THE IMPACT OF INTERVENTION ON STUDENT ENGAGEMENT: AN ANALYSIS AT A US ONLINE UNIVERSITY

HWANGJI LU

Ashford University
E-mail: Hwangji.lu@Ashford.edu

Abstract - Online learning has steadily grown in popularity as an important educational venue and created a paradigm shift in the U.S. education system. The related issue about high attrition rate has concerned and impacted many higher education institutions. In this paper, student engagement from a selected course inthe master's program of health care administrationwas investigated to triangulate the outcomes generated from a main initiative implemented by the University. This study also examined the relationship between student engagement and academic performance.The comparisons in student engagement between the selected course and other courses in the same program were also performed. The findings support the outcomes produced by the university-wide initiative. The implications, limitations, and future research are also discussed.

Index Terms - Instructor's Presence, Student Engagement, Student Success, Online Learning, Attribution Rate.

I. INTRODUCTION

With the innovative computer and communications technologies, higher education in the USA has undergone a virtual transformation in the past two decades. Advanced technologies have revolutionized higher education with increased access to educational services for students [1] [2] and offered the opportunity to learn anytime, anywhere, and at any pace [1] [3] [4]. Viewed as a valuable and powerful means for teaching and learning, online learning has grown tremendously and become increasingly ubiquitous [3] [5]. The flexibility of online learning enables non-traditional students to take courses without attending scheduled classes in a specific location [6]. Online learning is a viable alternative for nontraditional degree seekers who previously may not have had access to traditional education due to geographic location, financial situation, or other obstacles [7]. Thus, it is not startling to see that students who choose to enroll online courses and programs are more likely to be older than the traditional college students, employed full-time, and/or have kid(s) at home.

However, despite the growing popularity of online education, one of the noteworthy issues is the high attrition rate. Research has documented lower retention rates in online versus face-to-face courses [3]. Student persistence and completion are of utmost significance, critical for the long-term success of students as well asreputation and longevity of the universities. There is an urgency that higher education institutions should look for ways to increase student retention and graduation rates by improving the learner's experience in the learning journey.

The research presented in this paper examined the effectiveness of intervention strategies on a selected course in the master's program of health care administration. This paper starts with a section of introduction. The literature review in the section two describes the relevant literature and research concerning student engagement and participation in the online classroom and illustrates the importance of the instructor's role in building a virtual community and increasing student success. Section three provides the background information about this case study, research design, research questions, and data analysis methods. Section four presents the findings from this study. Discussion andconclusion are main components of Section five. The limitation and future research depicted in Section six will conclude this paper.

II. LITERATURE REVIEW

A. Student Engagement and Participation

Even though online learning surmounts the constraints of place, pace, and time, students often feel isolated due to the lack of face-to-face interaction and real-time communications [4]. Students' feeling of isolation is an important issue and challenge because it could make students feel less accountable for their learning [8]. Consequently, the quality of students' online learning experiences suffers, which leads tolower student persistence, achievement, and retention [4]. On the contrary, instructors also feel frustrated when students do not engage in the class [8].

Student engagement and participation is a key factor justifying significant variations in academic performance and vital to positive outcomes of online course experiences [7] [9]. In an engaged learning environment, learners contribute toindividual knowledge and overall knowledge development in the learning community [10]. Engagement likely impacts the levelof student learning and higher order thinking [1]. When students are engaged in course activities, they have greater student satisfaction [9].Therefore, efforts to engage learners tend to generate a greater sense of communitywithin the course and a higher retention ratewithin a learning program [11]. Several research studies have documented the relationships between online course participation and student success, and positive outcomes were associated with

more time engaged in the online content [12] [13]. Since active participation and collaboration among learners is essential to effective learning [11],promoting active participation should be a priority for instructors [1]. Students' perceived level of interaction with instructors has positive correlations with learning and overall satisfaction about the courses [2].

The instructor's attitude towards online learning is deemed as a centralcause in shaping the effectiveness of student learning. The instructor's presence has its practical implications to support social and cognitive presence[1] as well.Literature indicates that the instructor plays an important role in influencing student perceptions of learning and student satisfaction [10], which is also espoused byLadyshewsky's research findings [14]. Research has supported that there is a correlation between the instructor and student satisfaction with quality of feedback and teaching [15]. Moreover, timely and consistent instructor's participation and presence in the online classroom prompt students to engage with course materials and communication channels more often [8] [17]. Students are motivated when the instructor is actively involved in academic discussion, provides timely feedback on class activities and submitted work as well as keeps students informed on matters relevant to their learning [15] [16].

It is of paramount importance that instructor's interactions uphold students' involvement throughout the entire course of learning [10]. Instructor's planned and active engagement is imperative to the quality of online learning.In the online classroom, the instructor's presence should begin even beforethe start of the course and last during the course as the instructor facilitates the discourse and delivers direct instruction whenever it is needed [1] [8]. A great instructor injects knowledge, explains content, and provides extra assistance for individual students who need help [2]. The facilitation function of the instructor makes a major contribution to a sense of community and learning [19]. The instructor's classroom management skill could have a substantial influence on the quality of online education perceived by the students, affecting the level of trust, relational building, and knowledge exchange in the virtual communities [2] [8] [19].By encouraging student engagement, instructors can have a positive impact on student learning and success. Overall, the instructor's presence must reflect upon the instructor's dual role of both moderating and shaping the direction of the discourse [2] since the instructor is omnipresent throughout the learning process and orchestrating the entire educational experience in the learning community.

B. Discussion Boards

It has been well documented in the literature that discussion boards are a fundamental requirement and the most critical aspect of active, experiential learning[18] [19]. Discussion boards are a collaborative system of learning through engagement with students and the instructor to achieve learning and teaching. Discussion boards are an indispensable part of online courses for interaction, communication, collaboration, as well as promotion of constructivist, critical thinkings, and higher-order thinking skills [1] [2] [4] [5]. As studies shown, discussion boards are also a place where learners can engage themselves socially and develop a sense of community [2] [6].

Social presence is essential to student success in online course discussions [8]. Research has revealed that the perceptions of social presence significantly predict perceptions of cognitive presence [1]. Social presence can increase levels of cognitive presence as it sets the tone of the community and enables students to feel more comfortable expressing their ideas and opinions in a discussion, which lays the foundation for higher levels of learning[1] [2]. Additionally, one of the most derived benefits of discussion boards is the capacity of fostering learner's autonomy as the instructor assists students to take on responsibility for their own learning processes, in their own time, and at their own pace to progressively decrease their dependency on the instructor and peers [3] [20] [21].

Discussion boards are the place where instructors facilitate discourse and provide instruction. Facilitating discourse includes supporting dialogue, relating ideas and concepts, detecting misconceptions, and asking for clarifications [1].The increased teaching presence in the asynchronous discussion have a positive impact on student participation and may have fostered higher levels of learning because of the provision of direct instruction from the instructor as a subject matter expert [2] [4] [20]. Although some research proposed to minimize the instructor's role in the discussion boards, several studies suggested that instructors should take on an active role in guiding students and increasing dialogue [17] [20]. Indeed, while the instructor is more active in the discussion boards, the total number of messages generated is more likely to be higher [20]. Students in well designed and well-implemented online courses learned more effectively and substantively than those in online courses where teaching and learning activities were not prudently organized and implemented [17].

Instructors also need to provide a supportive learning environment by building relationships and connecting to the community of learners [20]. Instructor's presence and engagement is pivotal to developing a positive relationship with students, which brings about their success in the course [8]. A commitment to instilling social presence activities with timely and valued encouragement and support will not only reinforce the instructor's social presence but also strengthen learners' opportunities for integrating learning more effectively [15]. Increasing Instructor's presence also helps lessen student's frustration from

perceptions of not receiving any feedback in relation to postings in the discussion boards [20]. Feedback assures students that they are on the right path and is helpful for guiding them to the next level of learning. Furthermore, students should be aware of the opportunities such a shared learning environment provided for consolidating their own learning when they reflect on the feedback given to themselves and their peers [8] [21]. The discussion boards, if successfully implemented, are able to enhance connectedness between the students and instructors [5] [8] [17]. Connectedness between students and instructors appears to support strong learning and engagement motivation. Reinhart [24] examined factors that impact student success and uncovered that students who have a strong sense of community, connectedness, and social presence are more likely to complete an online course.

Through an intensive studyexamining student satisfaction and perceived learning, Bliss and Lawrence [2] found that the extent to which instructors are perceived to facilitate discussion is correlated with students' satisfaction of online courses. Student's participation, student's quantity of posts and extent of threading were positively correlated with instructor's presence as well as feedback and guidelines for quality posts. These results indicated that instructors ought to be attentive and active in discussion boards while facilitating student participation and learning. In a quantitative study, Krentler and Willis-Flurry [22] found that regular discussion board involvement yielded highly positive learning outcomes; leaners who actively participated in class discussion online performed better with a significantly higher course grade point average than their peers.Macfadyen and Dawson [23] used data from a learning management system to explore the relationship between student's participation and the prediction of success.The findings suggested that student's participation on the discussion boards strongly predicted student success.

III. CASE STUDY

A. Background Information

A for-profit accredited university located in southwest United States has offered associate's, bachelor's, and master's degrees via online modality to adult learners. Despite the fact that the University has striven for providing high-quality, accessible, affordable, and innovative, educational programs, it suffered a high decline in student enrollment due to growing competition, new regulation, and government pressure between 2012 and 2015.

In response to this critical issue, the University has conducted studies to ascertain the reasons why students were leaving and implemented a variety of interventions aimed at supporting and fostering student success throughout a student's academic experience[25]. One of the initiatives is Top 50 Retention Intervention, which targeted courses with the highest enrollments and lowest retention rates. Top 50 Retention Intervention is a collaboration between the faculty and the academic staff, student support departments, and the Office of Institutional Effectiveness. The interventions include the creation of scalable and successful piloted approaches to the best practices for teaching; better alignment of faculty expertise with the course; enhanced full-time and part-time faculty collaboration; additional professional development offerings if needed. Overall, these efforts produced a 2.4% growth in course pass rates, a 0.7% reduction in failure rates, and a 1.7% decrease in drop rates [25].

One of the courses in the master's program of health care administration (MHA) has been included in this initiative. There has no research done to look into the impacts and outcomes of this targeted course in the past few years. Hence, there is a need to investigate on how the institutional intervention affected student engagement in this specific course in the MHA program.

B. Research Methodologies

The purpose of this research was to evaluate the impact of intervention on this targeted MHA course. More specifically, this research asked,

1. Are there any differences in student engagement between targeted course and other courses?
2. Are there any differences in student engagement among high achievers, achievers, and low achievers in the targeted course?
3. Are there any differences in student engagement between the targeted and other courses by high achievers, achievers, and low achievers?

The study population included learners enrolled in the master's program of health care administration. The University has the standardized course syllabi, course designs, and course shells to incorporate the same components into the classrooms. Data were collected from all studied classes offered during a one-year period. Students earned grades based upon the quality of the discussion postings, their participation in discussion boards, and the written assignments or other assessments such as multimedia creations. Students were categorized as high achievers, achievers, or low achievers. Students completing the course with a grade of A were classified as high achievers. Achievers completed the course receiving a grade of B. Low achievers received a grade of C, and F, or an incomplete upon the completion of the course.

For the purposes of this study, student engagement was defined as student's participation in specific learning activities. Student engagement was specifically documented through two duration variables: total time spent in the entire course as well as time spent creating new discussion posts and responding to discussion posts.

The data used in this study were collected from the Learning Management System platform and exported into an Excel spreadsheet for analysis. Subsequently, two studied variables of student engagement were calculated and expressed as hours. The data were then aggregated by and across courses for high achievers, achievers, or low achievers. ANOVA was employed to compare means between and among groups. An alpha level of $p < 0.05$ was utilized as the criterion of statistical significance for comparative tests.

IV. RESULTS

The first research question attemptedto determine if there were any differences in student engagement between the targeted and other courses. Table 1 displays twoduration variablesof student engagement from targeted and other courses. There were 307recordsin the targeted course and 2,581recordsinother courses. Students in the targeted course spent significant longer time in either entire course or discussion boards than those in other courses.

Table I Duration Variables of Student Engagement in Targeted and Other Courses

Duration (hrs)	Targeted Course (n = 307) Mean	Other Courses (n = 2581) Mean	p-value
Entire Course	62.3	43.86	0.000*
Discussion Boards	2.54	2.19	0.000*

The second research question investigatedthe differences in student engagement among high achievers, achievers, and low achievers in the targeted courses. There were 135 high achievers, 100 achievers, and 72 low achievers in the targeted course. Table 2 reveals that there were statistically significant differences among high achievers, achievers, and low achievers observed in the Entire Course from the targeted course. In terms of time spent in the Discussion Boards, there was no significant difference among three comparison groups.

Table II ANOVA Output For Student Engagement VariablesIn The Targeted Course

Student Engagement Variables	Mean Square Between Groups	Mean Square Within Groups	F Statistic	p-value
The Entire Course	6602.96	703.67	9.38	0.000*
Discussion Boards	182.24	295.55	0.62	0.54

The data were further analyzed to understand the differences between groups by the variables, entire course and discussion boards.Averagely, high achievers spent 68.51 hours in the entire course compared to 61.47 hours from achievers, and 51.80 hours from low achievers. Table 3 presents the comparisons of total time within the course for three groups: high achievers versus achievers, high achievers versus low achievers, and achievers versus low achieversin the targeted course. All threegroups exhibitedsignificant differences.

Table III The Entire Course Mean TimesFor Three Comparison Groups Shown in The Targeted Course

	Mean	p-value
High Achievers	68.51	0.047*
Achievers	61.47	
High Achievers	68.51	0.016*
Low Achievers	51.80	
Achievers	61.47	0.000*
Low Achievers	51.80	

The average times spent in discussion boards were recorded as high achievers: 2.80 hours, achievers: 2.52 hours, and low achievers: 2.06 hours. Compared to achievers, higher achievers spend longer time creating their posts and reading and responding to their peers' posts; however,it is not statistically different at the significance level of 0.05, as organized in Table 4. There were statistically significant differences in the other two comparison groups, achievers versus low achievers and high achievers versus low achievers.

Table IV The Discussion BoardsMean TimesFor Three Comparison Groups ShownIn The Targeted Course

	Mean	p-value
High Achievers	2.80	0.08
Achievers	2.52	
High Achievers	2.80	0.005*
Low Achievers	2.06	
Achievers	2.52	0.000*
Low Achievers	2.06	

The third research question sought to ascertain if there were any differences in student engagement between targeted and other courses by high achievers, achievers, and low achievers. There were 1,339 high achievers, 809 achievers, and 433 low achievers in other courses. On average, high achievers spent a total of 47.25 hours in the entire course versus 40.21 hours from achievers, and 40.19 hours from low achievers. It is no surprising to see that higher achievers, achievers, and low achievers from the targeted course spent significantly longer time in the entire course than those in other courses as demonstrated in Table 5.

Table V ComparisonsIn Entire Course Between Targeted Course and Other Courses By Academic Performance

		Mean	p-value
High Achievers	Targeted Course	68.51	0.000*
	Other Courses	47.25	
Achievers	Targeted Course	61.47	0.000*
	Other Courses	40.21	
Low Achievers	Targeted Course	51.80	0.004*
	Other Courses	40.19	

The times spent in discussion boards were recorded as high achievers: 2.37 hours, achievers: 2.02 hours and low achievers: 1.98 hours from other courses. Apart from low achievers, as shown in Table 6, high achievers and achievers in the targeted course spent statisticallysignificant longer time creating their posts and reading and responding to their peers' posts than those in other courses did.

Table VI ComparisonsInDiscussion Boards Between Targeted Course and Other Courses By Academic Performance

		Mean	p-value
High Achievers	Targeted Course	2.80	0.007*
	Other Courses	2.37	
Achievers	Targeted Course	2.52	0.003*
	Other Courses	2.02	
Low Achievers	Targeted Course	2.06	0.653
	Other Courses	1.98	

V. DISCUSSION AND CONCLUSION

Discussion

Online courses and programs provide better access, convenience, flexibility, time-saving, and cost-saving to learners who canconnect with others without boundaries.Higher education institutions have embraced this form of alternate learning as a new way to better serve their non-traditional students as well as enroll and graduate more students. As online education expands in an amazing speed, student retention rate has been a major concern in many institutions for over a decade.Low retention rate results in not only poor perception of quality education but also losses in reputation and financial strength in the institutions.

The University encountered a tremendous drop in student enrollmentfrom 2012 to 2015. In order to survive and prosper in this competitive landscape, the University has successfully implemented a wide range of evidence-based practices institution-wide. It is also of importance to analyze and understand the effect of the intervention in the individual courseincluded in the intervention.

As expected, findings from this study revealed that there were significant differences in the students' behaviors in the target courses compared to those inother courses when the time spent in the entire course and discussion boards were evaluated. Numerous research studies have reported that instructor's active presence and participation strength students' involvement through the entire course of learning[10] [12]–[17] and engagement in discussion boards [2] [8] [19] [20]. The results derived from this study buttress previous empirical studies.

Several research studies have demonstrated the relationships between online course participation and student success, reporting thatbetter learning outcomes were associated with more time engaged in the online content [12] [13] [26].Ryabov's research [27] suggested that time spent in the online course matters for achieving a better academic grade.As Macfadyen and Dawson affirmed,time spent in discussion boards is one of the key variables to explain the student's final grade[23].Andersen [28] provided a thorough review of the literature regarding asynchronous discussion forums, finding that students who spend more time to formulate their thoughts also benefit from online discussions and are able to generate the critical dimensions of learning. In current study, high achievers who spent significantly more time on the tasks and engaged in online learning activities in the entire course and discussion boards performed better than their peers, achievers and low achievers. These resultsconfirmed and supported the assertions obtained fromprevious studies.

Conclusions

This study presents empirical evidence to espouse the efforts and outcomes manifested in the Office of Institutional Effectiveness of the University. This study is significant as more and more higher education institutions offer online courses and programs. The findings of this study might serve as a guide for other universities to determine what interventions would benefit student learning, persistence, and retention the most. There are some implications in faculty selection, training, and resourcing. The finding from this current study suggests that professional development in facilitating online courses is needed.Online instructors ought to possess the knowledge and skillsin engaging students during the entire learning process, so that adequate levels of teaching and social presence would support student success and help the institution achieve its mission and vision.

LIMITATIONS AND FUTURE RESEARCH

There are three limitations in this research. First, this study looked at student engagement in the online classes offered by the master's program in health care administration at a single university. Different programs and universities have different posting requirements and norms surrounding participation. Thus, the current findings have littlepower of generalizability.

The second limitation of the present study is that this research study focuses on analyzing quantifiable behaviors including time spent in the discussion board, rather than actual discussion content since time spent in the discussion board is a main indicator in student engagement as suggested in the literature.While this is a suitable methodology,some researchersmight argue that the quality of instructors' posts could be a more appropriate indicator.

The lack of surveying students' experience and opinion is considered as the third limitation. As documented in literature, robust instructor's presence and support lead to student success in the online learning [11]–[13] [19]. Nevertheless, each instructor has his/her own teaching style and classroom management methodology. This study did not seek students' points of view on teaching effectiveness. Additionally, there is no evidence to show that how many hours students spent outside the classroom engaging in other learning activities contributing to student success.

Overall, the future researchmightinclude quality of discussion posts as a study variable toexamine whether high quality posts bystudents is correlated with the academic performance. The future research might also design a survey to ascertainstudents' experience in the online learning, so that teaching effectiveness and the better predictability of students' behaviors and academic performance could be accomplished.

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