times asking to re-enroll me and he failed to do so. Therefore, I just put it on the back burner because I couldn't get reinstated. I want to finish out my degree and as soon as I can, but that is my only hold-up is getting someone to enroll me. He never called or emailed me back when I emailed him.

This student appeared to fault the University. However, an in-depth examination of the student's work in several classes revealed him to be an interesting, articulate, and strong student who was doing great in his classes until ongoing plagiarism was detected after which he dropped out. This particular student had accommodations and made comments on the survey about accommodations issues for special needs students, but never mentioned that he may have been dropped due to plagiarism.

An additional student interviewed supported the previous comment about advisors. This student was mistakenly enrolled into an Early Childhood track and was unable to change to the Educational Studies track, finally dropping out in frustration.

Two of the interviewees were residents of American Samoa. The primary reason these two students dropped out of the program were related to the lack of technology in their location, including unreliable Internet (due in large part to weather issues), inability to access websites, and lack of access to programs and computers. These two students were interviewed by email, as it was difficult to connect via phone due to the time difference.

### **Classroom Walk-Throughs**

Classroom walk-throughs were conducted on 60 randomly selected students. There were 55 different instructors among the courses that were reviewed. To help guide the researchers in looking for potential evidence that may have contributed to the students' dropping out, research conducted by Lee and Choi (2011) was used. According to Lee and Choi (2011) student-related factors include such elements as academic background, relevant experiences, skills, and psychological attributes. Within this sample, student-related factors such as skills (i.e. time management, juggling multiple priorities) and psychological attributes (i.e. motivation, interest in subject matter) were most frequently seen.

Specifically, the researchers looked for evidence in three categories: Student related factors, Course/Program related factors, and Environmental related factors. Of the 60 students reviewed, 51 offered potential evidence of at least one of these factors.

One student shared "I was having a very difficult time trying to make this work. I think I took on more than I could handle." With another student, it was evident he/she was not interested in the subject matter:

I don't really like psychology classes because I just don't think I get it or want to get it [...] This will be my third time trying to take a psychology class. I dropped out twice before in the traditional school.

A third student appeared to come into the class with a negative mindset toward using technology:

As far as technology goes. I only use it if I have to, otherwise, I am old fashion. I really do not want to have to use the mic or the web cam at all. Since I need to do this for this course, I will [be] cautiously engaged. I feel this way because I am a private person and I really do not care for the online networking at all.

Course- and program-related factors, the second most frequent category of factors seen in this sample, would pertain to elements like course design, institutional support, and interactions among students and the instructor (Lee & Choi, 2011). Knowledge of program offerings or what a program prepared a student to do after graduation was an issue. One student said, "My major at

[the] University is Education. I am strongly considering changing my major to Education Counseling.”

Deciding to change majors is common occurrence among undergraduate students, but this particular university did not offer a degree in Education Counseling. Another student stated, “My major will more than likely be changing to Cognitive Studies so I can pursue a career in Occupational Therapy or in that area.”

Here one might argue that a degree in Cognitive Studies is not going to prepare a student to be an Occupational Therapist. Instructor interaction was also a potential issue. Table 5 summarizes the inconsistency/lack of instructor interaction.

Discussion Forum Interaction		Feedback on Assignments	
Level of Interaction	# of Instructors	Level of Interaction	# of Instructors
Doesn't carry on the discussion	13	Offer a little summative feedback but no in-text assignment feedback	11
Doesn't address students by name	3	Offer no summative feedback but a little in-text assignment feedback	1
Offers shallow responses	2	Offer no feedback on assignments	13

Table 5. Instructor Interaction

## Discussion

### University Data and MANOVA

The MANOVA conducted focused on examining the differences in academic performance between the three groups based on the number of courses taken prior to dropping out (group one being 3 or less, group two being 4 to 10, and group three being 11 or more). Overall results from the MANOVA were statistically significant with specific differences being seen with GPA and the last course grade. In terms of GPA, differences were seen between groups 1 and 3 ( $p < 0.05$ ) as well as between 2 and 3 ( $p < 0.05$ ). In each case, the mean of group 3 was higher. There was a positive trend seen which was supported with a significant and positive correlation (.18). The more courses a student took before dropping out, the higher their GPA. These results may not be too unexpected. One might conclude that if a student is taking more classes, chances are they are passing them, which in turn could translate into a higher GPA. A question that might arise is, why drop out after 10+ courses? If students appear to have more academic success as they take more courses, then the likelihood of dropping out may not be due to academic reasons.

In terms of last course grade, differences were seen between groups 1 and 2 ( $p < 0.05$ ) as well as between groups 1 and 3 ( $p < 0.05$ ). In each case, the mean of group 1 was higher. Overall, there was a negative trend seen with this variable, meaning, the more courses a student took before

dropping out, the lower his/her grade was in the last course. Unlike GPA, it may be difficult to conclude whether or not these results would be expected. There could be multiple questions raised. For example, are students who took fewer courses prior to dropping out actually trying harder, but despite their effort they still struggle and decide to drop out? Do students who take more courses “run out of steam,” or motivation and simply stop trying in their last course? These additional questions may indicate a need for further research.

### **Survey**

An online survey was sent to all students identified in the initial larger group. Three survey items were of particular interest and will be discussed here:

1. Why students enrolled in the online university
2. Why students discontinued their studies
3. Whether or not there was anything the university could have done to keep the students from discontinuing their studies

The number one reason students decided to attend the online university was identified as *Flexibility to complete course work on my own schedule*. This rationale mirrors previous research which has found flexibility and convenience as a desirable trait of online courses among students (Barbour, 2008; Kenny, 2002; Northrup, 2002; Smart & Cappel, 2006; Young & Norgard, 2006). The number one reason why students discontinued their studies was, *I became too busy with work and/or family*. Several students who indicated flexibility as a main reason for enrolling also said they discontinued their studies because they became too busy with work and/or family. What does this mean? Although flexibility is an attractive feature and draws students to online learning, some students might misjudge their ability to juggle priorities and/or balance school with work and/or family.

Seventy-five percent of the respondents who indicated not receiving a quality education as a primary reason for discontinuing their studies, also indicated not receiving the necessary support from faculty and advisors. What can be taken from these results? Quality does not just equate to content and/or course design. There are students that take note of the level in support they receive and may factor this into what it means to receive a “quality education.”

Based on survey responses, it appeared that one thing the University could have done to increase the likelihood of retaining these students was to provide more support; specifically in areas of course, financial, staff/institution, and motivation. These results are in line with some of the reasons students discontinued their studies (i.e. a lack of quality education and lack of support from faculty and advisors), as reflected in previous research that notes the importance of support in the online learning environment (Ally, 2004; Hunte, 2012; Muilenburg & Berge, 2005). Not only did the issue of support reveal itself in the survey, but it was also brought up during the interviews, as well as in the classroom walk-throughs.

### **Interviews**

The interviews revealed a few potential contributing factors that may have led to students to discontinue their studies. One factor was a lack of teaching certification offered by the institution. Although there are plans in progress to offer a route to teaching certification, at the time of this study, a degree from the College of Education (COE) at this online university did not lead to teaching certification. For many students this could be a critical detail. It was common to see students make statements in their introductory posts about wanting to become a teacher. Efforts

to notify students that the degree does not lead to a teaching certificate are made in several ways (i.e. disclaimers on COE website and program pages). However, students may still have enrolled in the program, without a full understanding of what such disclaimers mean.

Another potential factor that revealed itself during interviews was financial reasons. This was further supported by the survey results, which showed financial reasons as a primary reason for a student's decision to discontinue studies. In addition, these results coincide with previously collected data from the university, which indicated financial reasons as being a factor that contributed to students dropping out.

The interviews revealed additional motives for dropping out. Two students from areas with poor technology infrastructure were overwhelmed by the effort it took to keep up. These students were also challenged by time zone issues and much of their struggle came from work submitted late. They have a challenging situation in American Samoa with weather and Internet access. These students would benefit from a more flexible late work policy, which the institution has recently implemented. Classroom examination of instructor comments in the gradebook showed many instructors refusing to accept work more than three days late.

Interview data also revealed the need for students to be coached in writing skills, including proper citation and paraphrasing of sources to avoid plagiarism. Instructors need to work to detect and correct plagiarism issues early in a student's program. Finally, as with other data collection methods, support appeared to be a potential factor that may affect a student's decision to drop out. There was a consistent complaint of inability to secure needed guidance from advisors and enrollment specialists. This is something that has been, and continues to be, addressed by the institution and has improved since these students dropped out.

### **Classroom Walk-Throughs**

After conducting the classroom walk-throughs, it appeared that student factors such as time-management skills, the ability to juggle multiple priorities, and psychological attributes may have been contributing factors to students deciding to drop out of online courses. Students would often explain in their introduction posts how busy they were raising a family, working, and going to school. In addition, it was common to see students with sporadic performance (e.g. zeros throughout the gradebook for not having completed discussions and/or assignments). Such performance could be attributed to students not having the time, or not managing their time skillfully enough to complete coursework. Flexibility and/or convenience are often noted as a primary reason why students take online courses or pursue a degree online (Barbour, 2008; Kenny, 2002; Northrup, 2002; Smart & Cappel, 2006; Young & Norgard, 2006). However, "flexibility" does not mean "less time," "less motivation," or courses being "easier." It is reasonable to think that a student may set out to pursue a degree online thinking, "It's flexible, therefore I'll be able to easily work it into my schedule and keep up the schoolwork," only to find out that the commitment to their studies still takes time. As a result, if a student does not have strong time management skills, the ability to balance life/work/school, or maintain the motivation after a long day of work, they may struggle to keep up with their coursework.

The classroom walk-throughs also revealed potential course- and program-related factors. Examples of such factors include knowledge of program offerings, what a program prepares a student to do after graduation, and a lack of instructor interaction. In most cases, a student will pursue a specific degree because they have a specific job in mind or field of employment they want go into. Some students appeared to lack knowledge about the degrees offered by the university,



(for example, a student wanting to switch his/her major to Education Counseling, a degree not offered by this university). Misunderstanding what a degree was meant to prepare a student to do and then realizing the misalignment could contribute to a student's decision to drop out. An example of such a misalignment may include a student pursuing a degree in Cognitive Studies thinking it will prepare them to become an Occupational Therapist. If a student has a career goal and the university does not offer a degree to help achieve that career goal, it is not unlikely to think that the student would leave the university to find an institution that did offer a more suitable degree. Furthermore, many students would make statements in their introduction posts about wanting to be a teacher, work with children, etc. At the time of this study, a degree from the COE at this university did not lead to a teaching certificate, which would be needed to teach within the United States. As a result, a student might be inclined to leave the university if their goal was to become a certified teacher. This was confirmed in one of the phone interviews where the student said he/she discontinued their studies because the degree did not lead to teaching certification, and that she had enrolled at another online university which did issue teaching certifications.

Another potential course- and program-related factor was a lack of instructor interaction. The course walk-throughs revealed many instructors who were not fully engaged with students in discussion forums and/or providing meaningful feedback (or any feedback) on assignments. This lack of presence and interaction can contribute to the feeling of isolation and disconnect that is sometime noted when taking online courses. Research has shown that it is important to create a sense of social presence and community in online courses (Aragon, 2003; Rovai, 2000; Rovai, 2002). For example, when students feel part of an online community, their feelings may have a positive impact on student attitude and performance. Facebook pages, LinkedIn groups, and a chat or socialization area in the online classroom are all examples of how social presence and community can be developed in online institutions (Moore & Fetzner, 2009). Students need to feel supported and oftentimes, the instructor is the first line of support in the online classroom. If the instructor is absent, the student may feel as if he/she is "in it alone," and believe they cannot or should not reach out to the instructor for support. The student's ability to cope with the lack of an instructor may have a negative influence on their performance and/or motivation to continue their studies. Although there were several instructors who provided little or inconsistent interaction, it is important to note that there were instructors that displayed the opposite. Sixteen instructors appeared to offer positive interaction in both the discussion forums and in assignment feedback.

### **Limitations**

Several limitations can be noted in the study that could affect the generalization of the results. First, the population was drawn from students enrolled at an online for-profit institution as opposed to taking online courses at a traditional university that also offers face-to-face courses. Second, the students were exclusively undergraduate students who had declared themselves as Education majors. Third, the students enrolled at the institution reflect a non-traditional student population (e.g. they tend to be older in age and many face additional demands on their time such as family and work). Fourth, the researchers intended to collect more demographic data through the online survey. Due to the low response rate for the survey, this goal was not achieved. Fifth, because of the low survey response rate, a very small sample size was obtained in terms of survey and interview data.

## Conclusions

Retention in for-profit online universities is an important issue, and will continue to be a focus of many institutions. The following are some general conclusions based on the research results:

- A lack of support could be a key contributing factor to students dropping out;
- Although students are drawn to online learning for the flexibility and convenience it offers, some students may misjudge their ability to balance multiple priorities or are unaware of the time commitment that is still needed for their studies;
- It cannot be assumed that students drop out of online for-profit universities because they struggle academically;
- The likelihood of students dropping out due to poor academic performance may be higher earlier in a program (i.e. took fewer courses). However, students who drop out further along in the program (i.e. took more courses) may drop out due to factors other than poor academic performance; and
- It may be a combination of factors that lead to students dropping out of online programs.

The following recommendations may be offered based on the results:

- 1) Make sure college advisors have manageable student loads and are knowledgeable about all academic programs.
- 2) Make sure instructors are not only content experts but have a passion for teaching and are student-centric.
- 3) Offer additional time management and organization coaching for students with multiple priorities and/or create programs that allow for more flexible self-pacing. This adjustment would not only support students with busy schedules, but also build in time for technology or time zone related issues.
- 4) Design retention inventions that address factors other than academic performance as it cannot be assumed that all students drop due to poor academic performance.
- 5) Ensure a higher level of support for students earlier in their programs and identify students at risk of dropping out early so intervention efforts can be put into place.

This research study lends support to previous research that indicates retaining students is a complex challenge that involves many aspects of the institution (Lee & Choi, 2011; Willging & Johnson, 2009; Mansfield et al.,2011). Educational institutions as a whole need to be supportive of retaining students, and those who do not complete their programs need to be solicited for feedback for continuous improvement. As research on the complexity of student retention in online academic programs is continued, the potential to develop successful strategies to combat this problem increases.

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## Appendix A Sample Interview Questions

### Potential Interview Questions

1. What made you decide to enroll at [University Name]?
  - a. Did you consider any other institutions other than [University Name]?
2. Were you very far in your program before you decided to leave [University Name]?
  - a. If yes, why not finish with [University Name]?
3. You indicated enrolling in another institution and you are now pursuing a degree that is different from the one you were pursuing at [University Name]. What degree is this?
  - a. Does [University Name] offer this degree?
    - i. If no, was this a factor in leaving [University Name]?
    - ii. If yes, why not stay with [University Name]?
  - b. Do you feel you're getting a better education? If so, why?
  - c. Without giving specific numbers, would you say you're spending more, less, or about the same in tuition?
4. You indicated enrolling in another institution and you are now pursuing a degree that is the same as you were pursuing at [University Name]. Why didn't you decide to stay with [University Name]?
  - a. Do you feel you're getting a better education? If so, why?
  - b. Without giving specific numbers, would you say you're spending more, less, or about the same in tuition?
  - c. Would you say the course material is more difficult, less difficult, or the same?
5. You mentioned one the reasons you decided to leave [University Name] was a lack of support from [University Name] faculty, advisors, and/or staff. How could they have supported you better?
  - a. Can you provide an example of when you really could have used support and it was not offered?
6. What's the one thing that [University Name] could have done to keep you enrolled?
  - a. Anything else?

# Exploring Differences in Business Undergraduate Perceptions by Preferred Classroom Delivery Mode

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## Abstract

The purpose of this study was to compare business undergraduate online/hybrid course perceptions across three different preferred classroom environment delivery modes: online, hybrid, or face-to-face (F2F). Four different perceptions were measured: perceived favorability of online/hybrid courses (PFoOC); intent to recommend online/hybrid courses; perceived learning; and timely graduation. Undergraduates who were taking at least one online or hybrid class voluntarily completed an online survey. In the fall 2015 a complete-data sample ( $n = 264$ ) of respondents was obtained and in the spring 2016 the complete-data sample ( $n = 272$ ). Consistent results across both samples were found for three of four outcomes. Undergraduates who preferred either online or hybrid classroom delivery had significantly higher PFoOC and intent to recommend online/hybrid courses than students preferring F2F. There were no differences in perceived timely graduation across the three classroom delivery mode groups, and inconsistent results were found for perceived learning. The fall sample showed no differences on perceived learning but for the spring sample, undergraduates preferring either an online or hybrid delivery mode perceived higher learning than F2F preferred-mode students. A new, short four-item measure of PFoOC was found to be reliable. As universities increase their online and hybrid course offerings keeping course integrity or equivalence between F2F and online/hybrid course sections will be important. Study implications for studying future online student perceptions are suggested. Ways to increase the PFoOC for undergraduates who prefer F2F are suggested. Increased PFoOC should lead to higher intent to recommend online/hybrid courses.

*Keywords:* Preferred classroom delivery mode; business undergraduates; perceived favorability of online courses; perceived learning; timely graduation

Blau, G. & Drennan, R. (2017) Exploring difference in business undergraduate perceptions by preferred classroom delivery mode. *Online Learning*, 21(3), 222-234. doi: 10.24059/olj.v21i3.973

## Introduction

Many universities and colleges are increasingly viewing online education as a critical component of their enrollment strategic plan to accommodate undergraduate students' needs (Comer, Lenaghan & Sengupta, 2015). There has been strong growth over the past several years in colleges offering online courses and degree programs, which is expected to continue (Britt, 2015). However, as Raju and Schumacker (2014-15) noted, the percentage of college students graduating within five years in 2012 was 51.9%, which was a decrease from 54.4% in 1991 across all institutions. The purpose of this paper was to compare business undergraduate online/hybrid course perceptions across three different preferred classroom environment delivery modes: online, hybrid or face-to-face. Four different perceptions were measured: perceived favorability of

online/hybrid courses; intent to recommend online/hybrid courses; perceived learning and timely graduation. After reviewing relevant literature, the research question to be addressed is posed. Then the methodology used, including samples, measures, and data analyses are presented. Next results—both descriptive statistics and tests of the research question—will be shown. After a discussion of the results, study limitations and implications of the results are offered.

### Literature Review

Three different delivery modes are now used in undergraduate college courses: face-to-face (F2F), online, and blended/hybrid. The blended or hybrid delivery mode is a combination of F2F and online, for example, alternating online and F2F meetings (Arbaugh, 2014). Prior research has compared these three delivery modes in various combinations across different disciplines, with varying results on outcomes. Common outcomes measured included grades (e.g., examination, final course), attitudes (e.g., engagement, satisfaction), and learning. For example, Johnson and Palmer (2015) found that students did better and were more engaged in a F2F versus online linguistics course. Using a student sample in an introductory business statistics course, Houghton and Kelly (2016) found that students in the hybrid environment performed better than students in the F2F environment on the common final exam. However, Helms (2014) found that online undergraduates performed more poorly in a required psychology course than F2F undergraduates. Using online and F2F undergraduate samples taking a common finance class, Fendler, Rubb and Shrkhande (2016) found that learning styles affected class performance. For example, balanced visual/verbal learners were more likely to be successful F2F than verbal learners, while verbal learners were more likely to succeed online than balanced learners.

Concerning other learning outcomes, e.g., learner satisfaction and learning motivation, results comparing online with F2F or hybrid with F2F have not shown consistent differences (Arbaugh, 2014). In perhaps the most comprehensive single study based on over 5,000 courses taught by over 100 faculty members over a period of 10 academic terms, Cavanaugh and Jacquemin (2015) found minimal differences in grade-based student performance between online and F2F student samples. Arbaugh (2014) also noted that typically studies do not compare all three delivery modes simultaneously. The present study used undergraduates taking at least one online or hybrid class and asked what classroom environment delivery mode they were most comfortable in, i.e., online, hybrid or F2F. Three of the four outcomes measured have not been as extensively studied in prior research, i.e., perceived favorability of online/hybrid courses (PFoOC), intent to recommend online/hybrid courses, and timely graduation. In addition, research controlling for variables that might also affect these outcomes is summarized, prior to the study's research question.

### Measuring PFoOC

Prior research has asked about general learning comparisons between online versus F2F courses. For example, Eom, Wen and Ashill (2006, p. 233) asked about a general learning comparison between online and face-to-face courses in their three-item measure, (e.g., "I feel like I learn more in online courses than in face-to-face courses"). One item from Sun, Tasi, Finger, Chen and Yeh's (2008, p.1198) three-item "e-learning course quality" scale was "conducting the course via the Internet improved the quality of the course compared to other courses." Daymont, Blau and Campbell (2011, p.162) used one item to measure preference for online course delivery (versus face-to-face), "I would have registered for the online section if there had been space

available in the online section of this course.” However, prior studies have not compared specific features of online/hybrid versus F2F, for example, video lectures versus class lectures, written discussion board versus classroom participation, and live online discussion versus face-to-face classroom discussion. It is important to directly compare these specific features to measure the “integrity” of a course (Daymont et al., 2011), i.e., approximating the same content and process in an online or hybrid course as the F2F equivalent course. Using these specific item comparisons, Blau and Kapanjie (2016) found that the four-item PFoOC scale had a Cronbach alpha of .91 and .89 at two separate times. Cronbach alpha is a measure of internal consistency (or reliability). Ideally a measure should have an internal consistency of at least .70 (Nunnally, 1978), with a still higher number (e.g., .80, .90) indicating greater reliability.

### **Less Prior Research Focusing on Intent to Recommend and Perceived Timely Graduation**

Prior research (Endres, Hurtubis, Chowdhury & Frye, 2009) investigated the relationships of five different online student course satisfaction facets (faculty practices, course materials, learning practices, student-to-student interaction, and online tools) to their recommendation intentions. Endres et al. (2009) found that student satisfaction with faculty practices, learning practices and course materials were each positively related to intent to recommend the online course to other MBA students. Only MBA students taking online courses were sampled. The impact of preferred classroom environment delivery mode on perceived timely graduation has not yet been empirically tested.

### **Controlling for Background, Technological, and Course Variables**

Arbaugh (2005) presented a model for testing the increasing impact of three variable sets on student perceived online learning: (1) control variables (e.g., age, number of prior online courses taken); (2) technological variables (e.g., perceived ease of use); and (3) pedagogical/course variables (e.g., perceived course interaction). More recent studies, (e.g., Cavanaugh & Jaquemin (2015), Haughton & Kelly (2016), and Helms (2014)) have collectively controlled for background variables including: grade point average (GPA), number of prior online courses, age, and current course load. Two pedagogical variables—student motivation and instructor effectiveness—can also be important to control for (Sebastianelli, Swift & Tamimi, 2015). Student motivation was found to have a positive impact on user online course satisfaction (Eom et al., 2006). Such motivation can be measured by students’ perceptions of hours spent preparing for a class. Instructor effectiveness (e.g., course organization, interaction with students) can impact online course student satisfaction (Johnson & Palmer, 2015). Controlling the impact of background, technological, and course variables when investigating the impact of preferred classroom delivery mode on outcomes allowed for stronger inference about the impact of classroom delivery mode. This study’s design controls for seven variables: (1) age, (2) GPA, (3) number of prior online/hybrid courses taken, (4) current class load, (5) number of hours spent preparing for class, (6) perceived ease of use and (7) instructor effectiveness. Given the lack of prior empirical research, this study asked the following general research question (RQ): After controlling for seven variables, will there be differences between online versus hybrid versus F2F preferred classroom environment delivery modes on four perceived outcomes: PFoOC, recommend online/hybrid course, learning & timely graduation?



## Method

### Sample and Procedure

In the fall of 2015, all business undergraduate students ( $n=3,292$ ) enrolled in at least one online or hybrid course were contacted by school email address and asked to voluntarily fill out an online survey. Permission for data collection was granted by the University Institutional Review Board. The business school is part of a large urban state-supported University located in the mid-Atlantic region of the United States. As an incentive to voluntarily fill out the online survey, two prizes were offered, i.e., the choice of an Apple or Android watch, with the two winners to be chosen by random number lottery. Prior research has suggested that incentives can improve online survey response rates (Fan & Yan, 2010). A student could fill out a survey for each different online/hybrid course he or she was taking and the student's name was entered in the lottery for each completed survey. Only respondents who completed a survey were eligible to win. One general survey reminder was sent after several days. Six hundred and thirty-eight students ( $N = 638$ ) filled out at least part of the online course survey. This represents a 19% response rate ( $638/3,292$ ). Generally, participating students were juniors or seniors (69%), taking one (54%) or two (14%) online courses, along with traditional classes. As a "mixed delivery course format" sample, (i.e., taking face-to-face (F2F) as well as online/hybrid courses), this allowed respondents to directly compare these courses. Eighty-six percent of the sample consisted of full-time students (at least 12 credit hours/semester). Eight percent of the sample was taking one hybrid course. Fifty-eight percent of the respondents were white (42% non-white), and 48% were male. The survey was posted near the end of each course for one week.

The same procedure was followed in the spring of 2016, with 546/2712 (20%) filling out at least part of the online course survey. A similar breakdown to the fall sample was found for the spring sample, e.g., 58% taking one and 15% taking two online courses; 90% of the sample were full-time students. Fifty-six percent of the respondents were white (44% non-white), and 48% were male.

### Instrumentation

Survey content was developed primarily based on a literature review, and available measures were adapted when possible. Prior to survey administration, a small pilot test of item content for the measures below was conducted among two business school online program faculty and two interning business undergraduates. Several survey iterations were conducted to reduce the length of the survey. Prior research working with college student samples suggests that shorter duration (e.g., less than 13 minutes for online survey completion time) results in a higher response rate (Fan & Yan, 2010). All measures used a seven-point Likert response scale, (1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = neither disagree nor agree, 5 = somewhat agree, 6 = agree, and 7 = strongly agree) unless otherwise noted. Cronbach alpha, which is a measure of internal consistency (or reliability), is reported below for each multi-item measure.

### Measures

**Control variables.** Seven variables were measured: age; GPA; number of prior online/hybrid courses taken; current class load; number of hours a week spent preparing for class; ease of use; and instructor effectiveness. Age was measured in yearly response categories, from 1–18 years old or less to 34–51 or older. GPA (cumulative) was measured in incremental tenth response categories, e.g., 2.0, 2.1, where 1 = less than 2.0 to 22 = 4.0. Number of prior online/hybrid courses taken was measured from 0 to 9 or more. Current class load was measured

from 1 to 6 or more. Number of hours a week spent preparing for class (including completing course assignments) was measured from 1 = less than one to 7 = 8 or more. *Ease of use* was measured using six items. Three technology tools used in online/hybrid courses were measured: (1) Blackboard/Canvas, (2) WebEx, and (3) Discussion Board (either Blackboard or Edmodo). Each of these three tools was assessed using two different lead-in phrases, adapted from Arbaugh (2005): (1) “each tool is/was easy for you to use, i.e., you are comfortable using it” and (2) “each tool was useful, i.e., that it helped you do well in your course.” In addition to the 7-point response scale noted above, an eighth response option, i.e., “Not Applicable,” was offered. If respondents selected this option, it was coded as missing data. Table 1 shows the survey items for multi-item measures. Using the two lead-in phrases and three technology tool items together, a six-item “perceived ease of use” scale was formed. Cronbach alpha for this scale was .85 for the fall sample and .89 for the spring sample. Two items adapted from Sebastianelli et al. (2015) were used to measure instructor effectiveness. Cronbach alpha for this scale was .77 for the fall sample and .81 for the spring sample.

**Preferred classroom environment delivery mode.** Undergraduates were asked “in general, what is the most comfortable classroom learning environment for you (please select one choice below):” where 1 = online, 2 = hybrid (combination of online and face-to-face classes), and 3 = face-to-face (F2F).

**Outcomes.** Four variables were measured using multi-item measures: perceived favorability of online/hybrid courses (PFoOC); intent to recommend online/hybrid courses; perceived learning; and timely graduation. Items are shown in Table 1. *PFoOC* (versus F2F) was measured using 4 items and responses were made using the following scale: 1 = very inferior to 7 = very superior. Any “not applicable” response to an item was coded as missing data. Cronbach alpha for this scale was .85 for the fall sample and .90 for the spring sample. Intent to recommend online courses was measured using two study-specific items. Cronbach alpha was .76 for the fall sample and .81 for the spring sample. Two items adapted from Alavi (1994) were used to measure perceived learning in online/hybrid course. Cronbach alpha for this scale was .76 for the fall sample and .87 for the spring sample. Timely graduation was measured using two study-specific items. Cronbach alpha was .76 for the fall sample and .80 for the spring sample.

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#### *Ease of Use*

1. Blackboard/Canvas is/was easy for you to use, i.e., it is not difficult, you are comfortable using it
2. WebEx is/was easy for you to use, i.e., it is not difficult, you are comfortable using it
3. Discussion Board (either Blackboard or Edmodo) is/was easy for you to use, i.e., it is not difficult, you are comfortable using it
4. Blackboard/Canvas was useful, it helped you do/perform well in the course
5. WebEx was useful, it helped you do/perform well in the course
6. Discussion Board (either Blackboard or Edmodo) was useful, it helped you do/perform well in the course

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*Table 1.* Survey Items for Multi-Item Measures

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*Instructor Effectiveness*

1. My online/hybrid course instructor responded promptly when I had questions or concerns
2. My online/hybrid course instructor provided useful feedback about exams, projects, papers, assignments

*Perceived Favorability of Online/Hybrid Courses*

1. Compared to face-to-face lectures, the high-quality video lectures in my online/hybrid course were
2. Compared to face-to-face class discussions, the live online WebEx sessions in my online/hybrid course were
3. Compared to face-to-face class participation, the online discussion boards in my online/hybrid course were
4. Overall compared to face-to-face classes, this online/hybrid course was

*Intent to Recommend Online/Hybrid Courses*

1. I would recommend this on-line/hybrid course to other students
2. I would recommend taking other on-line/hybrid courses in general to students

*Perceived Learning*

1. This online/hybrid course increased my learning ability to analyze and critically evaluate ideas and issues
2. I acquired new skills in this online/hybrid course

*Timely Graduation*

1. Taking this on-line/hybrid course will help me to graduate in a timely manner
  2. On-line/hybrid courses can help students to graduate sooner
- 

*Table 1 (cont.)* Survey Items for Multi-Item Measures**Data Analyses**

All data analyses were done using SPSS-PC (SPSS, 2013). Using list-wise deletion, missing data across all studied variables reduced the complete data sample size to  $n = 264$  for the fall sample, and  $n = 272$  for the spring sample. This deletion also included multiple submissions from the same person in each sample, to eliminate autocorrelation as a bias (Stevens, 1992). Inspection of the fall and spring data sets showed two consistent significantly mean ( $M$ ) differences between partial—versus complete—data samples. Complete-data respondents had a lower GPA ( $M = 3.2$ ) and were younger ( $M = 22$  years) versus incomplete data respondents (GPA,  $M = 3.3$ ; Age,  $M = 23$  years). Multivariate analysis of covariance (MANCOVA) was used to initially test the research question for the fall and spring samples. The seven control variables noted in the Measures section were used as covariates to control for their impact on the dependent variables. Prior to performing multivariate analyses, Box's test for equality of covariance was performed (Stevens, 1992). The independent variable was preferred classroom environment

delivery mode, and the split for the fall sample (n=264) was: online (n = 61); hybrid (n = 97) and F2F (n = 106). For the spring sample (n = 272) the split was: online (n = 58); hybrid (n = 92) and F2F (n = 122).

An overall multivariate test was performed. If that test was significant, this then allowed for testing the impact of delivery mode on each outcome. If this test for the impact of delivery mode on each outcome was significant, this then allowed for pairwise comparisons of delivery mode groups (Stevens, 1992). There are different post hoc pairwise group comparison test options, such as least significant difference (LSD) and Scheffe. The LSD test is generally regarded as too liberal, however, because it does not control for family-wise error rate (FWE), while Scheffe is generally regarded as too conservative because it uses a single range value for all possible comparisons, not just pairwise group comparisons (Stevens, 1992). An acceptable, common post hoc pairwise group procedure in SPSS-PC, controlling FWE when comparisons are independent in a research design (as here), is the Sidak test (Stevens, 1992), which was used.

## Results

### Descriptive Statistics for Control Variables

Table 2 reports the background variables' descriptive statistics for the complete data, fall and spring samples. Across both samples, there were very similar self-reported cumulative GPAs and age, and a natural increase from fall to spring in prior online/hybrid courses. Instructor effectiveness was rated slightly higher in the fall, while current course load, number of hours per week spent preparing for class, and ease of use were slightly higher in the spring sample.

Variable	Fall, 2015, n = 264	Spring, 2016, n = 272
Age, Mean (range)	M = 22.5 (range 18 to 51 plus)	M = 22.7 (range 18 to 51 plus)
Self-reported cumulative GPA, Mean (range)	M = 3.25 (range 2.0 to 4.0)	M = 3.22 (range 2.0 to 4.0)
Prior Online/Hybrid Courses, Mean (range)	3.01 (range 0-18)	4.13 (range 1-19)
Current Course Load, Mean (range)	4.42 (1-6 or more)	4.59 (1 – 6 or more)
Number of Hours/Week Spent Preparing for Class, Mean, (standard deviation) <sup>a</sup>	3.46 (1.31)	3.59 (1.22)
Ease of Use, Mean (standard deviation) <sup>b</sup>	5.74 (1.16)	5.85 (1.15)
Instructor Effectiveness, Mean (standard deviation) <sup>b</sup>	5.52 (1.28)	5.45 (1.36)

<sup>a</sup>Number of hours/week spent preparing for class, 1 = less than one to 7–8 or more

<sup>b</sup>Ease of use; Instructor Effectiveness, 1 = strongly disagree to 7 = strongly agree

Table 2. Descriptive Statistics for Background Variables – Fall 2015 and Spring 2016

### Test of Research Question

The research question asked if there were differences between online versus hybrid versus F2F preferred classroom environment delivery modes on four perceived outcomes: PfoOC, recommend online/hybrid course, learning, and timely graduation. Table 3 reports the univariate tests on each outcome, and cell mean paired comparisons by preferred classroom environment delivery mode for the fall and spring samples. Prior to these results, all reported overall multivariate test results, testing the impact of delivery mode while controlling for the seven covariates (MANCOVA) were significant at  $p < .01$ . The eta-squared results in parentheses give an estimate of the percentage of variance accounted for in the dependent variables by delivery mode (Stevens, 1992). For the fall sample: Wilk's lambda,  $F = 4.91$  (7%); Pillai's trace,  $F = 4.76$  (7%); and Hotelling's trace,  $F = 5.06$  (8%), and for the spring sample: Wilk's lambda,  $F = 7.86$  (11%); Pillai's trace,  $F = 7.48$  (11%); and Hotelling's trace,  $F = 8.24$  (11%). With multivariate significance found, univariate results are then shown in Table 2.

Outcomes <sup>a</sup>	PfoOC			Recommend		
	F = 16.13**			F = 5.40**		
Classroom Environment – Cell Means	(1)	(2)	(3)	(1)	(2)	(3)
(1) Online (n = 61)	4.79 <sup>c</sup>	4.50 <sup>c</sup>	3.86 <sup>d</sup>	5.93 <sup>c</sup>	5.84 <sup>c</sup>	5.45 <sup>d</sup>
(2) Hybrid (n = 97)						
(3) Face-to-Face (n = 106)						
<i>Spring 2016 (n = 272)</i>	F = 20.26**			F = 14.72**		
Classroom Environment – Cell Means	(1)	(2)	(3)	(1)	(2)	(3)
(1) Online (n=58)	4.84 <sup>c</sup>	4.57 <sup>c</sup>	3.76 <sup>d</sup>	6.09 <sup>c</sup>	5.76 <sup>c</sup>	5.21 <sup>d</sup>
(2) Hybrid (n = 92)						
(3) Face-to-Face (n = 122)						
Outcomes <sup>a</sup>	Learning			Graduate		
<i>Fall 2015 (n=264)</i>	F = .20			F = 1.89		
Classroom Environment – Cell Means	(1)	(2)	(3)	(1)	(2)	(3)
(1) Online (n = 61)	5.60	5.56	5.50	5.72	5.52	5.45
(2) Hybrid (n = 97)						
(3) Face-to-Face (n = 106)						
<i>Spring 2016 (n = 272)</i>	F = 9.53**			F = .95		
Classroom Environment – Cell Means	(1)	(2)	(3)	(1)	(2)	(3)
(1) Online (n=58)	5.59 <sup>c</sup>	5.58 <sup>c</sup>	5.02 <sup>d</sup>	5.71	5.65	5.48
(2) Hybrid (n = 92)						
(3) Face-to-Face (n = 122)						
<sup>a</sup> Outcomes – PfoOC = Perceived Favorability of Online/Hybrid Course; Recommend = Intent to Recommend Online/Hybrid Courses; Learning = Perceived Learning; Graduate = Perceived Timely Graduation; all items measured on 7-point response scale						
<sup>b</sup> Within each outcome, cell means that do not share the same superscript <sup>c</sup> versus <sup>d</sup> are significantly different at the 0.05 level by the Sidak post hoc test						
** $p < .01$ ;						

Table 3. Univariate Tests on Outcomes and Cell Means by Preferred Classroom Environment for Fall 2015 & Spring 2016 Samples

The fall and spring results are consistent for three of four outcomes. Significant univariate F tests ( $p < .01$ ) were found for PFoOC, intent to recommend online/hybrid courses, and perceived timely graduation. The significant univariate F for PFoOC (Fall,  $F = 16.13$ ; Spring,  $F = 20.26$ ) allowed for pairwise cell mean comparisons. The cell means for the online (Fall, 4.79; Spring, 4.84) and hybrid (Fall, 4.50; Spring, 4.57) preferred classroom environments were both significantly higher than the F2F cell means (Fall, 3.86; Spring, 3.76). The significant univariate F for intent to recommend online/hybrid course (Fall,  $F = 5.40$ ; Spring,  $F = 14.72$ ) allowed for pairwise cell mean comparisons. The cell means for the online (Fall, 5.93; Spring, 6.09) and hybrid (Fall, 5.84; Spring, 5.76) preferred classroom environments were both significantly higher than the F2F cell means (Fall, 5.45; Spring, 5.21). The online cell means were slightly higher than the hybrid cell means on these two outcomes but there were no significant differences. There was not a significant univariate F test for perceived timely graduation for either the fall ( $F = 1.89$ ) or spring ( $F = .95$ ) samples. For perceived learning, inconsistent results were found. While the univariate F test was not significant for the fall sample ( $F = .20$ ), it was significant for the spring sample ( $F = 9.53$ ). Following up on this significant F test result for the spring sample showed that the cell means for the online (5.59) and hybrid (5.58) were higher on perceived learning than the F2F cell mean (5.02). Thus overall, there is partial support for the research question.

## Discussion

There has been little online research thus far empirically testing undergraduate students' perceived favorability of online/hybrid courses (PFoOC), intent to recommend online/hybrid courses, or impact on perceived graduation. By controlling for seven covariates first, stronger inference can be made about the impact of preferred classroom environment delivery mode on each outcome. Results consistently showed that online and hybrid preferred classroom delivery modes each had higher PFoOC and intent to recommend online/hybrid courses than undergraduates in the F2F preferred delivery mode. However, there was no impact for delivery mode on perceived graduation. Inconsistent results were found for impact of preferred delivery mode on perceived learning. Overall, preferred delivery mode accounted for 7% of the variance in these four outcomes for the fall sample, and 11% of the variance in the spring sample. These results suggest that classroom delivery mode can have an impact on student perceived outcomes.

Perceived favorability of online/hybrid over face-to-face courses (PFoOC) is a new scale and showed a strong reliability (Nunnally, 1978). The items within this scale made more specific comparisons, i.e., video lectures versus class lectures, written discussion board versus classroom participation, and live online discussion versus face-to-face classroom discussion versus prior measures which are more general (Daymont et al., 2011; Eom et al., 2006; Sun et al., 2008). Future research using mixed course delivery format samples, i.e., students taking both face-to-face and online or hybrid classes, can utilize this perceived favorability measure for direct comparison.

## Limitations and Directions for Future Research

There are several study limitations to acknowledge. Ideally, the way to study PFoOC would be to have the same instructor across each different course delivery of the same course. This would better control for instructor effectiveness. Instead, instructor effectiveness was measured as a covariate. There were lower cell size frequencies, especially for the online preferred classroom environment delivery mode. Both fall and spring samples were business undergraduates at a large urban state university. Testing this study's results using other samples, e.g., private, small college,

non-business undergraduates, is important to see if there is generalizability. All data were self-report. A one-factor test (Podsakoff, Mackenzie, Lee & Podsakoff, 2003) showed that for the fall sample, six factors had eigenvalues of at least one, and that the first factor accounted for 25% of variance. For the spring sample, six factors with eigenvalues of one were also found with the first factor accounting for 31% of variance. This indicates that method variance, while an issue, is not an overriding limitation. Future research collecting non-self-report data, e.g., examination or final course grades, would be helpful. Despite the use of incentives, there was a large loss in complete-data sample size. One option to consider is requiring a respondent to complete a survey page before being allowed to continue to the next page.

### **Practical Implications and Conclusions**

Beyond programs that are completely online, growing numbers of traditional F2F classroom undergraduates are taking online or hybrid courses as part of their education (Comer et al., 2015). Keeping course integrity or equivalence between F2F and online/hybrid course sections is important (Daymont et al., 2011). For example, if group projects are important in a F2F section of a course, such group projects should be kept in online/hybrid sections of that course. Classroom delivery mode had a significant impact on two student perceived outcomes, PFoOC and intent to recommend. However, there was no impact on perceived timely graduation and there was a mixed impact on perceived learning. It was also found that there were no differences on any perceived outcomes between the online versus hybrid preferred classroom delivery mode samples. Yet these were the two smallest samples (versus F2F), so additional research with larger samples sizes for both online and hybrid preferred classroom delivery modes is clearly needed in future comparisons. Although there was no significant difference on perceived timely graduation, the cell means were consistently highest for the online, then hybrid, and finally, F2F samples. As noted earlier, research has shown a decrease from 1991 to 2012 (Raju & Schumacker, 2014) in the percentage of students graduating within five years (from 54.4% to 51.9%). Therefore, the impact of offering increased online and hybrid course sections on not just perceived graduation but persistence towards graduation and actual graduation rates needs to be further studied.

Online courses offer students a way to conveniently take college classes without having to make the trip to campus. For working adults, veterans who are getting ready to take traditional classes, or those students that want to take a class during the summer while away at an internship, online classes allow them the flexibility they need in their busy schedules to persist towards graduation. Carefully constructed online classes, including consistent and organized syllabi, tests, and instruction have been recommended to increase military students' persistence (Mentzer, Lowrie Black & Spohn, 2015).

The mixed impact of classroom environment on perceived learning also suggests follow-up research. Including additional perceived learning items would be useful (Alavi, 1994), as well as recognizing that student learning styles can affect their performance across different classroom delivery environments (Fendler et al., 2016). Considering course-level factors, such as quantitative versus qualitative or introductory versus advanced, may also impact student perceptions of their online learning (Comer et al., 2015).

Undergraduates who preferred F2F classroom delivery had the lowest means on both PFoOC and intent to recommend online/hybrid course. One way to help increase PFoOC and intent to recommend for F2F undergraduates would be to perhaps bring specific features of an online/hybrid course into an F2F course. For example, making video lectures available to F2F

students to help them review covered course materials as they prepare for exam. Another application could be to use a discussion board in a F2F class as an alternative counting towards class participation. Undergraduates may complain about a F2F classroom participation requirement, and a discussion board would benefit students in a F2F classroom who are either more introverted or need more time to reflect before they participate (Daymont et al., 2011).

How can a university or college encourage F2F-preference undergraduates to voluntarily “try” an online or hybrid class? Offering “ease of technology use” seminars at convenient times and locations for students is one way, for example, the application of social networking sites as a learning/teaching tool such as Facebook (Wang, Lit Woo, Lang Quek, Yang & Liu, 2012). The transition for an undergraduate used to taking only F2F courses may be easier if starting with a hybrid course, as opposed to an online course, since a hybrid has some F2F class meetings. If resources allow, put first-time online or hybrid undergraduates in smaller sections of a course and also try to put the “best” online/hybrid instructors in these “first timer” classes. The Student Online Learning Readiness (SOLR) scale (Yu & Richardson, 2015) can help to determine undergraduate readiness for online or hybrid class learning. Stronger F2F undergraduates’ PFoOC should then increase their likelihood of recommending such classes to their peers.



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# Compensation Still Matters: Language Learning Strategies in Third Millennium ESL Learners

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## Abstract

Digital media play enormous roles in much of the learning, communication, socializing, and ways of working for “Net-Generation” learners who are growing up in a wired world. Living in this digital era may require different ways of communicating, thinking, approaching learning, prioritizing strategies, interpersonally communicating, and possibly developing compensatory techniques for information gaps among other categories of Language Learning Strategies. The Net-Geners, therefore, need new skills and new strategies to perform successfully as learners and workers. This study uses a mixed-methods approach that includes concurrent quantitative and qualitative data (i) to identify the Net-Generation learner’s strategy preferences based on the “Strategies Inventory for Language Learning” (SILL) categories currently considered the most comprehensive strategy inventory and (ii) to identify possible emergent compensation strategies among Net-Geners, as a comprehensive study of the strategies used by the Net-Geners is clearly beyond the scope of this article. The results indicate that compensation strategies have undergone a number of modifications and are used differently by the Net-Geners in order to compensate for their knowledge gap and to help enhance their ESL learning.

*Keywords:* Net-Generation, modification, emerging, language learning strategies, compensation strategies, ESL

Shakarami, A., Hajhashemi, K. & Caltabiano, N.J. (2017). Compensation still matters: Language learning strategies in third millennium ESL learners. *Online Learning*, 21(3), 235-250.  
doi: 10.24059/olj.v21i3.1055

## Introduction

### The Net-Generation

To date, the research in the field of language learning strategy has attempted to increase our knowledge about the processes learners employ within the classroom context, the dominant setting for learning over the last two decades, to develop their skills in a second or foreign language (Ardasheva & Tretter, 2012; Breen, 2014; Dörnyei & Ryan, 2015; Rezaei, Derakhshan, & Bagherkazemi, 2011; Tang & Tian, 2014; White, 1995). The Net-Generation language learners seem to largely neglect outside criteria that may impact the language learning process. Based on research findings, language learning strategies (LLS) differ relative to learner factors such as the respondents’ level of proficiency (Chamot & Kupper, 1989; Hajhashemi, Shakarami, Anderson, Yazdi-Amirkhiz, & Zou, 2013; Radwan, 2011; Salahshour, Sharifi, & Salahshour, 2013) and

gender (Dunne & Martin, 2006; Radwan, 2011; Salahshour et al., 2013). As education has embraced the digital learning environment, there has been a commensurate increase in the proliferation of learner strategies. According to Oxford (1990), compensation strategies refer to the learner finding synonyms from the context of the reading and relying on non-verbal communication, such as gestures, to communicate meaning when the exact meaning of a statement is not understood. Compensation strategies may include the use of emoticons to convey meaning in the digital media. Emoticons are the iconic images used in various social networking sites to show emotions. Identification of possible emerging new compensation strategies are the main concern of this study. It is presumed that the new millennium learners and workers may need new skills and strategies to perform successfully in the readily accessible knowledge. It can be argued that “Net-Generation” (Oblinger & Oblinger, 2005) learners, who function in an era when much of the learning, communication, socializing, and ways of working take place through digital means may require new ways of thinking, ways of approaching learning, strategies, and priorities to compensate for their information gaps.

### **Language Learning in the Net-Generation**

In order to understand Net-Generation language learning it is important to consider some of the theoretical perspectives of both first and second language acquisition theories. First, the theories on first language acquisition will be presented in order to provide a brief historical context. The systematic study of language began in earnest in the 19<sup>th</sup> century. An early theory regarding first language acquisition is the Critical Period Hypothesis. The Critical Period Hypothesis, credited to Lenneberg working in the late sixties (see Heidar, 2012), sets a beginning age for language acquisition at around 2 years and a proposed end point of around puberty. The work of the behaviourists influenced linguists to conceive of language acquisition as the acquisition of habits through imitation and stimulus-response conditioning. The notion of individuals possessing a universal grammar containing a language acquisition device ushered Noam Chomsky’s rationalist approach to language acquisition. Empiricists such as Piaget considered language acquisition as a developmental process, where children noted patterns within their environment and engaged in sense making of the world around them. Later, cognitivists emphasized the role of mind. According to cognitive theory, information is selected, organized, and integrated into prior understanding. In this way, learners accumulate new knowledge and have the capacity for reflective practice (Chamot, Barnhardt, El-Dinary, & Robbins, 1996; Chamot & O’Malley, 1994; Mitchell, Myles, & Marsden, 2013; Prakongchati, 2007; Shakarami, Abdullah, Abdullah, & Hoon, 2011). Learning in cognitivism involves the deliberate use of new material to modify and update pre-existing beliefs and ideas (Wenden, 1991). Other theories, like social cognitivism (Bandura, 1992) and social constructivism (Vygotsky, 1978), build on learners’ interaction with environment and culture and their individual reflection for effective learning.

The theoretical framework for this study, which is the Constructivist philosophy of learning, is based on the premise that individuals construct their knowledge through their interaction with the environment. The basic idea is that learners construct their own knowledge by associating new information with already existing cognitive knowledge. The importance of learners’ interaction with their social and physical environment is emphasized. The learner is considered central in the learning process while the teacher is seen as a facilitator or a guide (Vassiliki & Marie-Josee, 2005).

In a paper by Chapelle (2009), a number of second language acquisition theories were presented. Of particular interest were the psycholinguistic and the general human learning theories. Processability theory argues “that certain hypothesized psycholinguistic processes are responsible for comprehension and acquisition” (Gass, 1997 cited in Chapelle, 2009, p. 745). Input processing theory focuses on how the language is processed and how form-meaning connections are made (VanPatten, 2015). Within the general human learning theories, two perspectives, namely, Ellis’s associative-cognitive CREED framework (cited in Mitchell et al., 2013), and DeKeyser’s skill acquisition theory (DeKeyser, 2015), appear pertinent to this discussion. The associative-cognitive CREED framework relies on learners’ recurring exposure to language examples. Skill acquisition theory relies on learning through constant practice and uses cognitive psychology principles. Net-Generation learners have the ability to connect to others without time and space restrictions. Their constant connection leads to frequent exposure, more interactions, and, ultimately, better language learning. Furthermore, Net generation learners have a tendency toward online and digital facilities which can help them learn better. Learners, to practice their English language, use live chat rooms, social networking, and other online connective measures to get in touch with others, including their friends, more knowledgeable peers, teachers, and other native speakers. Moreover, the widespread use of digital gadgets, including smart phones, makes it both necessary and comfortable for users to learn English.

Net-Generation language learners, faced with the requirements for, and opportunities of, a more self-directed environment, need to develop an awareness of the process of language learning and an understanding of their role in the shared learning spaces. Hauck (cited in Hauck & Hurd, 2005) points out that “online language learning makes learners aware of themselves, their attitudes, aptitudes and beliefs and of the affordances of the learning environment and the degree to which they demonstrate flexibility and control” (p. 4). Digital age language learners are more self-directed and can determine the types and arrangement of tasks they choose to work on and disregard tasks or sections of materials they do not consider useful for the development of their target language abilities. Additionally, the characteristics of Net-Generation learners (their collective and team-based tendencies), make it comfortable and preferable for them to work, play, talk, and learn as a group rather than as isolated individuals. This could apply to language learning settings as well.

Knowledge for digital world learners is constructed, not transferred, and learning is considered as an active, creative, and socially interactive process (Hampel & Baber, 2003, p. 39). The roots are in the Constructivist movement of Cognitive Psychology, which argues that through experience, maturation, and interaction with the environment, people construct their world understanding (Rovali, 2004). Based on the Constructivist’s point of view, the learner is an “active processor of information,” in sharp contrast to Behaviourism, which considers the learner as a mere recipient of information. In the Constructivist’s view, all individuals build their own concept of reality and, therefore, disparate ways of knowing and describing are equally legitimate (Spivey, 1997)

This study follows the principles of constructivism regarding the exploration of knowledge and believes that students themselves should be responsible for their learning. Students should not be “spoon-fed” by teachers, and should be trained to feel responsible for their own learning and to explore the new language they learn. Therefore, this study takes “learning” and “ways to learn learning” as its main theme and wishes to replace this system for “teaching language.” In short, that is why the LLS were used in the study.

## **Language Learning Strategies**

Language learners often use learning strategies with the explicit goal of improving their knowledge and understanding of, and competence with, a target language. The strategies have been defined as the conscious thoughts and behaviours used by students to facilitate the accomplishment of language learning tasks and to personalize the language learning process (O'Malley & Chamot, 1990). Although Chamot (2005) suggests the use and instruction of strategies for the benefit of lower achievers in the classroom, which was possibly the primary objective of the strategies studies, research in the field has concentrated less on the ways LLS are utilized by pre-internet and especially Net-Generation learners. The first author studied the various ways LLS are used by the Net-Geners compared to strategies employed by pre-internet language learners reported in the literature and found that the strategy difference scope is widely stretched on all of the six strategy categories reported by Oxford (1990) for pre-internet language learners. The main concentration of this paper is on possible differences of compensation strategies used by Net-Generation language learners, because there is a need to understand how Net-Generation learners manipulate, express, and employ compensation learning strategies in an online environment where a lack of face-to-face contact may impair smooth communication flow.

## **Learning through Strategies**

Most of the taxonomies developed in the domain of LLS, even in the pre-internet era, placed emphasis on cognitive and metacognitive strategies with less attention to the compensational side of the learning process. Edstrom (2013) found that students confronted with the challenges of second language acquisition engaged in metacognitive activities such as “asking classmates, consulting reference materials, and modifying their original ideas to manage the task” (p. 274). How such metacognitive activities may translate with the use of digital devices is worthy of consideration. Furthermore, the verbal and nonverbal performances of the learners are downgraded as they compensate for information or knowledge gaps in the language learning process. In fact, communication of meaning through compensatory means is less a concern in the development of LLS inventories that are developed from their contemporary and dominant learning theories.

While emphasizing that language learning is not just a cognitive process and asserting that affective/social aspects of language learning are indispensable parts of LLS studies, Oxford (1989) developed her now widely used and comprehensive strategy inventory for language learning (SILL). The SILL encompasses six groups of LLS, including memory, cognitive, compensation, metacognitive, social, and affective strategies that interact in the enormous task of language learning. This study attempts to identify how Net-Generation ESL language learners use compensatory strategies while on forums, online discussions, interactions, and networking in the absence of eye contact and other facial gestures that seem necessary for nonverbal communication of meaning.

## **Methods**

### **Research Design**

The study employed a mixed-methods approach. It incorporated a questionnaire for the quantitative component, and used a semi-structured questionnaire to guide the in-depth interview for the qualitative component of the study. Quantitative instruments elicit numerical values which

show that some of the LLS, namely cognitive or metacognitive, were of greater use and implementation; however, this study had a more detailed and deeper objective, that is, to identify how compensation strategies were used or replaced in a setting with no face-to-face contact. It was therefore necessary to probe participants for information that has mostly been neglected thus far. Accordingly, an additional part, namely, analysis of online interaction in a language forum, was added to the research. In order to participate in the study, students were required to fulfil two inclusion criteria, namely, that they were educated under the new Malaysian system of high tech-based education, and that they were learning English as a second language in an academic setting.

### **Participants**

A randomly selected representative sample of 107 undergraduate Net-Generation students learning English as a Second Language (ESL) from the language faculty of a Malaysian university participated in the study. The selected classes were from language and ICT courses. Students were enrolled in a variety of subjects and had different language learning classes but were instructed together. They were all approximately 21 years of age. Although both genders (females (n=98, 91.6%); males (n=9, 8.4%)) participated, the sample was heavily skewed towards female participants. For the purpose of the qualitative component of the study, 20 participants were randomly selected from the original sample.

### **Materials**

In order to identify the participants' compensation strategy use and preferences, Oxford's SILL (1989) questionnaire was used, as it is the most frequently used and most comprehensive instrument to date (Cohen & Macaro, 2008; Hsiao & Oxford, 2002; Oxford, 1990). The selection of the Oxford SILL was based on the fact that the data provided by the SILL relates to what we already know about the learning strategies of "baby boomers" (Oblinger & Oblinger, 2005) and not the current Net generation in the literature. In fact, what is new here is that the data is elicited through other instruments, such as semi-structured interviews and observation of the online communication of the respondents in a forum. All the online conversations were saved on the university server to which the researchers were permitted access for the purpose of this research. New data emerged regarding the Net-Generation as a result of their inclination toward the use of internet and web-based activities. The only reason they are compared to the data gained from SILL is to find out what new aspects of already existing strategies or what possible new strategies are at the center of attention of the current Net-Generation language learners, considering digital affordances. Therefore, the use of SILL established a basis for comparison. Although the authors could have used the result of the research done by others for comparative purposes, they preferred to administer the SILL to re-establish already existing learning strategies and then compare results with new data from other research instruments of this research to observe trends. The qualitative data were obtained via a semi-structured questionnaire containing 25 items about the strategies students use in their online language learning environment. In particular, the focus was to ascertain how they compensate for any knowledge and information gaps, and how they communicate affect in the absence of face-to-face contact. Specifically, the open-ended items were: 1) When you need information or need an idea to solve a problem, what do you generally do? 2) What is your major source of information and ideas?

### **Data Collection Procedure**

All students completed the Oxford's SILL questionnaire in their own time. The sub-group of 20 students was organized into five groups of four students. They completed online interaction

texts regarding a language task in which they had to participate in an online forum and cooperate to find 30 ordinary language terms and their different meanings relevant to information and communication technology (ICT) as task 1. Data collected using the various methods were analyzed (i) to compare the qualitative data with SILL data, and (ii) to find the compatibility of the SILL compensation strategies with the needs of ESL learning in the digitally connected world of today, and (iii) to identify possible emerging compensation strategies among the Net-Generation ESL learners.

## Results and Discussion

Net-Geners' compensation strategy preferences were classified using Oxford's (1989) compensation strategy categories as a basis. The SILL results were then compared to qualitative data from the interview transcript excerpts and online interaction texts, thus ensuring the triangulation of data. Compensation Strategy preferences obtained from the SILL is ( $M=3.59$ ). According to Oxford's (1990) explanation, the strategy use is considered high if its mean value ( $M$ ) is between 3.5 and 5.0, medium for mean values between 2.5 and 3.4, and low for values between 1.0 and 2.4. Accordingly, the value figure for use of compensation strategies reported here is considered high. It should also be noted that all participants' names are pseudonyms and that the reported excerpts are reproduced verbatim except where indicated.

### Compensation Strategies

Compensation strategies as language problem-solving techniques consist of various mental or physical activities carried out by students to resolve any language learning problems they encounter, and are divided into *guessing intelligently* and *overcoming limitations in speaking and writing* (Oxford, 1990). Data from the SILL indicate the use of components of compensatory strategies as follows: Guessing ( $M=4.08$ ), Using gesture ( $M=3.97$ ), Paraphrasing ( $M=3.92$ ), Guessing the interlocutor's next word or sentence ( $M=3.22$ ), Coining words ( $M=3.18$ ), and Reading without looking up every new word ( $M=3.14$ ). However, comparison of the quantitative data with the findings of the other qualitative measures reveals some mild differences and modifications in terms of the compensation strategies, indicating some emerging trends in strategy use by the respondents, and possibly suggests the need to revamp current inventories in the field of LLS in the networked world.

The following comparison is based on Oxford's SILL (1989) that classifies compensation strategies into the following two groups respectively.

### Guessing Meaning

The guessing meaning strategy helps language learners to intelligently guess a word's meaning by using surrounding words as linguistic and non-linguistic cues.

### Using Linguistic Clues

In using the linguistic clues strategy, learners use "linguistic knowledge of suffixes, prefixes, and word order to guess meaning" (Oxford, 1990, p. 90). It is reported as a highly used strategy in the SILL data ( $M=4.08$ ). Study respondents reported guessing the meanings of unknown words by dividing them into their components, using their knowledge of the comprising parts, and adding them up again to comprehend meaning. For example, Sani reported dividing the word "inseparable" as being made of a "negative maker," a "stem that seems to be taken from separate"



and a “suffix,” altogether indicating “something you cannot separate.” Another student, Sina, in his online interactions posted, “[I]’m kinda outdated when it comes to computers~didnt even know what firewall means first when i bought a laptop, i just thought of a wall build to stop fire 😊”

Sina assumed the meaning of the word to be a wall or barrier to stop fire. He was right, as a firewall is designed to block some computer applications based on a set of commands.

A girl student posted to her group mate: “I come across term webinar, you think [it] is an ict term 🤔”

Her friend used the guessing strategy and answered, “Think is a word made of ‘web’ and ‘seminar’ meaning an online seminar 😊 let me double check !!! 😊” She divided the word into two parts, used her knowledge of each part and, by “putting things together,” guessed the meaning.

The guessing strategy seems to be used in both digital and printed media. However, the abundance of material in digital and online communications may increase the chance of encountering new words and result in greater opportunity for guessing meaning and, ultimately, for learning. Moreover, the abundance of blended and compound words emerging from new technology, such as “Widgets, Wiktionary, and Brexit,” increase more frequent guessing chances on the Net. It is also possible to check and confirm the accuracy of guesses immediately in online situations, thus enhancing the effectiveness of learning. The strategy, accordingly, seems to be effective and employed more often in online interactions and networking.

### ***Using Non-Linguistic Clues***

This strategy is defined by Oxford (1990) as “seeking and using clues that are not language-based in order to guess the meaning of what is heard or read in the target language and includes knowledge of context, situation, text structure, personal relationships, topic, or general world knowledge” (p. 49). The use of this strategy is reported at a medium level in the SILL data ( $M=3.14$ ). Study participants reported using various non-linguistic cues to compensate for missing knowledge, to guess the meaning of problematic parts, and to get a general view about the problem. The situation, interlocutor, register, and jargon can help the learners to get a rough meaning of the problematic part. For instance, Eren reported:

I was listening to [a] mentor in the church in a memorial ceremony and had problem understanding the word melancholy; actually I was not sure about its meaning although I had a rough guess like ‘sorrow’ as related to the situation. Later on I went to dictionary to check if my guess was correct.

In this case, the compensation strategy for missing knowledge was based on making association between place, interlocutor, and the context of the word’s use. The student reported checking for the meaning later on to confirm her guess and encouraged herself to use the word in her speech production.

Another student remarked, “I notice plot and theme of the story that always help me in online reading.”

Sang stated that she used the context and activity to understand meaning:

The first time I came across the expression ‘knife him’ in a game, I did not understand, I got it mean ‘kill him’ through motion in the game or the word ‘finish’ did not mean killing to me unless I saw the action

Although it appears that Net-Generation students make extensive use of this strategy, they seem to pay less attention to minor contextual aspects as a result of their global and holistic viewpoints. Net-Geners tend to be more field-independent and prefer to focus on the whole picture, leaving minor parts unnoticed, possibly through the abundance of information on the Net. For example, Wong Chi reported:

When I don't understand particular terms on the net, I would explore the meaning only if I find it is crucial in doing so. I highlight more on the overall picture and content to understand rather than the minor things in it

She emphasized checking online for the information *only* if it was necessary and that she used the general content to understand the meaning of the problematic parts.

Although data from the SILL indicate medium-level use of the strategy, qualitative data show that the strategy tends to be used more by the Net-Geners, possibly as a result of the abundance of various materials on the Net and increased exposure to information. They seem to like quick understandings of unknowns, use abundant linguistic and non-linguistic clues on the Net, and focus on a broad, conceptual meaning rather than minor points.

### **Overcoming Limitations in Speaking and Writing**

Strategies for overcoming difficulties in speaking and writing are divided into the following six types:

#### **Switching Back to Mother Tongue**

Oxford explains the strategy of switching back to mother tongue as “using the mother tongue for an expression without translating it in speaking” (1990, p. 94). As a compensation strategy, it is used when learners face difficulties while “speaking” in the second language. The strategy is not explicitly addressed in the SILL (Oxford, 1989) items. However, it was noted that some informants of the study used Malay words in their spoken communication that were impossible for the researcher to catch because of his unfamiliarity with Bahasa Melayu. For that reason, a co-rater (a Malaysian Master student of language) was asked to check the online English interaction texts for any possible trace of Malay words or structures used by the informants of the study. Based on Oxford's discussion, reverting to the mother tongue for pre-internet generations of learners tends to be associated with *oral* communication but data from this study show that Net-Geners use the strategy in their electronic “written” form as well. There seems to be little hesitation in using mother-tongue words in their second language online communication (considered as “speaking” for Net-Geners). For example, Rizah posted: “i sayang u lebih [ I love you more] laaaa..... hehehe.... 😊 just kidding...”

Another example comes from the way Nani addressed Mun and called her *cikmun* to mean ‘Miss Mun’ in her online post.

The language used in electronic interaction or discourse seems to be a variation of language in which grammatical norms of written language are carelessly breached and mixed with informal spoken language. In addition, the use of code switching is comfortably accepted in online communication, even in academic discussions, just as it would be in spoken interactions. Code switching as one of the communication strategies in which the learner switches back to his/her mother tongue to fill the linguistic knowledge gap to convey the message existed in the research data collection. Although primarily associated with the spoken language, code switching, surprisingly, was used to convey the message in the online written forum. Code switching caused

no trouble in online interactions, accepted by others with little complaint. This caused the authors to recognize code switching as an accepted means of communication in the online interactions. The authors generally believe that the Net-Geners are more flexible than previous generations and can accept and understand problematic issues with more ease. This flexibility may be the result of access to widespread sources and vast amounts of information which, at times, may conflict. As Tornow (1997) argues, “the past distinction between writing and talking is blurred in E-texts” (p. 1). There seems not to be a firm discrimination between the spoken and written forms of language in Net-Geners’ online interactions.

### ***Getting Help***

Oxford defines the getting help strategy as implicitly “asking someone for help in a conversation by hesitating or explicitly asking for the missing expression” (1990, p. 95). This strategy, however, is not explicitly addressed in the SILL (Oxford, 1989) items.

About 90 percent of the students indicated that they directly asked their online buddies to help them with their language problems. Data from open-ended questionnaire entries also supported the case. For example, one student posted, “I usually ask my online buddies for my language problems and ask them to let me know if I make mistakes.”

Another student posted, “[C]ould you please explain it to me... brainee [sic]..huhu..”

Similarly, Nash emphasized his almost constant online connection and queries from his online friends: “I ask my friends in the chat room where I spend most of my time.”

Social networking affordances seem to have increased the level of intimacy between Net-Geners, despite their geographical, and possibly social, distances, thereby encouraging them to reduce learning barriers and increase their language intake from accessed sources, authorities, and peers to simply ask for and share their language information with others.

Nearly 20 percent of participants indicated that they consult their lecturers for their language problems as well. The excerpt from Willi addresses the strategy: “I ask my friends and lecturers to help me with my language problems.”

Another student tried to help her friend and posted, “[A]ctually to come to think of it i'm confuse now. It's k i'll ask the lecturer and let you know 😊😊”

The importance of the classroom teacher as the source of information, ready to help students with their language learning problems, is highlighted in the reported excerpts.

Some students also reported going online and getting in touch with native English speakers. Easy access to native speakers of English and having ‘Net friends’ from a native English-speaking community is obviously possible as a consequence of Network development. This helps Net-Geners to improve their language learning and attain proximity to, and understanding of, the target language culture. The Internet has provided people all around the world with real-time communication possibilities through social networking facilities. In fact, everything and everyone seem just a few clicks away. Net-Geners can extensively use this rather new facet of the getting help strategy in their language learning procedure.

While in Oxford’s discussion, the strategy is limited to conversation that logically refers to face-to-face interaction due to the blurred distinction between writing and speaking in online discourse, the strategy tends to be highly used in the online interaction of the Net-Geners’ electronic written language as well. Net-Geners can easily get help from their peers, lecturers,

native speakers and, in some cases, through random online connections. For instance, lecturers can easily prepare, record, edit, and upload their lectures in small and manageable bites (e.g., using Camtasia) and give students the flexibility to listen or view the materials at any time. Discussion boards also give both students and lecturers the opportunity to share opinions, ask questions, and make comments through Internet communication. In addition, many lecturers use email, Tweeter, My Space and Facebook to interact with students and receive their questions. Online communication and limitless connection between Net-Geners seem to have developed a kind of camaraderie among them that allows for giving help and requesting information without awkwardness. Getting in touch with the lecturers seems also to be less problematic for Net-Geners because students can easily access their lecturers without time and space limitations through their posts, emails, or blogs.

### Using Mime and Body Movement

Using mime and body movement strategy is defined as using “physical motion, such as mime or gesture, in place of an expression during a conversation to indicate the meaning” (Oxford, 1990, p. 95). Data from the SILL indicate high use of this strategy among participants (using gesture,  $M=3.97$ ). Interview data show this strategy used to express intended meaning, to ask about problems, or even to get approval and confirmation about their understanding in face-to-face interactions. Pari, for example, remarked, “I use gestures, body movement, facial expressions, and hand movement in case I have problems understanding others or expressing myself.”

While the strategy use seems to pertain to face-to-face conversation in the SILL item, data from online interactions and interviews indicate frequent use of this strategy in the electronic environment. However, the absence of face-to-face contact in online interactions and chat rooms necessitate a variation of the strategy, and invites the use of compensatory measures such as emoticons.

Information query through icons and textual techniques is easily observed in the students’ online interactions where absence of direct eye contact brings communication of nonverbal information query to a halt. In response, Net-Geners frequently use emoticons and iconic language to ask for information. For example, Anis showed his bewilderment about the term ‘action maze’ by using an icon and four question marks and asked for information, “[A]nyone could explain it [action maze] to me???? 😊”

Iconic language was also used to represent facial expressions such as laughter, anger, and frowning. For example, Anadi, in order to show her consent, posted a laughing icon to her friend: “It is okay. Thanks for your concern 😊”

Happiness and consent are expressed in a more creative manner in Rosa’s post: “[A]big hand of applause!!!!!!!!!!!!!! 😊 awesome lists you have here! \^(^)/”

She used iconic language and also made creative use of exclamation marks and textual facilities to represent a happy icon.

Students frequently tend to use emoticons and other animation-driven textual techniques such as :- ) for smile, :-o for shock, :-( for frowning, and even more creative and complex ones such as \^(^)/ for happiness, @^\_^@ for blushing. The strategy use for Net-Generation language learners in this study seems to extend to written online communication and is not limited to face-to-face interaction.

### ***Adjusting or Approximating the Message***

Adjusting or approximating the message strategy is explained as “altering the message by omitting some items of information, making the ideas simpler or less precise, or saying something slightly different with similar meaning” (Oxford, 1990, p. 96). It seems to be consistent with the SILL item regarding the guessing the interlocutor’s next word or sentence with a reported medium-level use mean value of 3.22. The strategy as discussed by Oxford entails speaking as well as writing dynamics. However, in online communication, a new visual facet of this compensatory strategy emerged. Merik, for instance, reported, “In case of having problem expressing what I mean online, I may search for an image or picture and send it to the other party to make her understand.”

This strategy use was based on her justification that “a picture is more expressive in that it provides a mental image in the mind and conveys more meaning.”

Respondents believed that their vast and instant access to online materials make it possible to look for words or concepts while they are communicating online and sharing their ideas with others. For example, Cafren remarked, “When I am Facebooking, it’s easier to understand coz [sic] you see things, you can check online to learn and share it.”

The strategy use seems to be facilitated for the Net-Generation language learners with modern online affordances equipped with visual modes. They tend to use the pictorial mode of the strategy as a quick, exact, and expressive way of conveying the message, in that it may leave a long-lasting effect in their minds as well as that of their interlocutors, in online communications. This facet of compensation strategy is not explicitly addressed in the SILL (Oxford, 1989) and seems to emerge from the study.

### ***Avoiding Communication Partially or Totally***

“Avoiding communication partially or totally” is explained as “avoiding communication when difficulties are anticipated or encountered” (Oxford, 1990, p. 95). The strategy, although not addressed in the SILL items, is reported in the interviews. Students reported the strategy use both in face-to-face and online communications. For example, when Pari spoke about difficult words and complex English sentence structures, she simply said: “I prefer not to talk about difficult things.”

In online interactions, the strategy use seems more convenient for the Net-Generation language learners, as they are almost always connected with their friends through social networking interfaces. As a result of the absence of face-to-face contact and the feeling of embarrassment and awkwardness of not knowing what to say, they felt that it was easier to avoid unfamiliar or odd discussions or to avoid the conversation if they had language problems. For example, Aftim reported, “In online communication, I just skip the idea if I don’t know how to say it.”

Another student, Pari, believed that when she is online, it is easier to keep silent and not feel awkward when facing problems in expressing herself: “In the chat room, I just keep silent if the language is difficult for me to join.”

The strategy was first suggested by Oxford (1989) for speaking and oral communication but in this case, the strategy use seems to extend to online written discourse.

### ***Coining Words***

*Coining words* is defined as “making up new words to communicate the desired idea” (Oxford, 1990, p. 50). In the SILL data, it was reported as a medium-level use strategy ( $M=3.18$ ). Internet and widespread socialisation facilities have brought about new terms and conventions not previously found in the pre-internet era. Observation of online interaction texts reveals that the Net-Geners tend to use newly coined words or shortened forms of the words in online and digital communications to save time. Some examples are: TTFN (Tata for now), OMG (Oh my God), LOL (Laughing out loud), and SYL (See you later).

The respondents tend to use these recently coined words to facilitate their communication and also coined words of their own. For example, Adjernest said, “Last night I was ooVooing my mom who live [sic] in another country.”

When asked about “ooVooing,” she explained that “ooVoo” is an application that makes it possible to video chat on the net with 12 people simultaneously from all over the world. She added a suffix to the “noun” as if it were a “verb,” similar to what is done to “texting” for sending an SMS. The strategy use seems to be facilitated by wide access to the Internet and daily exposure to increasing compound and blended ICT words, which makes it easier for the Net-Geners to coin new words without feeling odd.

Communication, especially in its online form, seems impaired without coined words, signs, and icons. Their literacy and use appear to be a must for the Net-Geners’ online communication.

### **Conclusion**

As for the emerging compensatory strategies, it was reported that compensatory strategies were repeatedly used by study participants, but some modifications in the strategy use seemed to be applicable in the online communications of the Net-Geners in their language learning tasks. Guessing strategy tended to be used more in online interactions and networking due to the abundance of materials, and blended and compound words emerging from the new technology.

Non-linguistic cues tended to be used more by the Net-Geners, possibly as a result of their use of the digital games through which Net-Geners can quickly absorb the meaning of lexical items by use of plot and context. There seemed to be little hesitation in using mother-tongue words in their second language online written communication. This Code switching used to be characteristic of spoken language; however the borderline between the spoken language and its written form seem to be blurred (Tornow, 1997).

Social networking affordances seemed to have increased intimacy between Net-Geners in spite of their geographical and possibly social distances. They simply ask for, and share, their language information with others. Net-Geners extensively used this rather new facet of the getting help strategy in their language learning procedure. The new social networking applications make it possible for the learners of the digital era to comfortably ask for any unknown information and consequently, increase their competence. This increased knowledge, in turn, can lead to better performance, both in online and offline communication. Net-Geners feel free to ask questions and answer other learner’s questions, possibly as the result of more online interaction and networking.

Mime and gestures strategy pertained to face-to-face conversation in pre-internet learners for communication of feelings and information query. However, the absence of face-to-face

contact in online interaction and networking necessitated a variation of the strategy and invited the use of compensatory measures such as iconic language and stickers in the online written communication. The existence and application of iconic language, along with Net-Generators' creativity, led to the creation of new forms of icons with specific social meanings. Avoidance strategy use, on the other hand, seemed to extend to online written discourse, although it was first suggested for speaking. Of course, it seems much easier to withdraw from an online communication, possibly because of the lack of eye contact. Also, it seems very comfortable to *avoid* "avoidance strategy" as there is access to an abundance of information on the Net which could easily be Googled and used at lightning speed.

Net-Generators tended to use the pictorial and visual mode to adjust their message as a quick, exact, and expressive way of conveying their message. This seemed to be in harmony with their visual and pictorial tendency in their online and offline language learning. The visual inclination may have been formed as the result of playing online and digital offline games in which they have to gaze at the screen and actively watch for every single movement from the "enemy front" and quickly respond to it. This quality may have turned Net-Generators into super viewers who are very attentive and also ready to interact with their learning context. They seemed to enjoy using newly coined words to facilitate their communication and also to coin words on their own for ease in their online interactions.

### Implications

Net-Generators language learners have embraced new technology and have found ways to cope with its facilities and compensate for its limitations. As mentioned earlier, they seem to adopt networking for every act of their ordinary and academic life. Digital media and networking have become part of the habits and expectations of these Net-Generation learners. Their study and learning, therefore, cannot be exceptions. For the purpose of this study, i.e. the use of compensation strategies in the online forums, students were observed to communicate their non-verbal expressions in pictographic form, using emoticons or the iconic images to show their emotions to their interlocutor who is possibly far away from them both in terms of time and place. Although the Oxford SILL questionnaire seems deficient for the incorporation of digital compensation strategy items in the digital age and did not point to the considerations of this study, it is still compatible with the necessities of the new digital era, although, the item, "*\* In online communication, I use emoticons and other textual forms to express a lack of understanding and a need for assistance,*" is suggested for Inclusion in the SILL Compensation Strategies Category.

But many other compensatory concerns of SILL need modifications for the current Net-based language learning.

While the present findings suggest a need for the above addition or modification to existing items in the SILL categories, future and extended research on language learning strategies of Net-Generators may, in fact, point to a possible reconceptualization of the categories themselves and, conceivably, a new inventory for the language learning in the digital age. Such an undertaking is beyond the scope of this study but definitely requires further investigation. The findings may also show language educators and teachers ways to deal with their Net-Generation language students and to set their learning objectives accordingly.

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