The Effects of Student Engagement, Student Satisfaction, and Perceived Learning in Online Learning Environments

This manuscript has been peer-reviewed, accepted, and endorsed by the National Council of Professors of Educational Administration (NCPEA) as a significant contribution to the scholarship and practice of school administration and K-12 education.

Julie A. Gray
University of West Florida

Melanie DiLoreto
University of West Florida

Studies have shown that course organization and structure, student engagement, learner interaction, and instructor presence have accounted for considerable variance in student satisfaction and perceived learning in online learning environments through a range of pathways, although no research to date has tested the mediational relationship identified. This study expanded upon the existing literature about online learning and the variables that influence student satisfaction and perceived learning. The researchers investigated the relationships among course structure/organization, learner interaction, student engagement, and instructor presence on student satisfaction and perceived learning. The results of this study were intended to inform practice related to increasing retention and improving the quality of online teaching and learning.

ISSN: 2155-9635

Introduction

"The landscape of distance education is changing" (Eom, Ashill, & Wen, 2006, p. 215). As more universities are offering online courses it is important for faculty to consider the changing aspects of online learning environments, including course structure, learner interaction, and instructor presence (Allen & Seaman, 2015). One study in particular provided a model upon which to develop and build this study (Eom et al., 2006), although our study varied in methodology. For this study we investigated the effects of each of these aspects in relation to student perceptions of their learning and satisfaction. We further hypothesized that student engagement would be a mediating variable. We hope the findings of this study will inform practices related to increasing retention and improving the quality of online teaching and learning.

There were four primary objectives of this research study. First, the researchers reviewed existing studies and surveys about online learning environments, student engagement, course structure, learner interaction, instructor presence, and student perceptions of their satisfaction and improved learning in such environments. Second, a new instrument, the Student Learning and Satisfaction in Online Learning Environments (SLS-OLE), was developed after a pilot study and factor analyses were conducted (DiLoreto & Gray, 2015). Once the data were determined to be valid and reliable, the SLS-OLE was shared with all students enrolled in an online graduate program at a regional comprehensive university in the southeast of the United States (Gray & DiLoreto, 2015). Next, the data collected from this questionnaire were interpreted to explore the relationships among course structure and organization, learner interaction, and instructor presence which have been reported to affect student satisfaction and perceived learning in online learning environments (Eom et al., 2006). Finally, the researchers investigated the mediating effects, if any, that student engagement had on student satisfaction and perceived learning (see Figure 1).

Review of the Literature

This study investigated the relationships of course structure, learner interaction (with each other and the instructor), and instructor presence, considering a previous study by Eom et al. (2006) as a model upon which to expand. Using structural equation modeling to examine the "determinants of students' satisfaction and their perceived learning outcomes" (p. 216), Eom et al. (2006) concluded that course structure, instructor feedback, self-motivation, learning style, interaction, and instructor facilitation significantly impacted student satisfaction. However, they concluded that only instructor feedback and learning style significantly affected perceived learning outcomes. They also determined that student satisfaction was a significant predictor of learning outcomes.

Similarly, Richardson and Swan (2003) concluded that students with high overall perceptions of social presence scored high in terms of perceived learning and perceived satisfaction with the instructor. They suggested that it is important to focus on the interaction that takes place between students and instructors. Thus, active learning and student engagement is imperative for increased student learning and ultimately retention. According to Swan (2001), clarity of design, interaction with instructors, and active discussion among course participants significantly influenced students' satisfaction and perceived learning.

While there have been many studies about student engagement in online learning environments, Kuh and his colleagues described student self-reported learning gains, improved social skills, and greater engagement in the learning process (Hu & Kuh, 2001; Kuh & Hu, 2001;

Kuh & Vesper, 2001). Chen, Lambert, and Guidy (2010) further explored the effects of student engagement based upon the items on the National Survey of Student Engagement (NSSE) instrument (2008). As students are expected to work more collaboratively with classmates, students' perception of their engagement in their learning and participation in courses increased (Duderstadt, Atkins, & Hoeweling, 2002; Thurmond & Wambach, 2004).

Course Structure and Organization

Course structure and organization include the development and design of the course resources, curriculum, instructional strategies and methodologies, course schedule, and overall planning of a course before, during, and after a course is taught (Garrison, Anderson, & Archer, 2000). Also known as instructional management, course development should establish the "explicit and implicit structural parameters and organizational guidelines" of the course (Garrison et al., 2000, p. 101). Instructors provide details about course expectations for assignments, due dates, guidelines, assessment rubrics, and resources in order to facilitate students' academic success and sustained learning (Author, 2015a).

Viewed as a critical variable that influences student perceptions about online courses, course structure includes the objectives and expectations of the course in order to accommodate and promote student learning (Moore, 1991). Course infrastructure should be logically organized, user-friendly, and detailed about the student learning objectives (Eom et al., 2006). "Teachers need the expertise to develop a class structure that stimulates social interaction and affirms rigorous academic standards, while fostering independent learning skills" (Muirhead, 2004, p. 50). If instructors lack the technological skills to develop engaging courses, then course designers may be considered to provide additional training, support, and guidance (Vargas, 2014).

Students' perceptions of the overall usability of the course are likely correlated to student satisfaction and learning. In other words, the more organized and logical the course layout, the more likely students will be satisfied with their learning in the course (Eom et al., 2006). Jaggars and Xu (2016) summarized the findings of several studies about online course quality. They found that quality courses contained the following characteristics: clearly written objectives, well-organized content, variety of opportunities for interpersonal interaction, and effective use of technology (Jaggars & Xu, 2016).

Learner Interaction

One of the challenges of online learning relates to students feeling disconnected to their classmates and instructor. By offering a variety of topics that are relevant to current issues in the field and allowing students to connect the practical, in this case their professional experience, to the theoretical, the course content, the learners become more invested in the course discussions and assignments, as well as their colleagues (Shearer, 2003).

Further, instructors can make connections with students by providing constructive feedback that affirms how they are performing well and details ways to improve (Muirhead, 2004).

By providing students with choices or some flexibility, students have a more personalized learning experience (Collis, 1998). In summary, "teachers need the expertise to develop a class structure that stimulates social interaction and affirms rigorous academic standards while fostering independent learning skills" (Muirhead, 2004, p. 50). Muirhead (2004) shares several strategies to promote student interaction in online courses including: encourage critical thinking,

provide relevant and engaging lessons, share biographical posts (instructors and students alike), offering positive feedback about student work, integrate stories into discussions, and allow flexibility within the course schedule or organization. It is important to model metacognitive skills so that students are writing more in-depth comments and reflections in online discussions (Muirhead, 2004).

The instructor should encourage students to consider a variety of perspectives and research-based resources as they question their beliefs, assumptions, and ideas (Collision, Elbaum, Haavind, & Tinker, 2000; Muirhead, 2004). Learners should have the appropriate time to consider the topics of discussions, especially when critical reflection is expected, so that they can develop their thoughts and communicate such at a deeper level (Garrison et al., 2000). This type of consideration and time gives students more opportunity for sustained communication with classmates (Garrison et al., 2000). Another study found that "the course's level of interpersonal interaction was the most important factor in predicting student grades; students in low-interaction courses earned nearly one letter grade lower than students in high-interaction courses" (Jaggars, Edgecombe, & Stacey, 2013, p. 2).

Instructor Presence

Establishing instructor presence in online courses can be achieved by the way in which the course is designed, organized, facilitated, and taught through a variety of methods that promote positive interaction between the instructor and students (Jaggars et al., 2013; Karmin, O'Sullivan, Deterding, Younger, & Wade, 2006). Although slightly different in nature, social presence has been defined as the "degree of feeling, perception, and reaction of being connected by computer mediated communication" (Tu & McIsaac, 2002, p. 40). In online learning environments the instructor's most important role is establishing his presence and personality in the course content, discussions, and activities (Shea, Li, & Pickett, 2006). Instructors can improve online instruction and "engender a sense of caring by soliciting student feedback about the course and using that feedback to enhance the course" (Jaggars et al., 2013, p. 6).

Garrison et al. (2000) summarized three indicators of instructor presence: instructional management, building understanding, and direction instruction. Primarily, instructional management describes what we have referred to as course structure and organization, which has already been detailed in the literature review. Secondly, all teachers should be able to deepen their students' understanding of the subject area content. "Through active intervention, the teacher draws in less active participants, acknowledges individual contributions, reinforces appropriate contributions, focuses discussion, and generally facilitates an educational transaction" (Garrison et al., 2000, p. 101). Finally, direct instruction involves any teaching provided directly or indirectly by the instructors in the form of lectures, video or audio lessons, synchronous and asynchronous sessions, constructive and explanatory feedback provided, and the selection and inclusion of course references and resources (textbook, readings, supplemental materials, videos, etc.) (Garrison et al., 2000).

The development of instructor presence and a sense of a learning community within online courses seem to have a reciprocal relationship in which one influences the progress of the other and vice-versa (Shea et al., 2006). "When optimized, technological tools can help instructors to establish a knowledgeable and approachable presence, a vital element of strong online courses" (Jaggars et al., 2013, p. 3). While many online instructors understand the challenges of connecting virtually with their students, Jaggars et al. argue that it is even more important to "actively and visibly engage with students in the teaching and learning process – perhaps with even greater intentionality than in face-to-face courses" (2013, p. 1). Jaggars et al.

(2013) discovered that "higher levels of interpersonal interaction were correlated with better student performance in their online courses" (p. 1). Garrison et al. (2000) concluded that teacher presence can be established by regular communication with students, consistent feedback, and critical discourse modeled by the instructor. Furthermore, by increasing their presence in online environments instructors can promote greater student academic performance and retention over the long term (Jaggars et al., 2013).

Providing direct instruction using video and audio in synchronous and asynchronous sessions allows students the opportunity to get to know their professors in a more personal way (Anderson, Rourke, Garrison, & Archer, 2001). In 'live' sessions the instructor is able to share personal stories related to the course content or discussion and respond directly to student questions or concerns (Anderson et al., 2001). When instructors participate in discussions online by providing prompt responses, asking follow-up questions, and seeking student feedback about how to improve the course, their students perceive the teacher's presence to be greater (Jaggars et al., 2013). Students feel as though they are more acquainted or familiar with their classmates and professors when given the opportunity to participate in interactive sessions (Author, 2015a). The use of interactive technologies has been described as a powerful instructional strategy that can improve student learning outcomes and academic performance (Jaggars et al., 2013). Instructor presence "can be created and sustained in computer-conferencing environments, despite the absence of non-verbal and paralinguistic cues" (Garrison et al., 2000, p. 96).

Ice, Curtis, Phillips, and Wells (2007) conducted a study in which they compared students' perceptions of community and teacher presence with asynchronous audio feedback in online courses in comparison to those with only text-based feedback. Their findings demonstrated higher student satisfaction with embedded asynchronous audio feedback than text only feedback (Ice et al., 2007). Students found that audio feedback was more effective because the nuance of the communication was clearer, their professors seemed to care more about them, and they were three times more likely to apply the content or suggested changes with audio feedback (Ice et al., 2007). By developing a supportive learning environment, instructors facilitate their online students by strategically combining audio, video, discussion, chat sessions, practical activities, and other online tools to engage students (Jaggars et al., 2013).

Student Engagement

Student engagement has been defined as "students' willingness, need, desire, and compulsion to participate in, and be successful in, the learning process" (Bomia, Beluzo, Demeester, Elander, Johnson, & Sheldon, 1997, p. 294). Course delivery in online classes requires pedagogical strategies that will create as many learning and engagement opportunities as possible. Looking beyond cognitive skills learned or mastered, engagement focuses on individuals' dispositions or attitudes about classroom experiences and life-long learning (Mandernach, Donnelli-Sallee, & Dailey-Hebert, 2011). Student engagement has also been described as the level of interest demonstrated by students, how they interact with others in the course, and their motivation to learn about the topics (Briggs, 2015).

There are several affective factors related to student engagement which include attitude, personality, motivation, effort, and self-confidence (Mandernach et al., 2011). Jaggars and Xu (2016) found that the quality of interaction within the course parameters positively correlated to student grades in online courses. By evaluating the level of student engagement and considering these affective aspects, instructors can more effectively plan lessons and activities that will encourage students to be more active participants in their learning and coursework (Jennings & Angelo, 2006; Mandernach et al., 2011).

When students are motivated to do well in their courses, involved or invested in their desire to learn, and willing to exert the effort expected by their instructors, they are more likely to be engaged in their education (Mandernach et al., 2011). Course engagement extends beyond the traditional ways of measuring instructional effectiveness include student mastery of course learning objectives, retention, and students perceptions of satisfaction, whereas "consideration of the impact of instructional activities on student engagement provides a more complete picture of the teaching-learning dynamic" (Mandernach et al., 2011, p. 277). Measuring levels of student engagement allows instructors to adapt their instructional practices in response to changes in students' motivation, involvement, and attitude about their course and educational pursuits (Mandernach et al., 2011).

In online learning environments there are many tools available for instructors to gather informal data about student participation in the course. Instructors can review log-in data, number of minutes online, views of learning modules or course content, and self-reported information from students by using surveys, reflections, discussions, and other formative tools (Gray & DiLoreto, 2015). It is important to assess the level of academic challenge of each course based upon the effort exerted, time invested, opportunities for interaction with faculty and other students, active and collaborative learning, and enriching educational experiences for students (Langley, 2006). This can be achieved by surveying students informally or formally and analyzing the results in order to improve instructional practices for future students.

Handelsman, Briggs, Sullivan, and Towler (2005) developed an assessment of student engagement that investigates four types of engagement: skills, emotional, participation/ interaction, and performance. The Student Course Engagement Questionnaire (SCEQ) includes items for each of the four kinds of engagement and provides self-reported results that extend what can be observed in classroom interactions (Handelsman et al., 2005). In reviewing both informal and formal assessments of student engagement faculty are able to more effectively evaluate student perceptions of their engagement and course effectiveness that "support and sustain learning across courses, programs, and beyond the collegiate experience" (Mandernach et al., 2011, p. 280).

Student Satisfaction

Several studies have been conducted to measure the level of student satisfaction in traditional and online environments. Dziuban, Wang, and Cook (2004) concluded that students were more likely to evaluate courses and instructors with satisfactory ratings if they believed their professors communicated effectively, facilitated or encouraged their learning, organized the course effectively, showed interest in students' learning and progress, demonstrated respect for students, and evaluated students' work accurately. Marsh and Roche (1997) developed a complex model for defining student perceptions of satisfaction in terms of several factors: learning value, instructor enthusiasm, rapport, organization, interaction, coverage, and assessment. Another study found that students who participated in cohorts with other colleagues and received detailed feedback from and interaction with faculty reported satisfaction with their learning experiences (Shea, Fredericksen, Pickett, & Pelz, 2003).

Bangert (2006) identified four factors related to student satisfaction in online courses, including: student and faculty interaction and communication, amount of time on task, active and engaged learning, and cooperation among classmates. Another study compared students' perceptions of a sense of community and teacher presence with asynchronous audio feedback in online courses (Ice et al., 2007). They contrasted their results based upon students who received text-based feedback rather than audio feedback. Students reported higher satisfaction with

embedded asynchronous audio feedback rather than text only feedback (Ice et al., 2007). Students found that audio feedback was more effective because the nuance of the communication was clearer, their professors seemed to care more about them, and they were three times more likely to apply the content or suggested changes of this type of feedback (Ice et al., 2007).

Perceived Learning

The current study requested that students report their perceptions of their learning in a specific course from the spring 2015 semester. They were asked to reflect upon the benefits of course, its activities and assignments, and level of learning they achieved during the semester. Participants were also asked to consider if the course helped to prepare them as future leaders. Because there is an "increasing number of a university program, particularly at the graduate level . . . moving to an accelerated model, where time is compressed to help adult learners achieve necessary skills and credentials at a quicker pace", it is important that we ask our students to determine their level of learning (Trekles, 2013, p. 13). If students report that their learning is limited or minimal, then it is our responsibility to redesign online courses, improve instructional practices, and develop more effective assessment and evaluation tools (Author, 2015a).

Research Questions

What are the mediating effects of student engagement on student satisfaction and perceived learning? What impact do course structure and organization, learner interaction, instructor presence, and student engagement have on student perceptions about their satisfaction and learning upon completion of an online course? What is the relationship, if any, between student satisfaction and self-reported learning outcomes? Figure 1 demonstrates the hypothesized relationships of the independent variables with the mediating variable and outcome variables.

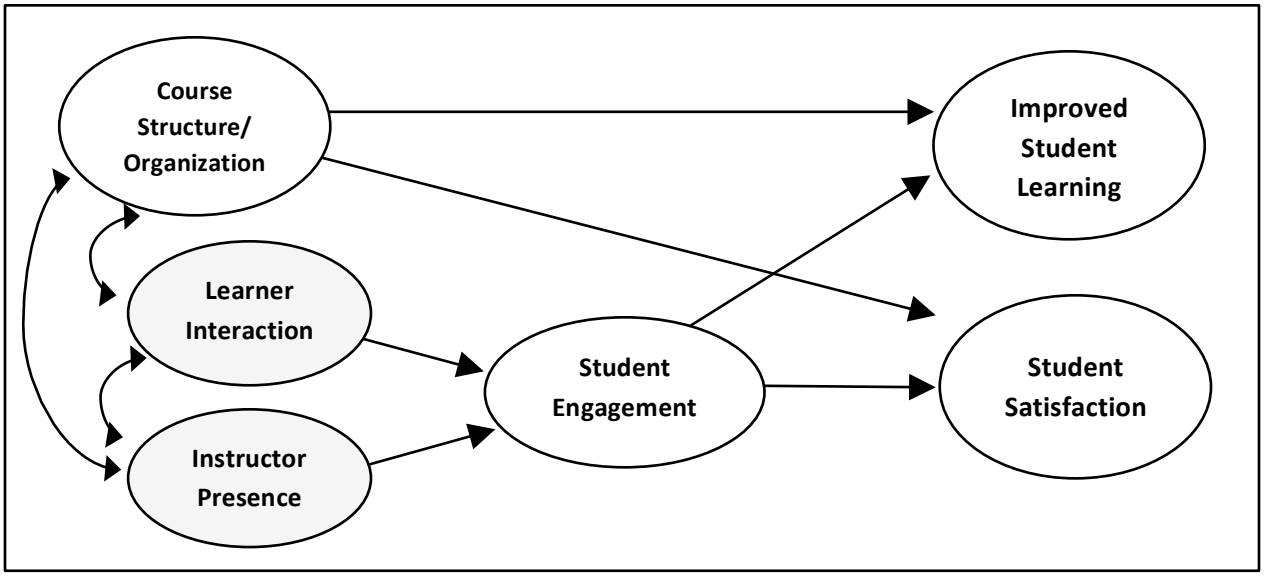

Figure 1. Conceptual Diagram Hypothesized Relationships

Data Sources

Phase I: Pilot Study

The researchers collected evidence of validity and reliability of a significantly modified version of a previously published instrument by completing a pilot study using a small sub-set of survey participants. The researchers reported the internal consistency of the items on the instrument as well as tested the proposed measurement model. This phase of the study was conducted during fall 2014.

Methods

Phase II: Main Study

The researchers used a cross-sectional design using survey methodology. A measurement-of-mediation design, using both the Baron and Kenny (1986) and the Shrout and Bolger (2002) bootstrap mediation analysis were employed in order to understand the relationships between course structure, learner interaction, student engagement, and instructor presence with student satisfaction and perceived student learning. This phase of the study was conducted in spring 2015.

The independent variables were course structure and organization, learner interaction, and instructor presence. The dependent or outcome variables for the study were improved student learning and student satisfaction, while we hypothesized that student engagement was a mediating variable.

Sample

Data were collected from all graduate students enrolled in an online educational leadership program in a regional, teaching university in the southeast of the United States. Of the 567 enrolled students invited to participate, 216 completed the Qualtrics Research Suite survey online. In order to maintain anonymity and confidentiality, the researchers had the program academic advisor send an email request to students. Participants who completed at least 85% of the questionnaire were kept in the analyses. Multiple regression procedures were used to replace missing values for any remaining items. The researchers included 187 participants' completed responses in the final analyses of the data. For this study, the response rate was 33% of the students (187 out of 567 invited).

Participants

Students enrolled in a minimum of one online course during the spring 2015 semester were asked to participate in the study. The study was delimited to students pursuing a Master's degree in an online educational leadership program offered at a medium, regional comprehensive university located in the southeast. Of the respondents, 100 had completed at least six online courses in the program. The majority of participants was female, from the same southeastern state, and ranged from 31 to 50 years of age. Many reported their expected graduation date to be within the next academic year and selected this program as the convenience and flexibility of an online program.

Procedures

The researchers created an instrument by modifying items from multiple existing instruments in order to collect data about student satisfaction and learning outcomes from currently enrolled online graduate students. A cross-sectional design using survey methodology was employed. Graduate students attending a regional comprehensive university located in the southeast were surveyed about their experiences and beliefs about their satisfaction and perceived learning in online courses.

Hypotheses

We asserted that there is a direct effect of course structure on perceived learning and student satisfaction. We also hypothesized that learner interaction and instructor presence causes student engagement, which in turn causes perceived student learning and student satisfaction. Finally, we sought to determine if student engagement was a mediating variable.

This study investigated the effects of these variables on improved student learning and student satisfaction. Therefore we hypothesized that:

H1: Course structure will have a statistically significant impact on both perceived student learning and student satisfaction.

H2: Student engagement mediates the relationship of learner interaction and instructor presence on both perceived student learning and student satisfaction.

H3: Learner interaction will have a statistically significant impact on both perceived student learning and student satisfaction.

H4: Instructor Presence will have a statistically significant impact on both perceived student learning and student satisfaction**.**

Instrumentation

The Student Learning and Satisfaction in Online Learning Environments Instrument (SLS-OLE) was created after reviewing an existing instrument and study (Eom et al., 2006), as well as numerous studies about online learning environments, student engagement, satisfaction, and learning, instructor presence, and learner interaction. The SLS-OLE was piloted with a sample of students in fall 2014. Based upon the results of the pilot testing of the instrument, several items were reworded and additional items were included. A positively-packed rating scale was used in attempt to elicit data that didn't violate the assumption of normality and to elicit more variability in responses. Sample items include: "The learning activities promoted interaction with others," "I am satisfied with my learning in the course," and "I discussed what I have learned in the course outside of class" (Author, 2015b).

Data Analysis

The descriptive data of the study are summarized by the means, standard deviations, and range for each of the variable is reported (see Table 1). Next, the relationships among the variables of the study are reported and finally, the results of the results of the mediated variables are shared.

Descriptive Analysis

Our first level of analysis involved obtaining descriptive statistics and bivariate correlations of the variables in our study. The descriptive statistics for our sample revealed that course structure and organization ranged from 1.00 to 6.00 with a mean of 5.3 and a standard deviation of .82. Learner interaction ranged from 2.14 to 6.00 with a mean of 4.8 and standard deviation of .92. Student engagement, instructor presence, student satisfaction, and perceived student learning all ranged from 1.00 to 6.00 with various means and standard deviations (see Table 1).

Table 1
Descriptive Statistics of Sample

	N	Minimum	Maximum	Mean	Std. Deviation
Course Structure/Organization	187	1.00	6.00	5.2730	.82369
Learner Interaction	187	2.14	6.00	4.7854	.91845
Student Engagement	187	1.00	6.00	4.9783	.86155
Instructor Presence	187	1.00	6.00	5.1433	1.11587
Student Satisfaction	187	1.00	6.00	5.2445	.99107
Perceived Student Learning	187	1.00	6.00	5.2793	1.04295

Bivariate Correlational Analysis

The researchers investigated the relationships of the dependent and independent variables of the study using the bivariate correlational analysis as seen in Table 2 and Figure 2. All independent variables were significantly and positively correlated with each other, as well as the two outcome variables, student learning and student satisfaction.

Table 2
Bivariate Correlation of all Variables (N=187)

	Learner Interaction	Student Engagement	Instructor Presence	Student Satisfaction	Perceived Learning
Course Structure / Organization	.51**	.51**	.62**	.66**	.62**
Learner Interaction	1	.72**	.62**	.64**	.62**
Student Engagement		1	.55**	.63**	.61**
Instructor Presence			1	.84**	.69**
Student Satisfaction				1	.85**

** Correlation is significant at the 0.01 level (2-tailed).

The two outcome variables, student satisfaction and perceived learning, share the strongest relationship of the variables of this study ($r = .85$, $\rho < .01$). Another equally strong and significant correlation exists between instructor presence and student satisfaction ($r = .84$, $\rho < .01$). A third strong and significant relationship is found between learner interaction and student engagement ($r = .72$, $\rho < .01$). All other correlations were significant and moderately strong (See Table 2).

Results

The researchers developed four hypotheses based on empirical evidence found within the literature. As such, the researchers hypothesized that course structure, learner interaction, and instructor presence will all have a statistically significant impact on both perceived student learning and student satisfaction. Furthermore, the researchers hypothesized that student engagement mediates the relationship of learner interaction and instructor presence on both perceived student learning and student satisfaction.

Using the basic normal theory approach to testing for mediating effects of a variable (Frazier, Tix, & Barron, 2004), four necessary steps should take place before mediation is concluded (Mallinckrodt, Abraham, Wei, & Russell, 2006). First, there must be a significant correlation between the predictor variable and the dependent or outcome variable. Second, the independent or predictor variable must account for a significant proportion of the variance in the mediating variable. Third, the mediating variable must account for a significant proportion of variance in the dependent or outcome variable. And, finally, the association between the predictor variable and the dependent or outcome variable must be significantly less after controlling for the variance shared between the mediator and the dependent or outcome variable. In the case of this particular study, all steps were met and mediation analyses were conducted.

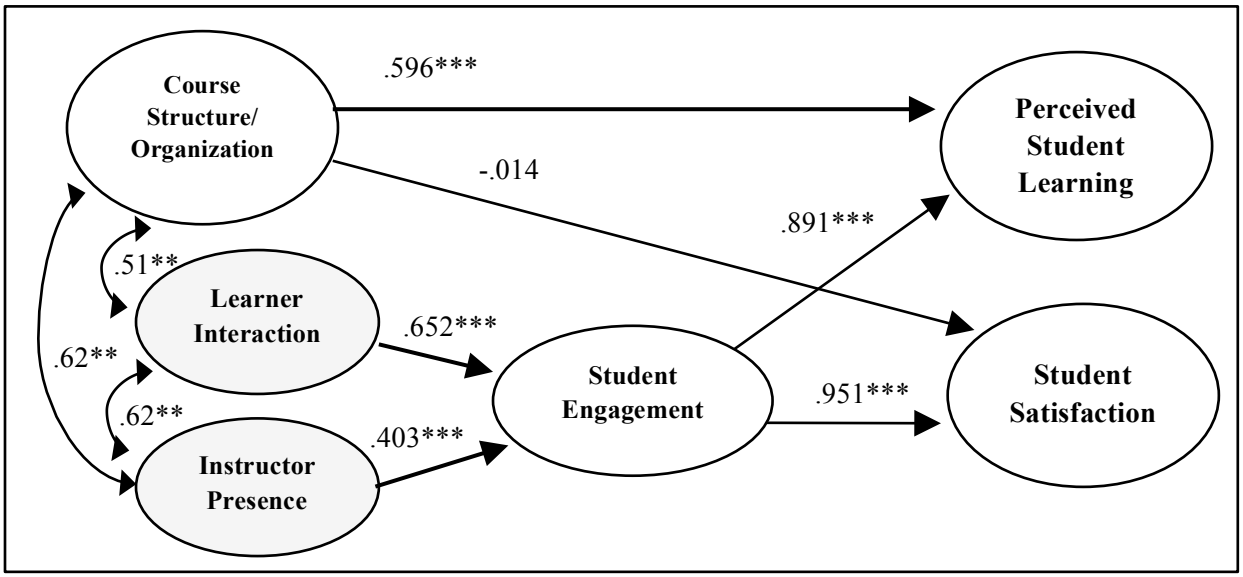

Figure 2. Diagram of Hypothesized Relationships with Unstandardized Regression Coefficient
** significant at .05; ** significant at .01; *** significant at < .01*

The researchers hypothesized that course structure, learner interaction, and instructor presence would all have a statistically significant impact on both perceived student learning and student satisfaction. As illustrated in Table 3, it is evident that course structure does have a

statistically significant impact on both perceived student learning and student satisfaction. Furthermore, learner interaction has a statistically significant impact on perceived student learning; however, learner interaction does not significantly impact student satisfaction as evident in past studies (Kuo, Walker, Belland, & Schroder, 2013; Richardson & Swan, 2003; Swan 2001). Finally, instructor presence does significantly impact both perceived student learning as well as student satisfaction (p <.001).

Table 3
Direct & Indirect Effects (N=187)

Path			Direct Without Mediator (Standardized Regression Weights & Significance)	Direct With Mediator (Baron & Kenny, 1986 Approach)	Indirect Effects (Bootstrap Two-Tailed Significance – Shrout & Bolger, 2002)	Conclusions
Structure	Learning		.411***			
Engagement	Learning		-.188***			
Structure	Satisfaction		.157***			
Engagement	Satisfaction		.862***			
Instructor Presence	Engagement		.445***			
Learner Interaction	Engagement		.720***			
Learner Interaction	Engagement	Learning	.148*	-.675(.12)NS	**	Full mediation
Instructor Presence	Engagement	Learning	.340***	-.188(.53)NS	**	Full mediation
Learner Interaction	Engagement	Satisfaction	-.013(.79)NS	-.554(.12)NS	***	No Mediation
Instructor Presence	Engagement	Satisfaction	.819***	.479*	***	Partial mediation

** significant at .05; ** significant at .01; *** significant at < .01*

The researchers further hypothesized that student engagement mediates the relationship of learner interaction and instructor presence on both perceived student learning and student satisfaction. Using Amos 23, the researchers tested the mediator variable of student engagement on learner interaction and instructor presence on both perceived student learning and student satisfaction. As such, once student engagement was added to the model, the impact of learner interaction on student learning went from $\beta = .148$ ($p < .05$) to $\beta = -.675$ ($p = .12$) indicating a full mediation. Furthermore, full mediation was present with student engagement mediating the effect of instructor presence on student learning from $\beta = .340$ ($p < .01$) to $\beta = -.188$ ($p = .53$). Student engagement, however, does not mediate the relationship between learner interaction and student satisfaction as the direct effects of learner interaction and student satisfaction were not statistically significant ($p < .05$). Finally, student engagement did partially mediate the effect of instructor presence and student satisfaction indicated by $\Delta \beta = .34$ while remaining significant at the .05 level (see Table 3).

Discussion

This study examined the factors that impact both perceived student learning outcomes and student satisfaction in asynchronous online learning courses. The research model was tested by using Amos 23 on data collected by the researchers from surveying graduate students. The researchers concluded that the hypotheses in this study were tested and received support with the exception of student interaction not significantly impacting student satisfaction. All other relationships were positively correlated with significant regression coefficients. Similar to past research (Eom et al., 2006), the researchers found a strong relationship between course structure and student satisfaction (Author, 2015a).

However, unlike past research completed by Eom et al. (2006), this study indicated a significant relationship between course structure and perceived student learning. Furthermore, the data indicated that student interaction does not have a statistically significant impact on student satisfaction yet instructor presence does have a statistically significant impact on perceived student learning. The data, however, indicated that learner interaction does significantly impact perceived student learning. The data also indicated that instructor presence does influence student satisfaction. The mediated variable, student engagement, partially mediated the impact that instructor presence has on student satisfaction. Furthermore, student engagement fully mediated the impact of both instructor presence and learner interaction on perceived student learning.

Of the three hypothesized factors to affect perceived student learning, course structure, learner interaction, and instructor presence all had a significant effect. These impacts, however, were fully mediated by student engagement. Of the three hypothesized factors to affect student satisfaction, both course structure and instructor presence had a significant direct effect. Learner interaction, however, did not have a significant impact on student satisfaction. Of the three types of interaction (learner-instructor, learner-content, and learner-learner) "learner to learner interaction was a poor predictor of student satisfaction" (Kuo et al., 2013, p. 30). Student engagement partially mediated instructor presence on student satisfaction.

Contrary to past findings from Eom et al. (2006) and similar to LaPoint and Gunawardena (2004), there was a positive relationship between learner interaction and perceived student learning. One possible explanation for this finding is that the online community at this institution is large and there is little variability between the requirements faculty place on students to interact with each other; therefore, students feel this aspect is important to their

learning. Conversely, the data did not indicate that participants felt that their interaction impacted their satisfaction – with or without their engagement.

Another interesting point is that statistically significant relationship between course structure and perceived student learning. Unlike past research from Eom et al. (2006), the results of this study show a positive significant relationship between course structure and perceived student learning. Not only is it a positive statistically significant relationship, course structure has one of the strongest impacts of all independent variables on the dependent variable, perceived student learning. One possible explanation is that many of the online courses at this particular institution use a consistent course layout template. Therefore, it is possible that as a result of such consistency among the structure of the courses, students believe that this is an extremely important aspect to improving their learning.

Partially congruent with the researchers' hypothesis that student engagement mediates the effect of learner interaction and instructor presence on student satisfaction; it was interesting to find that student engagement only partially mediated the effect of instructor presence on student satisfaction and there was no mediated effect of learner interaction on student satisfaction. The researchers are unable to soundly explain this deviation; however, conceptually, the more the instructor is present, the more engaged a student becomes, and the more satisfied he becomes (Garrison et al., 2000; Jaggars et al., 2013). Kuo et al. found that "learner-instructor interaction followed as the second strongest predictor that significantly contributed to student satisfaction" (2013, p. 30). Furthermore, graduate students in online settings are often self-motivated; therefore, they may not see the importance of interacting with their peers in order to be satisfied with the course.

The researchers also hypothesized that student engagement mediates the effect of learner interaction on perceived student learning. Congruent with their hypothesis, the data did indicate this mediational effect. This may be explained by the possibility that as students interact with one another; they are increasing their learning whether consciously or subconsciously.

Limitations and Future Research

While these findings provide evidence of the importance of aspects of course design, organization, planning, social interaction, engagement, and instructor presence, we acknowledge that these results may not be generalizable to other online learning environments. Students were instructed to respond to the survey with one course in mind, however this may have limited how they responded in context to the various constructs. The participants were also permitted to complete the online instrument more than once by responding about a different course, as most students are enrolled in more than one course at a time. We acknowledge that these responses may have potentially inflated the results for each participant. We are cautious in interpreting these items and making "inferences about differences in the underlying, latent, characteristic reflected in the Likert numbers, but this does not invalidate conclusions about the numbers" (Norman, 2010, p. 629). Therefore, we realize that additional analysis and testing on the data collected from this instrument is necessary.

Scholarly and Practical Significance of the Study

This study demonstrates the importance of course structure and organization in online learning environments. Course structure and organization shared a moderate and significant relationship with learner interaction, instructor presence, student engagement, student learning, and student satisfaction. Students seem to benefit from and appreciate well-designed and developed online

courses that are detailed, logical, and user-friendly (Eom et al., 2006). When the course learning objectives are specific, students have a clearer understanding of the expectations for success and learning in the course. It is important for instructors to design well-structured courses, maintain regular communication and presence in their courses, and promote student engagement. This can lead to greater student perceptions of learning and satisfaction (Eom et al., 2006). Furthermore, there are positive implications for providing courses that include opportunities for learners to interact with each other in addition to a high-level of involvement from the instructor. Students have a more positive outlook about what they have learned and their overall satisfaction with the course if they're provided opportunities to interact with each other and their instructors are present.

References

Allen, I. E., & Seaman, J. (2015). *Grade level: Tracking online education in the United States*. A research report for Pearson Education, retrieved from: http://www.onlinelearningsurvey.com/reports/gradechange.pdf

Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing environment. *Journal of Asynchronous Learning Networks, 5*(2).

Bangert, A. W. (2006, spring). Identifying factors underlying the quality of online teaching effectiveness: An exploratory study. *Journal of Computing in Higher Education, 17*(2), 79–99.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173–1182.

Bomia, L., Beluzo, L., Demeester, D., Elander, K., Johnson, M., & Sheldon, B. (1997). *The impact of teaching strategies on intrinsic motivation*. Retrieved from ERIC database (ED418825).

Briggs, A. (2015, Feb.). Ten ways to overcome barriers to student engagement online. *Online Learning Consortium*, Retrieved from http://onlinelearningconsortium.org/news_item/ten-ways-overcome-barriers-student-engagement-online/

Chen P. S. D., Lambert A. D. & Guidry K. R. (2010) Engaging online learners: the impact of web-based learning technology on college student engagement. *Computers & Education*, *54*, 1222–1232.

Collis, B. (1998). New didactics for university instruction: Why and how? *Computers and Education, 31*(4), 373-393.

Collision, G., Elbaum, B., Haavind, S., & Tinker, R. (2000). *Facilitating Online Learning. Effective Strategies for Moderators*. Madison, WI: Atwood Publishing.

DiLoreto, M., & Gray, J. (2015, October). *Student satisfaction and perceived learning in online courses: The development of the SLS-OLE*. Paper presented at the Annual Meeting of the Online Learning Consortium, Orlando, FL.

Duderstadt, J., Atkins, D., & Houweling, D. (2002). *Higher education in the digital age: Technology issues and strategies for American colleges and universities*. Westport, CT: Praeger.

Dziuban, C. D., Wang, M. C., & Cook, I. J. (2004). *Dr. Fox rocks: Student perceptions of excellent and poor college teaching*. Unpublished manuscript, University of Central Florida.

Eom, S.B., Ashill, N., & Wen, H.J. (2006). The determinants of students' perceived learning outcomes and satisfaction in university online education: An empirical investigation. *Decision Sciences Journal of Innovative Education*, *4*(2), 215-235.

Frazier, P. A., Tix, A. P., & Barron, K. E. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of Counseling Psychology, 51*, 115–134.

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2*(2-3), 87-105.

Gray, J., & DiLoreto, M. (2015, August). *Student satisfaction and perceived learning in online learning environments: The mediating effect of student engagement*. Paper presented at the Annual Meeting of the National Council of Professors of Educational Leadership, Washington, D.C.

Handelsman, M. M., Briggs, W. L., Sullivan, N., & Towler, A. (2005). A measure of college student engagement. *Journal of Educational Research, 98*, 184-191.

Hu, S., & Kuh, G. D. (2001). Computing experience and good practices in undergraduate education: Does the degree of campus ‘‘wiredness” matter? *Education Policy Analysis Archives*, *9*(49), Retrieved from http://epaa.asu.edu/epaa/v9n49.html

Ice, P., Curtis, R., Phillips, P., Wells, J. (2007). Using asynchronous audio feedback to enhance teaching presence and students’ sense of community. *Journal of Asynchronous Learning Networks, 11*(2), 3-25.

Jaggars, S. S., Edgecombe, N., & Stacey, G. W. (2013, April). *Creating an effective online instructor presence*. Report completed for the Community College Research Center, Teachers College, Columbia University, NY. Retrieved from http://files.eric.ed.gov/fulltext/ED542146.pdf

Jaggars, S. S., & Xu, Di (2016). How do online course design features influence student performance? *Computers and Education*, 95, 270-284, doi: 10.1016/j.compedu.2016.01.014

Jennings, J. M., & Angelo, T. (Eds.) (2006). Student engagement: Measuring and enhancing engagement with learning. *Proceedings of the Universities Academic Audit Unit*, New Zealand.

Karmin, C. S., O’Sullivan, P., Deterding, R. R., Younger, M., & Wade, T. (2006). Teaching presence in virtual problem-based learning groups. *Medical Teacher, 28*(5), 425-428.

Kuh, G. D., & Hu, S. (2001). The relationships between computer and information technology use, student learning, and other college experiences. *Journal of College Student Development, 42*, 217–232.

Kuh, G. D., & Vesper, N. (2001). Do computers enhance or detract from student learning? *Research in Higher Education*, *42*, 87–102.

Kuo, Y., Walker, A. E., Belland, B. R., & Schroder, K. E. E. (2014). A predictive study of student satisfaction in online education programs. *The International Review of Research in Open and Distance Learning*, *14*(1), 16-39.

Langley, D. (2006). *The student engagement index: A proposed student rating system based on the national benchmarks of effective educational practice*. University of Minnesota: Center for Teaching and Learning Services.

Mallinckrodt, B., Abraham, T. W., Wei, M., & Russell, D. W. (2006). Advances in testing the statistical significance of mediation effects. *Journal of Counseling Psychology, 53*(3), 372-378.

Mandernach, B. J., Donnelli-Sallee, E., & Dailey-Hebert, A. (2011). Assessing course student engagement. In R. Miller, E. Amsel, B. M. Kowalewski, B.B. Beins, K. D. Keith, & B. F. Peden (Eds.), *Promoting Student Engagement: Techniques and Opportunities* (pp. 277-281). Society for the Teaching of Psychology, Division 2, American Psychological Association.

Marsh, H. W., & Roche, L. A. (1997). Making students’ evaluations of teaching effectiveness effective: The critical issues of validity, bias, and utility. *American Psychologist, 52*(11): 1187–1197.

Moore, M. G. (1991). Editorial: Distance education theory. *The American Journal of Distance Education, 5*(3), 1-6.

Muirhead, B. (2004). Encouraging interaction in online classes. *International Journal of Instructional Technology and Distance Learning, 1*(6), 45-50.

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

Shea, P., Fredericksen, E., Pickett, A., & Pelz, W. (2003). Student satisfaction and reported learning in the SUNY Learning Network. In: T. Duffy and J. Kirkley, *Learner Centered Theory and Practice in Distance Education*. Mahwah, NJ: Lawrence Erlbaum.

Shea, P., Li, C. S., & Pickett, A. (2006). A study of teaching presence and student sense of learning community in fully online and web-enhanced college courses. *The Internet and Higher Education, 9*(3), 175-190.

Shearer, R. L. (2003). Interaction in distance education. *Special Report 2*(1). Madison, WI: Atwood Publishing.

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and non-experimental studies: New procedures and recommendations. *Psychological Methods, 7*, 422– 445.

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

Thurmond, V., & Wambach, K. (2004). Understanding interactions in distance education: A review of the literature. *International Journal of Instructional Technology & Distance Learning*, *1*, 9–33. Retrieved from http://www.itdl.org/journal/Jan_04/article02.htm

Trekles, A. M. (2013). *Learning at the speed of light: Deep learning and accelerated online graduate courses* (published doctoral dissertation). Retrieved from Capella University: http://gradworks.umi.com/35/58/3558242.html

Tu, C., & McIsaac, M. (2002). The relationship of social presence and interaction in online classes. *The American Journal of Distance Learning*, *16*(3), 131-150.

Vargas, J. (2014, May/June). What can online course designers learn from research on machine-delivered instruction: How to create effective and efficient mechanical aids to instruction. *Academe* (Journal of the American Association of University Professors), 100(3), Retrieved from http://www.aaup.org/reports-and-publications/academe

Appendix A

Student Learning and Satisfaction in Online Learning Environments Instrument (SLS-OLE)

Directions: This questionnaire assesses your satisfaction and perceived learning in online environments based upon the following constructs: course organization/structure, learner interaction, student engagement, instructor presence, student satisfaction, and perceived learning. Read each statement and use the associated scale to select which best reflects your opinion.

Scale: 1 = Strongly Disagree (SD), 2 = Mostly Disagree (MD) 3 = Slightly Agree (SA), 4 = Moderately Agree (MA), 5 = Mostly Agree (MOA), 6 = Strongly Agree (SA)

	SAMPLE ITEMS	**SCALE**					
	Course Structure/Organization	**SD**	**MD**	**SA**	**MA**	**MOA**	**SA**
	Student learning outcomes was aligned to the learning activities.						
	Course navigation was illogical.						
	The layout of the course was disorganized.						
	Instructions about student participation were clearly presented.						
	The purpose of the course was clearly presented.						
	Learner Interaction						
	I frequently interacted with other students in the course.						
	There were no opportunities for active learning in this course.						
	The learning activities promoted interaction with others.						
	I had the opportunity to introduce myself to others in the class.						
	I communicated often with other students within the course.						
	I regularly communicated with the instructor of the course.						
	I received ongoing feedback from my classmates.						
	Student Engagement						
	I frequently interacted with my instructor of this course.						
	I discussed what I learned in the course outside of class.						
	I completed my readings as assigned during the course.						
	I participated in synchronous and/or asynchronous chat sessions during the course.						

	I was not actively engaged in the activities required in the course.						
	SAMPLE ITEMS	**SD**	**MD**	**SA**	**MA**	**MOA**	**SA**
	Instructor Presence						
	The instructor's feedback on assignments was clearly stated.						
	The instructor's feedback on assignments was not constructive.						
	The instructor provided timely feedback about my progress in the course.						
	The instructor cared about my progress in this course.						
	I learned from the feedback that was provided during the course.						
	Student Satisfaction						
	I am satisfied with my overall experience in this course.						
	I would not recommend this course to other students.						
	I am satisfied with the level of student interaction that occurred in the course.						
	I am satisfied with my learning in the course.						
	I am satisfied with the instructor of the course.						
	I am satisfied with the content of the course.						
	Perceived Learning						
	I am pleased with what I learned in the course.						
	The learning tasks enhanced my understanding of the content.						
	I learned less in the course than I anticipated.						
	I learned skills that will help me in the future.						
	The learning activities promoted the achievement of student learning outcomes.						
	The course contributed to my professional development.						

Student Learning and Satisfaction in Online Learning Environments Instrument (SLS-OLE)
Written permission is requested for use of this questionnaire by emailing the author (mdiloreto@uwf.edu).