IMPROVING THE ASYNCHRONOUS ONLINE LEARNING ENVIRONMENT USING DISCUSSION BOARDS

By

ILENE RINGLER * CAROL SCHUBERT ** JACK DEEM ***
JIMMIE FLORES **** JILL FRIESTAD-TATE ***** ROBERT LOCKWOOD ******

** Professor, MBA program, Kaplan University.*
*** Professor, Graduate School of Business and Information Technology, Kaplan University.*
**** Academic Department Chair, School of Business and Information Technology, Kaplan University.*
***** Professor, School of Business and Information Technology, Kaplan University.*
****** Adjunct Professor, Graduate School of Business and Information Technology, Kaplan University.*
******* Professor, School of Graduate Education, Kaplan University.*

ABSTRACT

Discussion Boards are at the heart of an Asynchronous Online Learning or Distance Education Environment and can have a great impact on the learning experience. Understanding the individual factors that create a high quality discussion board experience for students and their interrelationships is critical to continuous improvement in distance education. Research which contributes to increased effectiveness of virtual Discussion Boards for both instructors and students can result in greater student involvement and success in learning new skills.

This paper discusses Phase 1 and 2 of a multi phase applied research effort on improving the quality of virtual Discussion Boards. "Applied research is defined as systematic study to gain knowledge or understanding necessary to determine the means by which a recognized and specific need may be met" ("Research and development," 2010, para 4). The study was completed in two phases with additional phases to be developed as the data analysis continues to yield results. In Phase 1, a literature review was completed and qualitative data employing a focus group methodology was completed. The focus group was comprised of full time faculty from a large, proprietary, online university with significant experience in the use of Discussion Boards. The data was collected from the focus group and was analyzed to create hypotheses for additional research on the topic. Phase 2 focused on collecting data utilizing a quantitative research methodology supported by continued research of the literature on this topic. The results of the data analyzed during these phases will become the basis for additional studies on recommended best practices in discussion board participation as it applies to both the student and the instructor.

Keywords: Discussion Board, Online Learning Virtual Classroom, Blooms Taxonomy, Asynchronous Online Learning, Distance Education.

INTRODUCTION

Discussion Boards are at the heart of an asynchronous online learning or distance education environment and can have a great impact on the learning experience. Reonieri (2006) and Birch & Volkov (2007) concluded that both students and faculty believe that online Discussion Boards contribute to learning. There are many benefits to Discussion Boards including: classroom community building; facilitating exploratory learning; increased reflection time for students prior to posting thoughts before responding to other's thoughts; improved thinking and writing skills; and facilitation of learning by giving students an opportunity to read the work of others and respond to the work (TeacherStream, LLC, 2009, "Using Online Discussion," 2011).

Mooney, Southard, and Burton (2014) described typical online threaded Discussion Boards as opportunities for students to respond to an instructor-posted assignment, using supporting materials and direction in a time controlled environment. Instructors often participate in and

monitor responses, providing additional support where needed. Gilbert and Dabbagh (2005) report that "a major challenge facing the instructor in distance learning is how to structure online discussions in order to engage students in meaningful discourse" (para. 1). Understanding the individual factors that create a high quality discussion board experience for students and their interrelationships is critical to continuous improvement in distance education. Research which contributes to increased effectiveness of virtual Discussion Boards for both instructors and students will result in greater student involvement and success in learning new skills.

This paper will discuss Phase 1 and 2 of a multi phase applied research effort on improving the quality of virtual Discussion Boards. "Applied Research is defined as systematic study to gain knowledge or understanding necessary to determine the means by which a recognized and specific need may be met" ("Research and Development," 2010, para 4). The results of the data analyzed during these phases will become the basis for additional studies on recommended best practices in discussion board participation as it applies to both the student and the instructor.

1. Literature Review

A literature review is a valuable tool to gain a greater understanding of the areas under study. Literature reviews serve many purposes in research, including the process of surveying the state of knowledge on a topic (Baumeister & Leary, 1997). The results of the literature review for this paper provided a high level of benchmark information about Discussion Boards within certain categories, but did not offer new interpretations of the information. It was used for two purposes: 1) as a foundation for future research in the next phase(s) of this study, and 2) as a comparison to the other data gathering processes.

The literature review revealed many factors contributing to student participation in the Discussion Boards such as class size, constructive instructor responses, and the use of rubrics. The results of the literature review indicated that there are multiple factors which impact the success of Discussion Boards and students' desire to participate in them, which is discussed in greater detail within the body of the literature review.

1.1 Motivational Factors

From a motivational perspective, research findings help increase our understanding of student participation. Xie, Durrington, and Yen (2011) conducted a study that addressed the relationship between student intrinsic motivation and overall participation in online discussions. The results indicated there was no relationship between students' intrinsic motivation and their participation in online discussions at the initial stage of a class. However, the relationship between motivation and participation became stronger and significant as students progressed though the class. The research seems to indicate that students' motivation was related to their online participation, but the relationship needs time to be established. Active peer involvement also positively affected motivation (Xie, DeBacker & Ferguson, 2006).

Nandi, Hamilton and Harland's (2012) study looked at the nature of questions in relation to student motivation to participate and found that when posts were more controversial, they stimulated discussion. These posts often dealt with real world experiences and observations. When instructor posts answered a student's question, discussion often stopped. Birch and Volkov (2007) added that when students were able to learn about each other's' ideas and experiences and were able to apply theory to real world outcomes, they were more motivated to participate in discussions.

The literature review on factors relating to class size and student participation produced interesting findings. Discussion board size and valued responses were studied by Reonieri (2006). Reonieri found that the optimal online discussion size was 10-15 students. Fewer than that number resulted in students and faculty feeling that there were too few perspectives offered. More than 15 students caused students to feel overwhelmed. Still, given the choice, both faculty and students felt too few learners in online Discussion Boards was preferable to too many (over 15). Bliss & Lawrence (2009) noted that nearly twice as many students posted in small versus large online groups. Within those small groups, students posted 2.5 times more often than they did while participating in large groups, although

the definition of a small group was not reported in the study.

Motivation, types of questions, and class size are all factors that affect student participation in Discussion Boards. Grading and the use of rubrics to provide feedback was found in the literature review to be another important factor in students' motivation to participate in online discussions. Grading discussions can "motivate students to greater participation…and increase sense of community" (Rovai, 2006, p. 79). Birch and Volkov (2007) data noted that students reported that specific requirements for participating in Discussion Boards helped them to stay on task in the course.

Using rubrics supports the andragogical perspective as it aids adult learners to identify critical elements of assignments by indicating their importance, which helps in early stages of problem-solving. Rubrics guide students in achieving the highest levels of success and performance when they are clear: learning objectives are identified, student expectations are provided, and criteria related to how performance will be assessed are included (Bolton, 2006). While rubrics take time to create, they are instrumental in helping evaluate assignments and link the assignment to outcomes and objectives. Bolton (2006) reported positive aspects of using rubrics including: their use as a guide to performance, their use in identifying expectations and standards of given assignments, their use in identifying critical issues within an assignment, and their value in providing feedback on student work.

The most reported drawback to using rubrics from the students' perspectives was the potential "to limit student creativity in preparing assignments" as using them created a "restrictive environment with little room for interpretation" (p. 6). In spite of this drawback, rubrics have been shown to increase performance by reducing ambiguity and uncertainty. Rovai (2006) supports the inclusion of the following areas within rubrics for Discussion Boards: qualitative (number of interactions and time of interactions during week), content, questions that promote discussion, collaboration (directing questions/comments to students versus the instructor), tone, and mechanics.

1.2 The Instructor's Role

The role of the instructor is critical to keeping students motivated to participate in ongoing discussions. "Research indicates that teacher presence has an impact on students' success in online learning (Bliss & Lawrence, 2009; (Sheridan & Kelly,2010, para 8). Freeman (2014) cites Palloff and Pratt (1999) who stated, "The instructor's role in the online discussion is to encourage critical reflection and knowledge construction in a learning community" (para 8).

Anderson, Rourke, Garrison & Archer (2001), as cited in Bliss and Lawrence (2009) stated ,"Instructors may use several strategies for facilitating discourse, such as 'identifying areas of agreement/disagreement, seeking to reach consensus and understanding, encouraging, acknowledging, and reinforcing student contributions, setting the climate for learning, drawing in participants and prompting discussion, and assessing the efficacy of the process'" (p.17). MacKnight (2000) suggested that instructional behaviors helpful in promoting social presence include: reviewing discussions each day and responding to at least one message per day, avoiding negative feedback or being overly critical, summarizing student comments at various points in the week, asking questions that promote reflection, making students accountable for their thinking, and responding immediately after receiving an email.

1.3 Discussion Board Question Creation

There has been little empirical research specific to the topic of effective Discussion Board (DB) questions. Most of the research that has been done investigates the quality of responses rather than the content of the questions. Examples of such research include Lester and King (2009) and Pena-Shaff, Altman and Stephenson (2005).

Indeed most of the literature on the topic of discussion board questions falls into the categories of what to do and what not to do. Little or no evidence from research is provided to support the claims of these works. Examples of such work include: Akin and Neal (2007); Bender (2003), Berge and Muilenburg (2002); Maddix (2012); Milman (2009) and many others.

Maddix (2012) synthesized the key to do's into the following list: "1.Use open-ended questions; 2. Base questions on higher levels of Bloom's taxonomy; 3. Utilize probing questions (Socratic method); 4. Play devil's advocate; 5. Promote diverse viewpoints; 6. Require supporting

evidence for the opinions stated; 7. Require synthesis of theory and personal experience" (p. 380-381). Bender (2002) suggested areas to avoid include vague questions, questions with yes or no answers and multiple questions in one thread. The research efforts did surface additional information on Bloom's Taxonomy, identified by Maddix as one of the key to-do's above. Understanding and using Bloom's Taxonomy to create questions increases the expectation for students to critically think, particularly in an online setting where it is important to gauge how students connect knowledge, experience, content and theory. "Thought-provoking questions require that students go beyond facts and use knowledge (recognizing assumptions, implications, and consequences) in the exercise of judgment". The six categories, through which students can progress, ranging from lower level critical thinking skills to high-level skill respectively, include knowledge, comprehension, application, analysis, evaluation, and synthesis (Bloom and Krathwohl, 1956). Anderson and Krathwohl (2001) revised Bloom's Taxonomy to include both cognitive process and knowledge dimensions as there is some level of overlap between the categories.

Miller (2014) discussed the results of a study that analyzed hundreds of discussion prompts and posts in online courses, which found that the level of thinking within student responses is related to the type of instructor prompts. If an instructor uses prompts, activities, or assignments associated with lower levels of Bloom's Taxonomy, then students become conditioned to think at those levels.

2. Purpose of the Study

The purpose of this study was to examine student and instructor interactions on Asynchronous Discussion Boards to further develop best practices for improving participation within the online learning environment. As previously reported, Cheung, Hew, and NG (2008) posit that student participation in discussion results in higher order learning. It stands to reason that if student participation in such Discussion Boards is increased, so will the associated learning, both in terms of quality and quantity. Accordingly, the study concentrated on factors affecting student participation in Discussion Boards.

The study was completed in two phases. In Phase 1, a literature review was completed and qualitative data employing focus group methodology collected. The focus group was comprised of full time faculty from a large, proprietary, online university with significant experience in the use of Discussion Boards. The data collected from the focus group was analyzed to create hypotheses for additional research on the topic.

2.1 Phase 1

The results of the data analyzed in this phase became the basis for the Phase 2 study. The venues for collecting data in the Phase 1 are outlined below.

Qualitative data gathering, employing a focus group methodology - Researchers (Cooper & Schindler, 2002; Creswell, 2005 and Neuman, 2003) have described focus groups as a process whereby interviewers ask open-ended questions, listen to, and record the comments of the respondents for analysis. Then, Rankin and Ali (2104) suggest that focus group questions should be broad based, a suggestion followed by the research team in preparing the questions.

The focus group for this study was the full-time faculty reporting to the Department Chair in the School of Business and Management of one online, proprietary, higher education provider serving in excess of 17,000 students. Participants were graduate business professors with backgrounds in industry and education that possessed many years online teaching experience. Courses taught by participants spanned a range of classes from introductory classes to capstone courses within the University's MBA program. A qualified facilitator who was not affiliated with the University conducted a teleconference meeting. The teleconference meeting was recorded and transcribed, but no names were assigned to participants. Teleconference meetings have been cited by researchers as an effective qualitative data gathering methodology offering benefits that traditional face-to-face cannot, including ease of recruitment, lower cost, and increased level of anonymity for participants (Creswell, 2005; Tolhurst& Dean, 2004).

The sample size was potentially 25 with five actual participants. No member of the research team attended

or provided input at the meeting. All members of the research team were either full-time faculty in the School of Business and Management or management staff of the department, reducing the possible sample size by five. Participants volunteered to provide feedback, which may have disproportionally skewed the responses if they participated because they were the most vocal, supportive or critical; however, because participants were anonymous, the researchers cannot say with certainty that this occurred. The small sample size for this data gathering process did not reduce the effectiveness or validity of the results. Researchers (Marshall, 1996; Patton 2001; Sandelowski, 1995) posited there is no predetermined adequate sample size. The researcher ultimately determines how much data to gather based on how the information answers the research questions.

Questions including, but not limited to, the following were administered in the teleconference focus group:

1) What is your overall opinion of the quality of the discussion board questions for the classes that you teach? Why?

2) What recommendations would you have to improve these boards?

3) Do you have any best practices that you use in your classroom or have come across in your work that you would like to share? These best practices can encompass all areas relating to Discussion Boards and may include but not be limited to:

a) Creating a culture of community in Discussion Boards, level and types of instructor interaction

b) Creation of discussion board questions

c) Use of resources/technology/multimedia

d) Grading and feedback

e) Articles or other resources that you have found helpful in this area that you would recommend.

Participants received an Informed Consent letter, which acknowledged participants' permission to participate in this research study. Transcription documents from the recorded focus groups were kept in a locked storage cabinet for a period of time not to exceed one year after completion of the study. Transcription documents were then shredded.

A comprehensive literature review – The span of the literature review encompassed a variety of sources including Scholarly Journals, Websites, and other sources seen as important to the collection of information. "A literature review surveys Scholarly Articles, Books and other sources (e.g. Dissertations, Conference Proceedings) relevant to a particular issue, area of research, or theory, providing a description, summary, and critical evaluation of each work" ("Write a literature," n.d, para 2).

2.2 Phase 2

This phase focused on collecting data utilizing a quantitative research methodology supported by continued research of the literature on this topic. Hutcheson and Moutinho (2011) stated, "The end point of all quantitative research is at the least to establish that there is an association between factors A and B" (p. 12). The research was conducted within the same online proprietary higher education provider serving in excess of 17,000 students used in Phase 1. The classes studied represented beginning, middle, and end of program requirements for the MBA program. The instructors who taught these courses were both full-time and adjunct. All students were required to take these classes to achieve degree completion.

Within the results of Phase 1, faculty feedback indicated that a relationship exists between class size and student participation in Discussion Boards, which aligns with the work of Reonieri (2006) who stated that the optimal class size is 10-15. Accordingly, Phase 2 of this study focused on the following hypotheses.

2.2.1 Hypothesis H1

There is a negative relationship between posts/students and class size.

The literature suggests that there is relationship between teacher presence and student participation in Discussion Boards (Sheridan & Kelly, 2010). Accordingly, this hypothesis was added to the study parameters.

2.2.2 Hypothesis H2

There is a positive relationship between the number of instructor posts and the number of posts/student.

Previous research by Miller (2014) supports the notation that discussion questions based on higher levels of Bloom's Taxonomy elicit higher levels of critical thinking. The proposition is that this will lead to higher student participation in the discussions as well. Accordingly, this hypothesis was added to the study parameters.

2.2.3 Hypothesis H3

There is a positive relationship between the Level of Bloom's Taxonomy of the Discussion Board topic and the number of posts/student.

Based on the focus group data from Phase 1, it is further proposed that participation will be greater when the discussion board grade had a bigger impact on the final grade for the course. Accordingly, this hypothesis was added to the study parameters.

2.2.4 Hypothesis H4

There is a positive relationship between the score on a Discussion Board and the number of posts/student.

As a class progresses, and the final grade becomes more determinant, students may be less inclined to participate in Discussion Boards. Accordingly, this hypothesis was added to the study parameters.

2.2.5 Hypothesis H5

There is a negative relationship between the unit number and the number of posts/student.

Instructor status, adjunct versus full time, may have an effect on student participation in Discussion Boards. However, the expectation is that any effect would be insignificant. Accordingly, this hypothesis was added to the study parameters.

2.2.6 Hypothesis H6

There is a no relationship between instructor status and posts/student in Discussion Boards.

The data set consisted of a convenience sample as "elements have been selected from the target population on the basis of their accessibility or convenience to the researcher" (Ayiro, 2012, p. 220). The goal was a 100 % sample of discussion board instructor responses from three MBA core classes. Data was collected by the Department Chair from all sections of these classes from January 30 to July 23, 2013. The Department Chair normally collects and monitors data including number of posts per instructor as described in the study as a core responsibility. Data was collected by section and term with all sections coded to eliminate risk to participants. This method of data gathering, targeting the entire population, reduces the possibility of sampling error because the sample size is large and more representative of the population under study (Creswell, 2005; Salkind, 2003). All instructors who taught sections of these classes were asked to complete an Informed Consent Letter, which when returned indicated participant permission to participate in this research study. These documents were kept in a locked storage cabinet for one year after completion of the study and then shredded.

3. Method-Data Analysis and Initial Results

Phase 1 -Qualitative- Data obtained from the transcribed notes of the focus group teleconference was systematically organized into phrases, sentences, or whole paragraphs and classified into categories (codes), which were analyzed for trends.

1) Literature Review- All researchers reviewed all documents listed in the literature review and contributed to a master document which then was analyzed for trends.

2) The analysis tool for this qualitative analysis was nVivo version 10. nVivo is an internationally recognized software analysis tool which "helps you manage, analyze and report on unstructured data like interviews, websites, images, videos and social media posts" ("About qsr," 2013). The final analysis and recommendations for future research were derived from the results of the analysis.

3.1 Phase 1

The focus group transcript and the literature review documents were analyzed for trends and themes using nVivo as a coding tool. The initial analysis results are chronicled below.

3.1.1 Purpose of Discussion Boards

The review of the focus group and the literature review data on the purpose of Discussion Boards showed strong areas of agreement on the following:

- Students and instructors felt that Discussion Boards were

integral to the learning process in an online environment.

- Discussion Boards were viewed as a developmental process for students on both a personal and professional level. Specific examples included: learning about other students' background and experiences, applying theory to real world outcomes, using logic to present an argument, gaining the expertise to present to upper management and defending their decisions.
- There were no significant data points of differences from either the focus group or literature review relevant to this analysis.

3.1.2 Overall Quality of Discussion Boards

1) Instructor Interaction

a) Areas of Agreement In Literature Review and Focus Group:

- It is the responsibility of faculty to shape the online discussion and create the culture to support it.
- Instructors should be frequent contributors to the discussion board.
- Instructor's role in the discussion board process should include: providing guidance and focus to students on the discussion board content, offering personal real life examples, asking probing follow-up questions to encourage additional discussion, and encouraging proper discussion protocol.

b) Specific Focus Group Information:

- Instructors should use their participation time and energy to encourage subject mastery versus seeking opinions. Some feedback in the focus group suggested that when an instructor asks follow-up questions relating to subject mastery or class reading, the students do not respond as readily.

2) Class Size

a) Areas of Agreement In Literature Review and Focus Group:

- The literature review results focus on small class size, with 10-15 students per class being optimal (Reonieri, 2006). Focus group results also identified class size as important and noted that current class sizes, oftentimes over the 15 student limit identified in literature review, can be a negative factor.

b) There were no significant data points of differences from either the focus group or literature review relevant to this analysis.

3) Creation of discussion board questions

a) There has been limited empirical research specific to the topic of effective Discussion Board (DB) questions. Most of the published research investigates the quality of responses rather than the content of the questions. There were some areas of agreement between focus group and literature review results:

- Develop questions using established standards (i.e., Department of Education, Blooms Taxonomy)
- Questions should be developed to promote meaningful discussion including current events or controversial topics

b) Focus group-There was strong consensus on these areas from the focus group participants:

- Create a strong tie in to unit outcomes and other assignments
- Only one or two questions per unit
- Questions can be multi-level
- Questions can be created in a list format
- Focused on subject mastery and developing content competence
- Reduction of reflection based questions
- Current process is insufficient to allow faculty to develop high quality questions. Concerns included: inadequate development time, limited ability to get feedback from others on question quality, little ability to easily revise questions that are not achieving the desired outcomes due to curriculum constraints.
- Inconsistency in standards on question creation (i.e., what one professor considers a quality question, others may not).

4) Grading

a) Use of Rubrics

- Areas of Agreement In Literature Review and Focus Group:

(1) Rubrics are seen as important to give students specific direction on discussion board requirements and help guide students to using proper discussion protocol. Rubric elements can include: frequency, quality, length, content detail and scholarly source support for work.

(2) Grade according to the rubric so students are clear on why the grade has been applied.

(3) Rubrics that are too strict may reduce quality of discussion conversation, but rubrics have been shown to increase performance by reducing ambiguity.

- Focus Group findings included:

(1) Posting examples in the classroom to demonstrate good performance that are based on rubric requirements

b) There were no significant data points of difference from either the focus group or literature review relevant to this analysis.

5) Use of Technology

a) The literature review results indicated that the use of technology based tools (i.e., Wiki's, YouTube, screencasts and Prezi) can increase quality of discussion, question creation and increase student participation.

b) The focus group results were directed more toward the use of technology in the use of grading and indicated that current "Off the Shelf" tools were unsatisfactory in providing individualized feedback to students.

Phase 2- Quantitative Analysis - The discussion topics remained the same for all students in a given course during the review period. The data was extracted from all Discussion Boards in three MBA Program core courses between January 30 – July 23, 2013. The classes studied represent beginning, middle, and end of program requirements in the MBA program. All MBA students were required to take these courses. Courses had six units, with one unit completed per week. Each unit started on Wednesday and ended the following Tuesday evening. The course syllabus, a document standardized across all MBA courses, defined posting requirements for quality, quantity and time frames. For example, discussion responses, including the first post, were to be completed by Saturday evening and each student was required to post on three days per unit to receive full credit. The following are the hypotheses that were reviewed for efficacy for this phase of the study:

H1: There is a negative relationship between posts/students and class size.

H2: There is a positive relationship between the number of instructor posts and the number of posts/student.

H3: There is a positive relationship between the Level of Bloom's Taxonomy of the Discussion Board topic and the number of posts/student.

H4: There is a positive relationship between the score on a Discussion Board and the number of posts/student.

H5: There is a negative relationship between the unit number and the number of posts/student.

H6: There is a no relationship between instructor status and posts/student in Discussion Boards.

Based on the hypotheses, the following data were collected for this study:

a. Class number
b. Unit number or week
c. Instructor status – Full Time/Adjunct
d. Class Size
e. Total Posts to the Discussion Boards
f. Number of Instructor Posts
g. Number of Student Posts
h. Discussion Topic number
i. Bloom's level associated with Discussion Topic
j. Available points associated with the Discussion Board.

3.1.3 Descriptive Statistics

A total of 38 courses, with a combined enrollment of 791 students, were included in this study. These 38 courses contained 303 different discussion board questions. In some courses, and in some units, there were two different discussion board questions. All other units had one discussion board question. Each discussion board question was evaluated using the Bloom's et al Taxonomy of Cognitive Objectives (Bloom &Krathwohl,1956). The coder had experience with curriculum development and had an

in-depth knowledge of Bloom's Taxonomy. Table 1 shows the frequency of each level of the taxonomy and shows that about half the questions (49.9%) were classified at the three highest levels.

There were 11 full-time faculty and 27 adjunct faculty represented in the 38 courses. The average number of posts per instructor per unit was 16.91 and the average number of posts per student per unit was 4.61. The mean class size was 20.82, while the median and the mode were both 21. The minimum class size was 13 and the maximum class size was 24.

In 34 of the 38 courses, the total point value for the discussion across all units was 240 points. In the remaining four courses, the total value for the discussion questions was 300 points. These represent 24% and 30% of the students' final course grade respectively. This may indicate that the students were motivated to earn those points, which supports the thoughts discussed in Rovai's (2006) work. "Consequently, the instructor must provide a measure of extrinsic motivation (i.e., motivation induced by external factors) for students to participate in dialog" (pg. 79).

3.2 Phase 2

The first hypothesis that there is a negative relationship between posts per student and class size was investigated using bivariate correlation. The correlation between posts per student and class size was not statistically significant ($r = -0.014$, $p = .813$) and therefore this hypothesis was not supported. The first hypothesis that class size was negatively correlated with the number of posts per student was not significant but that may be a function of the restriction in range of the class sizes. There were only four courses that had enrollments below 20 (19, 17, 14, 13) and therefore it might be expected that this restriction would attenuate the correlation. The mean number of posts per student in the four courses with enrollments less than 20 was 4.68 and the mean for those classes with enrollments of 20 or more was 4.59. This is not a large difference but it may indicate that further research is needed to determine the relationship between class size and student participation in the discussion board. These results should be considered inconclusive.

Bloom's Level	Frequency
Knowledge	0
Comprehension	45
Application	107
Analysis	95
Synthesis	34
Evaluation	22

Table 1. Discussion Board Questions Classified Using Bloom's et al Taxonomy

The second hypothesis that there is a positive relationship between the number of instructor posts and the number of posts per student was investigated using bivariate correlation. The correlation between posts per student and number of instructor posts was statistically significant ($r = 0.224$, $p = .000$) and therefore this hypothesis was supported. The second hypothesis was supported and it was expected that instructor participation would be related to student participation in the discussion board. One effective method for increasing student participation in the discussion board is to engage in Socratic questioning to further engage the student.

The third hypothesis that there is a positive relationship between the Bloom's level of the discussion board question and the number of posts per student was investigated using bivariate correlation. The correlation between posts per student and the Bloom's level was statistically significant ($r = -0.139$, $p = .016$) and therefore this hypothesis was supported. The third hypothesis was also supported reflecting a significant correlation between the judged Bloom's level of the discussion board question and student participation. The small but significant correlation indicates that as the level of the question increases so does the student participation. This finding should encourage course designers to include the higher level type of questions in the Discussion Boards for all courses.

The fourth hypothesis that there is a positive relationship between the possible score on a discussion board and the number of posts per student was investigated using bivariate correlation. The correlation between posts per student and points for the discussion board was not statistically significant ($r = -0.005$, $p = .932$) and therefore this hypothesis was not supported.

The fifth hypothesis that there is a negative relationship between the unit number and the number of posts per student was investigated using bivariate correlation. The

correlation between posts per student and unit number was not statistically significant (r = -0.024, p = .679) and therefore this hypothesis was not supported.

The sixth hypothesis that there is no relationship between instructor status and posts per student in Discussion Boards was investigated using the point-biserial correlation. The point-biserial correlation, which is mathematically identical to the Pearson correlation coefficient, between posts per student and instructor status was statistically significant (r = -0.197, p = .001) and therefore this hypothesis was supported. The sixth hypothesis was supported showing that there is a negative point-biserial correlation between instructor status and student participation. In this study, full-time instructors were coded as 1.00 and adjunct instructors were coded 0.00. The negative correlation would indicate that there are more posts per student for adjunct faculty than for full time faculty. An independent samples t-test was conducted to further explore this finding. The mean post per student for adjunct faculty was 4.689 and for full time faculty the mean was 4.344. This difference is statistically significant (t = 4.042, p = .000). The actual difference in the number of posts per student is not large enough (.3456) to be able to detect the difference merely by looking at or counting the posts per student for each classification of instructor.

Table 2 shows the correlation matrix for all of the variables included in the six hypotheses. The hypotheses that were supported, that is, the correlations that were statistically significant, are highlighted in the table.

3.3 Additional Discussion

Stepwise regression to predict discussion board posts per student was conducted using the three variables shown to correlate with the number of posts per student, instructor status, number of instructor posts, and Bloom's taxonomy level. The results of the stepwise regression included the instructor status and number of instructor posts as predictors and excluded the Bloom's Taxonomy level. The multiple R was .270. While this is not a great increase over the bivariate correlation of posts per student and number of instructor posts (r = 0.224), it does add to the correlation. Table 3 presents the results of the stepwise regression procedure.

From the results presented in Table 3 the following prediction equation was generated from the stepwise regression procedure:

Number of Posts per Student = 4.310 + .028(number of instructor posts) - .272 (instructor status)

Once again this indicates that assuming the number of instructor posts are the same between full time and adjunct faculty, the difference in the predicted number of posts per student is only .272.

Limitations

- The sample was taken from one institution of higher education. Cultural aspects of that one institution may

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.275[a]	.075	.066	.7208

a. Predictors: (Constant), Number of Instructor Posts, Blooms Level, Instructor Status

Coefficients [a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	4.447	.194		22.865	.000
	Instructor Status	-.236	.107	-.135	-2.201	.029
	Blooms Level	.037	.041	.055	.907	.365
	Number of Instructor Posts	.028	.009	.185	3.224	.001

a. Dependent Variable: Posts per Student

Table 3. Stepwise Regression to Predict Number of Posts per Student

	Posts per Student	Number of Instructor Posts	Blooms Level	Point Value	Unit Number	Instructor Status	Class Size
Posts per Student Pearson Correlation	1	.224**	-.139*	-.005	-.024	-.197**	-.014
Sig. (2-tailed)		.000	.016	.932	.679	.001	.813
N	303	303	303	303	303	303	303

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

*. Correlation is significant at the 0.05 level (2-tailed)

Table 2. Summary of Correlational Analysis of Hypotheses 1 – 6

have affected the results.

- The students in the study are not traditional students (18-26 years of age). Most are working adults and have family responsibilities. These factors could affect the results.
- The institution under study uses an online platform exclusively. It is possible that students from a hybrid programs combining traditional classroom and online platforms may produce different results.
- The institution under study has specific minimum expectations for posting, including posting by Saturday, day 4 in the weekly schedule and on at least 3 different days. It is not clear what effect these expectations might have on the results.
- The number of weeks in a semester could be a factor in the results from a participation perspective. A 16 week semester could produce different results than one with a 6 week duration.

5. Recommendations and Areas for Further Research

Many factors collectively affect the learning and interaction in an online Discussion Board thread. The purpose of both phases of this study was to analyze some of those factors in order to determine the relationship between the interaction levels of students and faculty. Based on the information collected and analyzed from both study phases, the following recommendations are suggested for continued research and implementation:

1. Investigate the creation of a training module for students related to proper Discussion Board etiquette and expectations to be posted in all courses within the curriculum, with particular attention being placed on entry-level courses.

2. Develop guidelines for course developers to guide Discussion Board question creation in course development.

3. Work with the training department to develop research-based materials for instructors on how to effectively facilitate and engage students in online discussions.

4. Continue research related to class size and discussion quality as well as best practices for the creation of discussion questions.

5. Use a student focus group in order to vet discussion questions prior to launch in a classroom setting.

6. Encourage other researchers to continue research in this area using larger sample sizes as well as additional organizational members.

References

[1]. **About qsr. (2013).** Retrieved from http://www.qsrinternational.com/about-qsr.aspx

[2]. **Ayiro, L. P. (2012).** *A Functional Approach to Educational Research Methods and Statistics : Qualitative, Quantitative, and Mixed Methods Approaches*. Lewiston, N.Y.: Edwin Mellen Press.

[3]. **Leary, M. R., &Baumeister, R. F.(1997).** Writing Narrative Literature Reviews. *Review of General Psychology*, Vol.1, No3, pp.311-320.

[4]. **Bender, T. (2003).** *Discussion Based online Teaching to Enhance Student Learning: Theory Practice and Assessment.* Sterling, Va: Stylus Publishing.

[5]. **Birch, D., &Volkov, M. (2007).** Assessment of online reflections: Engaging English Second Language (ESL) students. *Australasian Journal of Educational Technology*, Vol.23, No.3, pp.291-306.

[6]. **Bliss, C., & Lawrence, B. (2009).** "Is the whole greater than the sum of its parts? A comparison of small group and whole class discussion board activity in online courses". *Journal Of Asynchronous Learning Networks*, Vol.13, No.4, pp.25-39.

[7]. **Bloom, B. S., and D. R. Krathwohl (1956).** *Taxonomy of Educational Objectives: The Classification of Educational Goals.* New York: Longmans, Green.

[8]. **Cheung, W., Hew, K., & Ling Ng, C. (2008).** "Toward an understanding of why students contribute in asynchronous online discussions". *Journal of Educational Computing Research*, Vol.38, No.1, pp.29-50.

[9]. **Cooper, D. R., & Schindler, P. S. (2002).** *Business Research Methods* (8th ed.). Boston: Irwin.

[10]. **Creswell, J. W. (2005).** *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research* (2nd ed.). Upper Saddle River, NJ: Pearson Education.

[11]. Freeman, J. (2014). *Using Discussions in Online Courses: The Importance of Interactivity. Retrieved April 23, 2014, from http://academics.utep.edu/Portals/844/nofo/Using%20Discussions%20in%20Online%20Courses.pdf*

[12]. Gilbert, P. & Dabbagh, N. (2005). "How to structure online discussions for meaningful discourse: A case study". *British Journal of Educational Technology*, Vol,36, No.1, pp. 5-18.

[13]. Hill, P. (2012). Online educational delivery models: A descriptive view. *Educase Review*, Retrieved from https://net.educause.edu/ir/library/pdf/ERM1263.pdf

[14]. Hutcheson, G. D., &Moutinho, L. (2011). *The Sage Dictionary of Quantitative Management Research*. Los Angeles: SAGE

[15]. Marshall, M.N. (1996). Sampling for Qualitative Research. *Family Practice*, Vol.13, No.6, pp.522-525.

[16]. Miller, J. (2014). "Crafting discussion prompts and promoting critical and reflective thinking in an online class". *Presentation presented at The Sloan Consortium 7th Annual International Symposium,* Dallas, TX. Abstract retrieved from: http://sloanconsortium.org/conference/2014/et4online/crafting-discussion-prompts-and-promoting-critical-and-reflective-thinking.

[17]. Mooney, M., Southard, S., & Burton, C. (2014). "Shifting from Obligatory Discourse to Rich Dialogue: Promoting Student Interaction in Asynchronous Threaded Discussion Postings". *Online Journal of Distance Learning Administration, XVII*.

[18]. Neuman, W. L. (2003). *Social Research Methods* (5th ed.). Upper Saddle River, NJ: Prentice Hall.

[19]. Patton, M. Q. (2001). *Qualitative Research and Evaluation Methods* (3rd ed.). Thousand Oaks, CA: Sage.

[20]. Pena-Shaff, J., Altman, W., & Stephenson, H. (2005). "Asynchronous online discussions as a tool for learning: Students' attitudes, expectations, and perceptions". *Journal of Learning Research*.Vol.16, No.4. pp.409-430. *Research and development (r&d) definitions*. (2010, January). Retrieved from http://www.nsf.gov/statistics/nsb1003/definitions.htm.

[21]. Rovai, A. (2006). "Facilitating Online Discussions Effectively". *Internet and Higher Education*, Vol.10, pp.77-88

[22]. Reonieri, D. C. (2006). "Optimizing The Number of Students for an Effective Online Discussion Board Learning Experience". Retrieved from http://files.eric.ed.gov /fulltext /ED494890.pdf

[23]. Salkind, N. J. (2003). *Exploring Research (5th ed.).* Upper Saddle River: NJ. Prentice Hall.

[24]. Sandelowski, M. (1995). "Focus on qualitative methods. Sample size in qualitative research". *Research in Nursing & Health*, Vol.18, No.2, pp.179-83. Retrieved January 1, 2008, from Ebscohost database.

[25]. Sheridan, K., & Kelly, M. (2010). "The indicators of instructor presence that are important to students in online courses". *MERLOT Journal of Online Learning and Teaching*, Vol.6, No.4. Retrieved from http://jolt.merlot.org/vol6no4/ sheridan _1210.htm.

[26]. TeacherStream, LLC. (2009). "Mastering Online". *In Mastering Online*. Edutopia.org. Retrieved from http://www.edutopia.org/pdfs/stw/edutopia-onlinelearning-mastering-online-discussion-board-facilitation. pdf.

[27]. K. L., Rankin, J. A., & Ali, E. (2014). "Focus Group Research: What Is It and How Can It Be Used?".*Canadian Journal Of Cardiovascular Nursing*, Vol.24, No.1, pp.16-22.

[28]. Tolhurst, H., Dean, S. (2004). "Using teleconferencing to enable general practitioner participation in focus groups". *Primary Health Care Research & Development, Vol.*5, No.1, pp.1-4.

[29]. *Using Online Discussion Boards to Enhance Learning in Your Class*. (2011, April 21). Retrieved from http://depts.washington.edu/swedtech/2011/04/21/using-online-discussion-boards-to-enhance-learning-in-your-class/ *Write a literature review* . (n.d.). Retrieved from http://guides.library.ucsc.edu/write-a-literature-review

[30]. Xie, K., Debacker, T.K. & Ferguson, C. (2006). Extending the Traditional Classroom through Online Discussion: The Role of Student Motivation. *Journal of Educational Computing Research*, Vol.34, No.1, pp.67-89.

[31]. Xie, K., Durrington, V., & Yen, L. (2011). "Relationship between students' motivation and their participation in asynchronous online discussions". *MERLOT Journal of Online Learning and Teaching*, Vol.7, No.1, pp.17-29.

ABOUT THE AUTHORS

Ilene Ringler, D.M. is full time Professor in the MBA program at Kaplan University, School of Business and Information Technology and also a principal of Ilene Ringler Associates, LLC, a company committed to business and individual growth through values fulfillment. In addition to over a decade of teaching experience, she has over thirty years of business experience in both internal and external consulting roles supporting leading edge companies such as Textron, Bose, Oracle, Fidelity Investments, International Rectifier and Smartbridge. Her research interests include: Improvement in online education quality, small business growth and development, and values satisfaction and business growth.

Carol Schubert is full time Professor teaching in the graduate School of Business and Information Technology at Kaplan University. She is the former owner of four businesses. Her areas of interest are teaching, cycling, and ceramics, stained glass, and water sports.

Jack Deem is the Academic Department Chair in the Strategic Management & Marketing Department, School of Business and Information Technology at Kaplan University. He has over 30 years of progressive management experience. He has a Bachelor of Industrial Engineering Degree from General Motors Institute, an MBA from New York Institute of Technology and a DBA from Nova Southeastern University. His research interests include Organizational Culture, Organization & Management Theory.

Jimmie Flores is full-time Professor in the Kaplan School of Business and Information Technology. Dr. Flores has held management and leadership positions in major companies including Shell Oil Company, The Prudential, and USAA. At USAA, he managed the $11.5 million budget for the IT department. Dr. Flores was assigned as Project Lead for IT initiatives in India and the Philippines. He has written several books including How to Become a Proficient Online Learner. He has earned two doctorates and seven master's degrees.

Jill Friestad-Tate is the Group Leader for the Business Administration programs at Des Moines Area Community College-West Campus as well as Adjunct Professor in the Graduate School of Business and Information Technology at Kaplan University. She has over 25 years of experience working in the fields of real estate, small business, training, and education. She recently published a textbook, Introduction to the World of Business, and her research interests include Organizational Culture, Active Learning, Leadership, and Educational Pedagogy.

Robert Lockwood is Professor in the School of Graduate Education at Kaplan University. He received his Doctoral degree in Educational Psychology/Research, with a statistics concentration from the University of Alabama in 1977. Prior to going to graduate school he was an Army helicopter pilot and served in Vietnam in 1969-1970. His Under Graduate degree is in Psychology from Troy State University. He worked in both the Alabama State Department of Education [K-12], where he was the Supervisor of Assessment for 18 years and also was with the ACCS for 8 years. He began teaching for Kaplan in January 2005 and has taught courses in student assessment, research methods, educational psychology, statistics and quantitative methods.