

How Can Effective Online Interactions Be Cultivated?

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Abstract: Social interaction is the essence of learning. Such an interaction can be designed and facilitated in the online classroom to enhance student's learning experience. The objective of this study was to investigate the usefulness of a redesigned online course in a master's program. The theoretical framework supported this research is Moore's model of interaction. The data were compared between the old and new version of this studied course. One-way analysis of variance was used to discover the differences between two different versions concerning students' academic performance, engagement, and satisfaction. The results of this evaluation study demonstrated favorable outcomes in the revised course. This empirical study also validated previous research findings that instructors have a strong influence on students' perceived learning and satisfaction. This study suggested that higher education institutions might consider providing faculty development opportunities to strengthen the instructors' capability of facilitating interactions and developing the learning community that is promising for increasing the retention rates in the online learning.

Key words: course redesign, online learning, attrition rate, student satisfaction, student-instructor interaction.

1. Introduction

In order to enhance access to learning, meet student's expectation, and improve the quality of learning, institutions in higher education have embraced the advanced information technology and electronic communication as an important vehicle for delivering courses and programs to a wide range of individuals (Chowdhry, Sieler & Alwis, 2014; Peliter, Schibrowsky & Drago, 2007). Over the last few decades, there has been a steady increase in online courses offered (Chowdhry et al., 2014; Peliter et al., 2007). Having a profound impact on the higher education, e-learning has transformed the teaching and learning model from an instructor-centered learning to a student-centered learning, in which students take on accountability and share responsibility for their learning outcomes (Peliter et al., 2007). Despite the fact that online education offers an effective learning platform, students might be dissatisfied with their learning experience due to various reasons. Peltier, Schibrowsky and Drago (2007) suggested that the increases in student-to-student interactions, instructor-to-student interactions, and critical thinking could help boost student's satisfaction in the online classrooms. It requires some alternatives in designing the curriculum, managing the course, and adopting other relevant infrastructures (Onodipe, Ayadi & Marquez, 2016).

The research described in this paper examined the effectiveness of an improved online course. This paper is organized as follows. It begins with a section of introduction. The literature review in section 2 describes the

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conceptual framework based upon Moore's three types of interaction and research that illustrate the importance of three types of interaction in the online learning environment. Section 3 summarizes the research design, research questions, and data collection and analysis methods. Section 4 outlines results and discussions. The limitations along with future research are articulated in Section 5 while conclusions and implications presented in Section 6 will conclude this paper.

2. Literature Review

2.1 Moor's Three Types of Interaction

The learning process is by no mean an individual endeavor. Interaction has long been a core element in the learning process (Shackelford & Maxwell, 2012). Social interaction is a precondition for collaboration that is essential for learning (Brunet, 2011). Social constructivists perceive learning as a process in which a learner constructs new meaning and knowledge through active interaction with others (Shackelford & Maxwell, 2012). Interpersonal interaction is the fundamental component that not only facilitates learning but also helps lessen the transactional distance and strengthen learners' psychological connection to their peers, instructor, and course as a consequence of the enhancement of social presence (Ke, 2010). Subsequently, learners can project themselves socially and emotionally as real individuals through the medium of communication being used (Ke, 2010; Shackelford & Maxwell, 2012). In the online learning, Moore first operationalized interaction to include three types of interaction: student-student, student-instructor, and student-content interactions (Moore, 1989). Swan (2002) posited that each type of interaction supports learning and these three types of interaction are interdependent. Each interaction potentially contributes to and benefits from the others (Shackelford & Maxwell, 2012; Swan, 2002).

2.1.1 Student to Student Interaction

The first interaction that Moore identified is student with student (Moore, 1989). Online learning theorists and practitioners have strongly believed that interpersonal interaction has key influences on student's learning experience and outcome (Jaggars & Xu, 2016; Moore, 1989; Moore & Kearsley, 1996). Once students actively interact with each other and enthusiastically construct knowledge, a learning community is created (Bradley, 2011). Research has shown that members of a learning community tend to interact with other members and become committed to the community if they receive valuable information through their engagement (Jaggars & Xu, 2016). Collaborative work among students helps build a learning community that forests critical thinking, problem solving, analysis, synthesis; offers cognitive supports to students; and, eventually, advances a deeper understanding of the course material (Bradley, 2011; Moore & Kearsley, 1996). Social interaction affects student's learning through the cognitive process and the overall course satisfaction (Brunet, 2011). A research study conducted by Peltier, Schibrowsky and Drago (2007) found that perceived quality of student-to-student interactions is positively related to the perceived quality of the learning experience.

It is recognized that students often feel isolated due to the lack of interaction with peers in the online classrooms. Although the physical presence of the teacher and students does not exist in the online classrooms, robust student-student and student-teacher interactions support students' feeling of engagement with the courses. Indeed, the teacher has a role of cultivating a learning environment in which active participation between and among students and their teacher can happen (Sarder, 2014; Shackelford & Maxwell, 2012). Moore and Kearsley (1996) deemed that the teacher is responsible for facilitating student-student, student-teacher, and student-content

interactions in the online learning environment.

Social interaction is often taken for granted. Indeed, social interaction should be deliberately designed into online learning to allow learners to interact with the instructor and each other (Bradley, 2011). Chang and Smith (2008) argued that one of the instructor's roles is to develop a curriculum that actively promotes learner-learner interaction. An instructor can improve online classrooms by designing appropriate protocols and implementing policies and practices that encourage learners to actively engage in the learning process (Bradley, 2011; Sarder, 2014). It is the best practice that instructors intentionally design for all three types of interaction to occur in the online classrooms (Sarder, 2014; Shackelford & Maxwell, 2012). A well-designed course is beneficial to both learners and instructors. Learners long for a meaningful and memorable learning experience while achieving the desired learning outcome (Onodipe et al., 2016). Based upon the survey responses collected from the attendees at a learning communities conference, DiRamio and Wolverton (2006) concluded three recommendations for strengthening the learners' sense of connection and engagement in the online learning environment. First, methodically design activities and assignments to help learners feel connected to course material and their peers. Second, actively engage learners in discussions and inspire them to share their personal and professional experiences in relation to the course material. Third, enthusiastically advocate learners' responsibility and accountability through numerous instructor-learner communications.

2.1.2 Student to Instructor Interaction

Student-instructor interaction refers to the ways that the instructor communicates with the students to facilitate learning (Swan, 2002). The interaction between students and their instructor is crucial in the online education, which is considered as one of the most critical factors in augmenting student satisfaction (Croxtton, 2014; Jaggars & Xu, 2016; Moore & Keaersley, 1996; Nandi, Hamilton & Harland, 2012; Onodipe et al., 2016). In Swan's (2002) study, student-instructor interaction is positively associated with both perceived learning and student satisfaction. Those students who had low levels of interaction with their instructors reported the lowest levels of learning and satisfaction with the courses (Swan, 2002). The findings from Swan's research (2002) suggested that the instructor's interaction is a vital aspect in determining the success of online learning, and the quality of interactions is more significant than the quantity of interactions. Likewise, another study by Jaggars and Xu's (2016) showed that the quality of interpersonal interaction is associated with students' grades positively and significantly. When additional analyses on course observations and interviews were performed, it is evident that frequent and effective student-instructor interactions advance students to be devoted themselves to the course; consequently, students achieve a greater academic performance (Jaggars & Xu, 2016).

High attrition rates are troublesome and often associated with online education. The use of learning communities has proven successfully in improving the retention rates (DiRamio & Wolverton, 2006). There have been countless research studies exploring the teacher's roles in developing a learning community. The findings demonstrated that the teachers play an important role in facilitating the formation of a learning community and establishing meaningful, active interactions among learner-learner and learner-teacher; consequently, learners are capable of applying the knowledge they have acquired meaningfully (DiRamio & Wolverton, 2006; Dixon, 2010; Swan, 2002). Brunet (2011) argued that learner-teacher interaction is especially needed at the start of the course. To promote positive learning experience, the teacher ought to engage learners in the dialogue from the beginning of the course and consistently throughout the course, encouraging learners to interact with course content, the teacher, and their peers (Brunet, 2011; Miller, 2015). The learning relationship between the learners and their teacher, as Sarder (2014) claimed, is thought to be a powerful means of facilitating highly engaged learning community in the

online classroom environment.

McCarthy (2012) pointed out that student-instructor interactions often occur within the context of formal and informal feedback. Moore (1989) stressed that an instructor's feedback could provide effective support, motivation, experience, and clarity with the course materials, which yields better application of new knowledge by the students. Instructors should also attempt to use online instructional tools and methodologies to encourage students' sense of connection and engagement (DiRamio & Wolverton, 2006) and stimulate interactions that offer an optimal level of dialogue for the online learning (Miller, 2015). Dixon's (2010) study further highlighted that student-instructor and inter-student interactions unveil a strong correlation with higher student's engagement with the course.

2.1.3 Student to Content Interaction

The interaction between student and content is described by Moore (1989) as the "defining characteristic of education" (p. 1). According to Moore (1989), this is the process of student's intellectual interaction with the content that brings about transformation in the student's learning, perspective, and cognitive structures of the student's mind. Interaction with content takes place as students are exposed to new information and attempt to integrate the new content with the students' prior knowledge on the study subject (Brunet, 2011; Peliter et al., 2007; Swan, 2002). Students are disposed to participate and motivated to learn when course content is interesting, relevant, and of high quality (Peltier et al., 2007). Onodipe, Ayadi, and Marquez (2016) advised that guidelines, checklists, and study guides provided by the instructor are also effective ways to help students stay focused and engaged with the materials. Thurmond and Wambach (cited in Nandi et al., 2012) asserted that interactions between the students and their instructor advance students' comprehension of the course content.

In today's technological landscape, human interaction with technology is the primary avenue students learn in the online environment (Change & Smith, 2008). Such interactions include reading informational texts, watching videos, interacting with computer-based multimedia, exercising simulations, etc. (McCarthy, 2012). Students must be meaningfully engaged in learning activities through various interactions that could happen individually or collectively with their peers or instructor (Miller, 2015). The student-content interaction is achieved while a student applies reading from texts or audio-visual lecture material to assignments such as discussions, quizzes, written papers, and other creative options.

2.2 Student Satisfaction

Student satisfaction, which reflects not only a student's attitudes and perceptions toward learning but also perceived the value of the education when the student attends an educational institution (Chang & Smith, 2008; Sarder, 2014). Research (Eom, Wen & Ashill, 2006; Sun, Tsai, Finger, Chen & Yeh, 2008) concerning computer-assisted learning clearly confirmed that student satisfaction, a valid measurement of learning, is regarded as a key factor assessing final learning outcomes and the successful implementation of the online learning system. Student satisfaction, a decisive determinant of student's concern about his or her learning, functions as a proxy for more direct measures of learning, for example, grades (Rovai & Barnum, 2003). Once students are dissatisfied with their online learning, they are likely to decide to drop out. A successful learning experience marks student's satisfaction with the experience in the online education. The student is inclined to continue and complete his/her study. Therefore, student satisfaction is a strategic indicator of an educational course or program (Brunet, 2011; Chang & Smith, 2008; Croxton, 2014) and an essential component in improving learning attainment (Sarder, 2014).

Some empirical studies (Jaggars & Xu, 2016; Nandi, Hamilton & Harland, 2012; Swan, 2002) have substantiated that student-student interaction and student-teacher interaction can predict students' satisfaction toward learning. Increased interaction between the students and their teacher can boost student satisfaction, which is the main contributor to perceived learning (Brunet, 2011; Croxton, 2014). The teacher's interactions with students keep them engaged and on task throughout the course (Brunet, 2011). The impact of social interaction on learning influences through the cognitive process and, ultimately, the overall course satisfaction. A review of the literature by Croxton (2014) suggested that online courses with high levels of interactivity result in strengthened student motivation, improved learning outcomes, and intensified student satisfaction comparing to less interactive learning environments.

In a study that explores the determinants of students' satisfaction in online courses, Eom, Wen and Ashill (2006) discovered that instructor's feedback is an eminent predictor for students' satisfaction, which is a notable predictor of learning outcomes. In other studies (Sun et al., 2008; Swan, 2002), a series of analyses concluded that instructor's attitudes toward online learning, perceived usability and flexibility of courses, and clarity of course design are predictors for students' satisfaction in online learning. Chang and Smith (2008), in a review of the research literature on students' satisfaction in the online learning environment, summarized that it is of utmost importance that the teacher makes time for students to interact, because interactions between students and their peers, students and their teacher, and students and course content directly relates to student's satisfaction with the course. The significance of interaction affirms that students' academic achievements and positive attitudes raise as the level of interaction increases.

3. Research Method

3.1 The Objective of the Study and Research Questions

The aim of this study was to assess the effectiveness of a revised graduate course in an online master's program of healthcare administration. By investigating the usefulness of the redesigned course, the following questions were raised: (1) How do the students learn in the revised course? (2) How are the students engaged in the revised course? (3) How satisfied the students are with their experience in this revised course?

3.2 Research Design

This research study was conducted in a U.S. university that offers its master's program in healthcare administration exclusively online. In response to the healthcare reform, this studied course was redesigned to better prepare the students for the rapidly changing healthcare environment. When this studied course was revised, the framework of Moore's three types of interaction was incorporated into assessments, course content, and course delivery. Multimedia is also used to improve course contents as well as assignment deliverables.

This study is significant since online courses and programs have become an imperative part of higher education. The empirical evidence of this study might serve as a guide for other universities to determine whether the framework of Moore's three types of interaction should be adopted to engage students and attain better learning outcomes. The results derived from this study are important for subject matter experts, curriculum developers, and instructional designers who have striven to better course design, enhance course facilitation, and improve students' learning experience and outcome in the online environment.

3.3 Data Collection and Data Analysis

This study was designed to ascertain whether and to what extent substantial differences in students' academic achievement, engagement, and satisfaction are found in the revised course. Data analyses to compare the old version and new version were performed. The University has offered this course once or twice per month. It requires a pool of faculty to facilitate this studied course in order to meet the demand. However, this study only included those courses taught by the same instructors in both versions. Accordingly, the old version comprised 225 student records while the new version had 172 student records. Quantitative data were collected from multiple sources. Students' academic achievement was evaluated through three main assessments: (1) the average score of three selected discussion boards (maximum: 3 pts); (2) a 3 to 5-page written paper due by week four (maximum: 8 pts); and (3) a 3 to 5-page written paper due by week five (maximum: 8 pts). Students' engagement was measured by the total number of posts per discussion board and time spent per discussion board in three selected discussion boards. Students' satisfaction was investigated using the University's standardized end-of-course evaluation survey that was sent to selected students via email and tallied by the research staff at the University. The ratings were on a five-point Likert-type scale from strongly disagree = 0, disagree = 1, neutral = 2, agree = 3, to strongly agree = 4. The end-of-course survey encompasses three core categories: about the student, evaluation of the course, and evaluation of the instructor. The data were analyzed by Analysis of Variance (ANOVA) to determine whether students in two different versions of courses exhibited differences in academic achievement, engagement, and satisfaction.

4. Results and Discussion

4.1 Students' Academic Achievement

The first research question focuses on the learning outcomes of the old version courses and new version courses. Table 1 shows week four written assignment (W4A), week five written assignment (W5A), and the average scores of three selected discussion boards (DBs) that were used to identify the difference, if any, in student performance. The new version obtained a mean score of 7.11 from W4A while the old version had a mean score of 6.90 even though it was not statistically significant. The average scores of W5A in both new and old versions were resembling those of W4A. The mean score of three selected discussion boards from the new version was 2.87, which is slightly higher than 2.85 of the old version.

Table 1 Students' Academic Achievement

Data Source	Mean		
	Old Version (N = 225)	New Version (N = 172)	<i>P</i> -value
W4A	6.90	7.11	0.33369
W5A	6.90	7.11	0.15141
Three selected DBs	2.85	2.87	0.86645

4.2 Students' Engagement

The second research question addresses the impact of the revised course on students' engagement. This study assessed students' engagement by the total number of posting and the time spent per discussion board in three selected discussion boards. Table 2 displays the results for the engagement measurements. There was no

significant difference in the number of posting between two versions (3.35 in the old version versus 3.39 in the new version). Although similar numbers of posts were observed in both versions, students in the new version indeed spent significantly longer time reading and responding to their peers’ responses ($P < 0.001$). Students in the new version spent 151.89 minutes per discussion board in three selected discussion boards compared to 119.26 minutes in the old version.

The learning process is a social activity — not an individual endeavor. Nandi, Hamilton and Harland (2012) argued that learners must interact with each other and the course material at a deeper level, which is often observed in asynchronous discussion boards. Instead of memorizing the knowledge, learners would have internalized the shared knowledge. The quality of such interactions plays an imperative role in determining the success of online learning and teaching (Croxtton, 2014; Miller, 2015; Nandi et al., 2012). Devoting time to learning is a key measure of overall engagement, which makes student-student, student-instructor, and student content interactions possible (Miller, 2015). Students in the revised course spent considerable time constructing learned knowledge and contributing to the collaborative learning process, which is one of the most decisive factors in improving student satisfaction in the online classrooms (Nandi et al., 2012). While higher levels of thinking can be engendered in online discussions, Nandi et al. (2012) urged that the instructor should develop prompts that yield dialogue and provoke students to think critically about the information posted by the instructor and classmates.

Table 2 Students’ Engagement

Data Source	Mean		
	Old Version (N = 225)	New Version (N = 172)	<i>P</i> -value
# of Postings per DB	3.35	3.39	0.68151
Time Spent per DB (Minutes)	119.26	151.89	0.00000***

*** $p < .001$

4.3 Students’ Satisfaction

The third research question explores the levels of students’ satisfaction in the old version and new version. The results from the University’s standardized end-of-course survey were utilized to explain the difference, if any, of student’s attitude, perception, and experience in two different versions of this studied course. The end-of-course survey is an ongoing effort to acquire feedback from students across the University in a systematic way. Understanding students’ experience and satisfaction is central to improving the course curriculum and enriching the students’ learning experience. Table 3 displays students’ perception and feedback regarding the course with the 16-item end-of-course survey. Among 16 survey items, the means from 12 items in the new version were statistically significant higher than those of the old version. Especially students in the revised course felt very strong about clear instructions for completing assignments and grading, instructor’s communication and promotion of high expectations, instructor’s feedback aligned with communicated expectations, and quality of education perceived. Students in the new version also rated statistically higher for instructor’s timely feedback, feedback for improvement, consistency in grading across assignments, and promoting critical thinking. When asked if they will recommend this instructor to another student, more students in the new version said “YES” to this question, which is statistically significant.

Clear instructions for completing assignments and grading help students succeed. Baran, Correia and Thompson (2011) emphasized that instructional materials and clear instructions should prepare students for

assignments and help students learn more effectively. With assignment-specific guidelines, students can follow the guidance and achieve the learning goal appropriately. Research has shown that the most significant contributor to perceived learning is the interaction between the students and their instructor. The data analyses from Nandi and colleagues' (2012) study identified that students highly value periodic feedback from their instructor, which keeps the students on track. Another study by Ke (2010) indicated that substantial feedback provided by the instructors is essential to student's learning and satisfaction, and students reported higher satisfaction when their instructors gave confirming feedback. Conclusively, instructors play a critical role in promoting a high-quality online learning experience. The results derived from this course evaluation are congruent with the findings from previous empirical research studies.

Table 3 Students' Satisfaction

Question	Old Version (N = 86)	New Version (N = 88)	P-value
1. Clear instruction was given on how assignments would be graded.***	3.31	3.49	0.000
2. Course assignments require me to think critically.	3.55	3.55	0.956
3. Hard work is required to earn a good grad in this course.*	3.59	3.65	0.010
4. I would recommend this course to another student.	3.27	3.33	0.165
5. I would recommend this instructor to another student.**	3.21	3.38	0.002
6. Instructions for completing assignments are clear. ***	3.15	3.41	0.000
7. The course content (assignment/reading/student material) is engaging.	3.36	3.33	0.339
8. The instructor adds her/his perspective such as knowledge and experience to the course content.**	3.53	3.61	0.001
9. The instructor communicates and promotes high expectation. ***	3.45	3.59	0.000
10. The instructor fosters critical thinking throughout the course.**	3.48	3.58	0.001
11. The instructor promotes active classroom participation of students.	3.56	3.59	0.270
12. The instructor provides consistent grading across assignments.**	3.30	3.42	0.004
13. The instructor provides feedback in a timely manner.**	3.34	3.44	0.002
14. The instructor provides useful feedback for improving students' quality of work.**	3.37	3.49	0.004
15. The instructor's feedback aligns with her/his communicated expectations. ***	3.25	3.52	0.000
16. The quality of my education experience has met my expectations. ***	3.29	3.44	0.000

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

5. Limitations and Future Research

5.1 Limitations

Three chief limitations are identified in this study. First, this revised course was implemented in an online course of the master's program in healthcare administration. Hence, results drawn from this study are not generalizable to all graduate courses at other programs in a different college nationwide. Second, the end-of-course survey was managed by the University's Assessment Department. The response rate in the old version was very low. Low response rate generates non-response bias, which has significant detrimental effects on the accuracy of survey estimates. Third, the students' job status and family issues may interfere with students' learning and objective evaluation for the 6-week course.

5.2 Future Research

This study offers a foundation for future research. Students in the redesigned course rated their instructors with significantly higher scores and would recommend their instructor to another student. Such findings generate two opportunities for further investigations. First, there is a call to examine the relationship between the instructor's teaching style and students' academic performance, engagement, and satisfaction. Second, there is also a need to explore the association between the instructor's profile, such as age, gender, race or ethnicity, and students' academic performance, engagement and satisfaction.

6. Conclusions and Implications

6.1 Conclusions

In this study, the efficiency of an improved online course was evaluated in the master's program of healthcare administration. The findings derived from this evaluation study provides invaluable information as to what the vital contributors are to student's satisfaction. The empirical results from this study reveal four insights. First, well-organized courses with clear instructions for completing assessments and grading are certainly desirable. Online learning experience can be improved. It requires careful planning and coordination among the instructional designers and faculty in a deliberative effort to make it happen (Bradley, 2011; DiRamio & Wolverton, 2006; Sarder, 2014). Second, instructors should articulate their expectations of the students at the start of the course, including late policy, netiquette rules, research practices, and clear directions for participating and acquiring the best out of the discussion boards. Students are more likely to perceive a higher satisfaction when they have guidance on what is expected of them during the entire course. Third, the findings of this study highlight the importance of instructor's feedback that is timely and helpful for improving students' quality of work. Feedback, as a prime part of student-instructor interaction, helps students fathom the subject studied, and presents evident guidance on how to improve their learning. Substantive feedback facilitates learning, improves student's performance, and supports student's retention. Fourth, it is crucial for instructors to create an online learning environment that promotes student-student, student-instructor, and student-content interactions. The framework of this revised course focuses the learning module design on the Moore's (1989) three types of interactions: student-student, student-instructor, and student-content. Although the University's standardized survey did not collect the information regarding peer-to-peer interaction, this study validates previous research findings concerning the magnitude of student-to-instructor interaction, which is the most critical factor in moderating student satisfaction. An enriched students' learning experience can be accomplished when an instructor's intention of enhancing assignments and inspiring interactions fosters the development of the online learning community.

6.2 Implications

This paper provides important implications for higher education institutions and educators to improve the quality of education and retention rate in the online setting. Moore's (1989) three-part model of interaction should be taken into consideration when designing and delivering online courses that meet the diverse learners' needs in an effective and efficient approach. The course design process requires the inclusion of instructional theories and empirically tested best practices in learning that leads to satisfactory interactions. Undeniably, instructors in the online settings ought to facilitate the progress of the learning community intentionally and innovatively. To reach this aim, it is required that qualified and capable instructors promote communication and interaction, enabling

students to engage in an enhanced interactive learning experience. In reality, the ability to design and facilitate effective online courses are not innate. Hence, institutions of higher education need to recognize the eminence of providing faculty development opportunities for the realization of the online learning communities. Conversely, the instructors should make a commitment to learning the principles of course design and delivery for developing and supporting quality interactions in the online learning environment, engaging students through effective course design and delivery as well as technology integration. Once a sense of community is formed and students are satisfied with their online learning, a lower attrition rate can be achieved.

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