
Shifting from Obligatory Discourse to Rich Dialogue: Promoting Student Interaction in Asynchronous Threaded Discussion Postings

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Abstract

Asynchronous online threaded discussions are widely recognized as a tool to enhance learning in the virtual classroom. While they can serve as a mechanism for reinforcing material and promoting a deeper understanding of course content, discussion boards often lack rich and dynamic dialogue, and instead serve as a field of obligatory discourse, hasty postings, and repetitive content. This study examines measures to promote meaningful interaction in threaded online discussion postings. The researchers created an innovative, activity-based discussion exercise, known as the "suspense model," that was utilized in two undergraduate hybrid online courses to promote student-centered learning and to increase the quality and quantity of student engagement. The researchers conducted a second discussion board activity in the same classes whereby students were provided with the problem and supporting material at the outset of the exercise. Qualitative methods were employed to measure the quality of student performance on the exercises to compare levels of interactivity. Results indicate that students more promptly and thoroughly engaged in the discussion board utilizing the suspense model, and students' perception of the exercise was tentatively favorable as compared to its conventional counterpart.

Introduction

Numerous studies have been conducted on the efficacy of discussion boards as a teaching and learning tool in the online classroom environment (Blackmon, 2012; Dennen, 2005; Robinson, 2011). Typical online discussion board exercises entail the instructor providing an assignment, supporting materials, and preliminary direction to students at the outset of the exercise. Students are also given a time frame in which to complete the assignment. The assignment requires students to make threaded postings on a course discussion board, using the resources provided by the instructor and, in many cases, outside research that students complete as part of the exercise. The instructor will often monitor the discussion board and judiciously participate if the discussion strays off topic or if other guidance and feedback is warranted.

While findings largely support the theory that discussion boards are a value-added component to online instruction, fewer studies have explored whether a variation on the model of conventional discussion board discourse will positively or negatively impact the quality and quantity of student engagement (Brooks & Jeong, 2006; Palmer, Holt, & Bray, 2008). The researchers were also interested in whether a variation on the method by which students typically receive information would significantly impact student perceptions of the learning experience in an online group project. To accomplish this variation, a "suspense model" of measured and deliberate release of critical information was created to more closely resemble the manner in which information is disseminated outside the cocoon of a classroom setting. Students who participated in the study were tasked with forming a legal partnership and assigned roles to each group member in the partnership.

Later, students were instructed to create a business plan for opening a restaurant. Over the course of one week, the students were surprised with developments that impacted the direction of the partnership, such as a disagreement between the limited and general partners concerning the operation of the business, an issue involving vicarious liability, and a lawsuit filed against the business by a restaurant patron making potentially libelous statements in the media.

By employing this novel approach, and comparing it to a more traditional exercise in which students were given all pertinent information at the outset, the researchers were able to examine how an alternate mode of discussion board discourse pertaining to an online group project might serve to pique student interest in the material and potentially elevate levels of participation and content posted by students during the course of the exercise.

Literature Review

Instructors who teach online courses are often challenged to create meaningful assignments for the students who "reside" in their virtual classroom for a designated period of time. Instructors are also responsible for maintaining rigorous academic standards for the community and employing teaching techniques that deliver and reinforce course content in an engaging manner (Puzziferro & Shelton, 2009). While instructors may weave a variety of activities into a virtual classroom experience, the use of asynchronous threaded discussions is widely recognized as a pedagogical tool to enhance learning in an online community (Brooks & Jeong, 2006; Palmer, Holt, & Bray, 2008).

Discussion Boards as Multi-dimensional Learning Tools

Discussion boards are particularly useful for achieving higher levels of learning because a well-tailored exercise can invoke a combination of cognitive (knowledge-centered), social (learner-centered), and teaching (assessment-centered) presence (Ke, 2010; Xin, 2012). Research indicates that the highest level of learning occurs at the intersection of these three components and incorporates regular contact between community members, cooperation among participants, prompt feedback, the use of active learning techniques, respect for the diversity of the group, and the communication of high expectations (Moore, 2006).

However, factors such as group dynamics (Mabrito, 2006), content (McLoughlin & Mynard, 2009), and instructor skill (Bliss & Lawrence, 2009) may positively or negatively influence the success of a particular exercise. While some debate exists about the overall effectiveness of discussion boards as pedagogical tools (Pao-Nan, 2012), threaded discussions are the predominant means through which asynchronous interaction is accomplished in most virtual classrooms (Mandernach, Gonzales, & Garrett, 2006; Pao-Nan, 2012).

Variation in quality and scope of discussion board utilization exists between courses and often within the same course. Nevertheless, one important feature of online discussion boards is that they provide a unique platform for the exchange of ideas in an environment that may be less intimidating or restrictive than a traditional classroom setting (Lapsle, Kulik, Moody, & Arbaugh, 2008). This type of more open interaction creates a "community of learners" in which students from varying backgrounds may contribute a sum of knowledge that is greater in its whole than the knowledge possessed by any individual participant (Nisbet, 2004).

Online discussions may further serve as a mechanism for instructors to reinforce material and to promote a deeper understanding of the course content (Brooks & Jeong, 2006). As opposed to discussions in a traditional lecture format, which are limited by time and space, online discussion often affords students the opportunity for analysis, reflection, and synthesis before making contributions. Hence, these exercises are used by many as an integral part of the online learning process (Carr-Chellman & Duchastel, 2000; Robinson, 2011). The opportunity for students to digest information before responding to others and the chance for students to revisit course concepts are both important facets of online interaction (Brooks & Jeong, 2006). According to Anderson's (2003) equivalency theorem, at least one of these three essential forms of interaction, specifically, student-student interaction, student-instructor interaction, or student-course content interaction, is essential to achieve deeper and truly meaningful learning. Faculty should, therefore, attentively foster the process of online learning by planning meaningful exercises and staying involved in the learning process through active participation and monitoring of the discussions (Tallent-Runnels et al., 2006). Another benefit of these higher level exchanges is that they can be tailored to achieve one or more types of student-instructor-content

interaction within the same exercise (Anderson, 2003).

Challenges with Discussion Boards

Student participation in online discussions, however, is not automatic (Dennen, 2005). Effective participation and interaction requires forethought by the instructor and an ongoing commitment by the instructor and students to engage in the material (An, Shin, & Lim, 2009; Bliss & Lawrence, 2009). With regard to the instructor's role in the process, the nature and scope of discussion exercises should be initially determined in the design phase of an online course. The implementation of an instructor's vision is equally important and must be actively and attentively furthered for the duration of the course (Irizarry, 2002; Xie & Ke, 2011).

Even in circumstances where planning and oversight occur, discussion threads often lack depth, include repetitive comments, and involve little interaction (Brooks & Jeong, 2006; Lobry de Bruyn, 2004). Therefore, many online instructors find it prudent to incorporate measures that promote a discussion environment with rich and dynamic dialogue, rather than a field of obligatory discourse, hasty postings, and repetitive content. For example, online collaboration in the form of group work has been shown to enhance student learning achievement (Chang, 2012). While the utilization of dynamic and timely material as the subject matter for online discussion boards can be an effective way to garner and keep students' attention throughout the course of the exercise (Leong, 2011), many students procrastinate before getting involved in the discussion and may tune out altogether once they have made their individual obligatory posts. Simply requiring students to post comments does not result in higher-level thinking, meaningful content, or sustained interaction without the incorporation of reflection, synthesis, and application in the student posting process (Jarosewich et al., 2010). Another important factor to consider when evaluating an online exercise is students' perception with regard to the learning experience (Resnik, 2005). A study by Dietz-Uhler & Lanter (2011) found that the more interesting a topic can be made, the more likely students are to excel on an assignment. And a study by Bye, Smith, & Rallis (2009) found that students who participated in weekly online interactions and reflections with peers indicated higher satisfaction with the exercise as compared to students who submitted weekly hardcopy reflections with one-time feedback. Conversely, a study by Clarke (2011) found that discussion boards do not raise student engagement, performance, or satisfaction levels, and worse that satisfaction and overall performance of the whole may actually decrease when one or more group members do not participate (Ling & Ku, 2006). In short, the relationship between student perception and academic performance is unclear and deserves greater attention. Given the relatively positive associations found between the two variables, the researchers hypothesized that students' perception of the usefulness of an online exercise would be positively related to their performance on the exercise.

Research Question

As previously noted, prior studies have acknowledged a proliferation in the use of online discussion boards in academia and have identified many of the challenges involved with the use of this type of pedagogical tool. Research also indicates that a need exists for additional study to fully quantify the pedagogical utility of online discussions (Mandernach, Gonzales & Garrett, 2006). In particular, Tallent-Runnells et al. (2006) noted that further exploration of the ways in which different types of online discussion formats might improve and increase students' thinking would be particularly useful. And in a synthesis of the literature related to pedagogical value of threaded discussions, Maurino (2006) concluded that, while the literature touts the potential for development of deep learning and critical thinking through online threaded discussions, these elements are largely absent from this mode of delivery and should be incorporated. While a select few studies have responded by attempting to develop variations on the traditional model of discussion board discourse (Matheson, Wilkinson, & Gilhooly, 2012; McFarland & Hamilton, 2006), the current study is the first to utilize an online discussion board model that more closely mirrors the "real-world" dissemination of information to determine what impact, if any, it may have on student participation and perception. This type of model may be especially useful for institutions striving to bridge the gap between school and work. A suspense model that moderates and varies the format in which information is received can help prepare students for the work environment, where the receipt of critical information is often received at unpredictable times through unanticipated means.

Based upon the existing body of research and recommendations made therein, the researchers developed and employed a "suspense model" in an online threaded discussion exercise. This model entails the gradual release

of information to students in a manner that more closely mimics how information is typically received outside of the more artificial setting of a classroom environment. The researchers queried whether the structure and design of the suspense model would impact student participation in the exercise and whether the quality of student work would be elevated as compared to the work submitted in a comparable, conventional format discussion exercise. While there are many reasons why student performance and perceptions may or may not differ across discussion exercises, examining student performance and interaction in light of the format in which information is released may expand our knowledge base regarding differences in the efficacy of online discourse delivery models. Rather than view the question as one of content over form, the researchers maintained the integrity of the content while modifying the form of its delivery, to ascertain whether the modification would play a differential role. The following research question was explored:

RQ: Will the structure and design of the suspense model positively influence student participation and the quality of student work compared to the students' participation and work product in the conventional discussion exercise?

Method

Sample and Data Collection

Participants in the study consisted of undergraduate students enrolled in two hybrid online business organization courses in which approximately 50% of classroom time was spent online. Student participation in the study was voluntary. After receiving an overview and explanation of the study, students who wished to participate in the study signed a consent form and completed a survey instrument about their prior experience with online course platforms and with asynchronous threaded discussions in particular. Each respondent was assured confidentiality and each willing participant completed the pre-assessment survey instrument in 5-10 minutes. Between the two classes, 49 students were asked to participate in the study, and 48 consented and completed the survey (n=48).

Students subsequently participated in two separate asynchronous discussion exercises during the course of the semester. In the first exercise, known as the suspense model, students were randomly divided into groups, instructed to select a group name for a partnership that owned a pizza business, and advised to check back on the course web site for factual updates relevant to the assignment. At graduated intervals, the instructor released these facts to each group through various audio-visual mediums. Specifically, the instructor used audio and Wiki clips to introduce different decision-making elements, such as how the entity would be structured and what roles the group members would play in the running of the business. The instructor also employed video content that required the group to handle conflict when their entity was sued by a restaurant patron. All group interaction occurred on the discussion board.

Later in the semester, students were assigned a second, more conventional, discussion exercise involving a scenario of corporate expansion over which shareholders of the entity vehemently disagreed. While there were still substantive decisions to be made and conflicts to be resolved on the discussion board, all of the factual information concerning this exercise, such as corporate bylaws and a script of the annual shareholders' meeting, was provided in written format at the beginning of the exercise. Students were randomly placed in different groups and required to discuss the legal implications of hypothetical scenarios applicable to their corporate entity.

At the conclusion of the exercises, students were asked to complete an anonymous Likert scale survey in which they rated their impressions of the suspense model and the conventional model and provided information regarding history of participation in online learning environments. Students took 5 – 10 minutes to complete the survey. Each of the 48 students whose work was evaluated in the exercises completed a survey at the end of each module, for a total of two surveys completed by each student.

Measurement

At the conclusion of each exercise, the researchers analyzed the quality and quantity of postings by associating point values in a grading rubric, which appears in Figure 1. Variations exist in the form and scope of grading rubrics, although an effective rubric will assess student performance in the core areas of cognition, mechanics

(style and grammar of posts), procedure, and interaction (Penny & Murphy, 2009). The rubric was used to assess the content and form of a student's collection of postings, including the content of the postings, the total number of postings made by each student, participation patterns, and quality of interaction. A high score in all areas of assessment represented a substantively well-rounded contribution to the board with attention to detail and connectivity to other posts, while a lower score indicated one or more deficiencies with a student's contributions to a particular exercise.

	Excellent - 2	Good - 1.5	Fair - 1	Poor - .5	None - 0
Promptness	Demonstrates initiative by submitting initial posting within the first three days.	Begins posting within four days of the start of the exercise.	Begins posting within 24 hours of the deadline.	Begins posting within several hours of the deadline.	Does not participate.
Depth & Breadth	Posting demonstrates a solid understanding of the central topic.	Posting clearly relates to the topic.	Posting is partially related to the topic.	Posting is unrelated to the topic.	Does not participate.
Substantiates Position	Consistent use of all proper and relevant legal terminology.	Mostly consistent use of most proper legal terminology.	Rare use of legal terminology.	No use of proper legal terminology.	Does not participate.
Interaction	Initiates and encourages interaction through the discussion.	Consistently responds to discussion postings.	Intermittently interacts in the discussion thread.	Rarely interacts in the discussion thread.	Does not participate.
Writing and Grammar	No grammar and spelling errors.	Rare grammar and spelling errors.	Multiple grammar and spelling errors.	Writing is difficult to understand or is unintelligible.	Does not participate.

Figure 1. Grading rubric. This figure illustrates the criteria used to assess content and form of student discussion postings.

For both exercises in this study, students were allotted a seven-day window of opportunity to participate in the discussions and were furnished with a copy of the grading rubric ahead of time.

Two surveys were administered to collect students' administrative information and perception of the exercises. While both surveys included a seven-item Likert section, survey one collected administrative data and survey two functioned as an exit survey, asking students to reflect and draw comparisons between the two discussion board formats. A compilation of the seven questions that appeared on the surveys is shown in Figure 2.

Please rate the following items on a scale from 1 to 5 by circling the appropriate number:

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	I can effectively use a computer to communicate with other people using threaded discussion boards.	1	2	3	4	5
2.	The discussion posting helped					

	me better understand the legal concepts discussed in the module.	1	2	3	4	5
3.	I had a desire to participate in the discussion board activity.	1	2	3	4	5
4.	I found the discussion posting activity interesting.	1	2	3	4	5
5.	I found reading responding to other student postings helpful to my understanding of the material.	1	2	3	4	5
6.	I looked forward to checking the discussion board to see my classmate's posting	1	2	3	4	5
7.	I felt that I needed to work hard and contribute to the discussion posting activity	1	2	3	4	5

Figure 2. Likert-scale Questions. This figure contains the questions used to obtain qualitative feedback from students participating in the study.

Variables

As the orientation of the study is primarily qualitative in nature, researchers used the grading rubric to evaluate the following variables: (1) promptness of postings on the discussion board; (2) the quality of postings; and (3) interactivity among group members. Understanding these three outcomes would answer our research question. As a secondary measure to help explicate these results and explore other possible findings, the survey questions assessed various measures of student satisfaction and students' perceived utility of the exercises. A student's prior experience in online courses was also assessed, as this could influence their performance in the discussion board exercises.

Results

A content analysis of students' postings showed partial support for the research question, specifically that participation, measured as timeliness and interaction, was better with the suspense model. Tables 1 and 2 present descriptive statistics, which show that students entered the online discussion earlier and contributed more often in the suspense model. Conversely, the quality of students' postings, defined as breadth/depth and the ability to substantiate one's position, was better with the conventional model. These results are shown in Tables 3 and 4.

Suspense Discussion Model (N=48)	2 – Excellent	1.5 – Good	1 – Fair	.5 – Poor	0 – None
Promptness	N=22 %=45.8	N=8 %=16.67	N=15 %=31.25	N=3 %=6.25	N=0
Conventional Discussion Model (N=42)	2 – Excellent	1.5 – Good	1 – Fair	.5 – Poor	0 - None
Promptness	N=12 %=28.57	N=7 %=16.67	N=14 %=33.33	N=5 %=11.90	N=3 %=7.14

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<i>Interaction of Participants</i>					
Suspense Discussion Model (N=48)	2 – Excellent	1.5 – Good	1 – Fair	.5 – Poor	0 None
Interactivity	N=24 %=50	N=11 %=22.92	N=13 %=27.08	N=0 %=0	N=0
Conventional Discussion Model (N=42)	2 – Excellent	1.5 – Good	1 – Fair	.5 – Poor	0 - None
Interactivity	N=14 %=33.33	N=4 %=9.52	N=20 %=47.62	N=0 %=0	N=0 %=0

Table 3 <i>Depth and Breadth of Postings</i>					
Suspense Discussion Model (N=48)	2 – Excellent	1.5 – Good	1 – Fair	.5 – Poor	0 None
Depth & Breadth	N=19 %=39.58	N=23 %=47.92	N=5 %=10.42	N=1 %=2.08	N=0 %=0
Conventional Discussion Model (N=42)	2 – Excellent	1.5 – Good	1 – Fair	.5 – Poor	0 - None
Depth & Breadth	N=22 %=52.38	N=16 %=38.10	N=0 %=0	N=0 %=0	N=0

Table 4 <i>Substantiation of Position</i>					
Suspense Discussion Model (N=48)	2 – Excellent	1.5 – Good	1 – Fair	.5 – Poor	0 None
Substantiates Position	N=27 %=56.25	N=14 %=29.17	N=6 %=12.50	N=1 %=2.08	N=0
Conventional Discussion Model (N=42)	2 – Excellent	1.5 – Good	1 – Fair	.5 – Poor	0 - None
Substantiates Position	N=33 %=78.57	N=5 %=11.90	N=0 %=0	N=0 %=0	N=0 %=0

Survey Responses

The researchers asked students to report their past online usage history since inexperience could hamper discussion board participation, regardless of model. Students were asked two questions: "*How many online or partially online (at least 30% of the course instruction was conducted online) have you taken in the past 2 years?*" and "*How many discussion postings have you made in online or partially-online courses in the past 2 years?*" Only 12% of students (n=4) had never taken an on online course, with 69.6% (n=23) having taken one to two online courses and 18.1% (n=6) having completed three or more courses in the past.

Consistent with the reported online history, 53% (n=17) of students had previously engaged in discussion board activities, while only three students or 9.4% had no online posting experience. Twelve students or 37.5% engaged in four or more postings in the past, lending further support to the portrait of students as able participants in their discussion board activities.

Likert-scale Questions. The researchers surmised that students' perception of the contrasting forms of delivery associated with each model may also play a role in their level of engagement. Question means and standard deviations are presented for both models in Table 5.

Table 5 <i>Likert-scale Descriptive Statistics</i>		

Likert-scale Questions	Suspense Model		Conventional Model	
	Mean	Std. Dev	Mean	Std. Dev
I can effectively use a computer to communicate with other people using threaded discussion boards.	+4.58	.614	+4.39	.974
The discussion posting helped me to better understand the legal concepts discussed in the module.	+3.58	1.119	+3.76	.971
I had a desire to participate in the discussion board activity.	3.36	1.295	3.55	1.083
I found the discussion posting activity interesting.	3.16	1.322	3.50	1.084
I found reading the reading/responding to other student postings helpful to my understanding of the material.	3.30	1.237	3.42	1.266
I looked forward to checking the discussion board to see my classmate's posting.	3.18	1.211	3.18	1.312
I felt that I needed to work hard to contribute to the discussion posting activity.	+3.79	1.083	+3.95	.899

Survey question means were also analyzed to determine if there was a statistically significant difference between responses after each exercise. The researchers completed a test of normality using the Shapiro-Wilk test and found that p-values were less than 0.05, indicating that the data was not normally distributed, requiring use of a non-parametric test.

The Wilcoxon Signed Ranks test for non-parametric data was then applied to compare the means between surveys 1 and 2 (Elliot & Woodward, 2007; Boslaugh & Watters, 2008). Students' responses on each of the seven question items indicated a statistically significant difference in means, $p=.000$, indicating that the treatment did impact responses. Given that reduced power can produce false associations however, it is possible that this result may be due to the small sample size of less than 50.

Two questions on survey two explicitly compared the models. When asked "Which discussion helped you to better retain the information?", 41.7% ($n=15$) selected the suspense model, 38.9% ($n=14$) said both equally and 19.4% ($n=7$) chose the conventional model. When asked "Which discussion format did you like better?", 55.6% ($n=20$) chose the suspense model, 22.2% ($n=8$) of students selected the traditional model, and 22.2% ($n=8$) said both models were preferred equally.

Discussion

Promptness

A noteworthy finding is the difference in timing of participation between the two models. More students were likely to begin the discussion exercise earlier within the allotted time period for the suspense model than the conventional model. Timing of participation is pedagogically relevant because the earlier a student begins participation in the dialogue, the more opportunities the student will have to interact with peers and reflect upon his or her own interpretation of the exercise (Blackmon, 2012). Students who begin posting within the final stages of the exercise are not likely to experience the full depth of this learning process. Specifically, 45.8% of the participants in the suspense model posted within the first three days of the exercise, versus 28.5% posting in the first three days in the conventional exercise. The researchers theorize that pacing the release of information relevant to a hypothetical triggered student interest in the topic and motivated them to begin the exercise earlier. The promptness of their participation maximized their potential to gain the full benefit of the exercise. Conversely, 11.9% of students in the conventional model waited until there were 24 hours or less remaining to enter the discussion, while only 6.3% of students in the suspense model waited until the end to participate. Also, the suspense model had 100% participation while three students did not make any contributions in the conventional model.

Interactivity

Interactivity was measured as the frequency of posts that initiate conversation and encourage feedback from classmates. The researchers found that 72% of students in the suspense model interacted with their group members at a level of good or excellent, while only 42% of students in the conventional model interacted with their group members at the same level. Notably, 50% of students in the suspense model attained "excellent" levels of interaction as compared to only 33% of participants in the conventional model. This finding is noteworthy given that high levels of interactivity by a few students seem to act as a multiplying effect that generates discussion within the learning community beyond the initial poster.

Quality of Responses

Quality of responses was measured using the point-based system of the grading rubric and included an evaluation of the depth and breadth of postings and whether a student substantiated their position within each posting. Depth and breadth was viewed in terms of the relationship of the content of a posting to the central themes of the exercise. Substantiation of position could occur through a variety of means, such as by reference to online lectures, handouts, the textbook, and/or outside resources that the student independently researched.

Depth and Breadth. While 87% of participants' postings in the suspense model were deemed to be good or excellent in terms of depth and breadth, almost 100% of participants who participated in the conventional model were deemed to be good or excellent. A likely explanation for this result is that the suspense model was run first and students may have still been acclimating to the course and its content at that time. Since the conventional model was the subsequent exercise, all of the students had the suspense model exercise and feedback to perform better on the conventional model exercise.

Substantiation. According to the rubric standards, 85% of participants' postings in the suspense model contained an excellent or good amount of substantiation, compared to 90% in the conventional model. By requiring students to substantiate their position in postings, students think critically about the material. Somewhat surprisingly, 56% of student postings in the suspense model were "excellent" while nearly 79% of postings in the conventional model were deemed "excellent." Similarly to above, because the conventional model was run second, students had a chance to incorporate feedback they received on the first graded rubric into their participation in the conventional model.

Students' Perception. Participants in the study were clearly online-capable, as demonstrated by over 88% having taken online courses and over 90% having used discussion boards in past classes. It is therefore not surprising that the Likert-scale question that received the strongest response on both survey 1 (mean 4.58) and 2 (mean 4.39) was "I can effectively use a computer to communicate with other people using threaded discussion boards." The questions with the next highest responses for both models were "I felt that I needed to work hard to contribute to the discussion posting activity" (means of 3.79 and 3.95) and "The discussion posting helped me better understand the legal concepts discussed in the module" (means of 3.58 and 3.76). Given that responses on both surveys demonstrated the same ordinal ranking for these questions, it is fair to say that although there is no distinction to be made between the models evidenced by these two questions, both the suspense model and the conventional are perceived to be rigorous assessments that enhance learning. This outcome supports previous findings that discussion posting activities are sound pedagogical strategies (Brooks & Jeong, 2006; Palmer, Holt, & Bray, 2008).

Where there does appear to be some distinction is demonstrated when students are asked directly to compare the two models and they state that they both preferred the suspense model over the conventional model (55.6%) and it helped them to better retain information (41.7%). This can be categorized only as a modest positive outcome since a sizable portion of students also stated that both models were equally effective (38.9%) and both were liked equally as well (22.2%). The preference for the suspense model coupled with higher levels of interaction, lends support to Bye, Smith and Rallis's (2009) contention that higher interaction among students produces higher satisfaction. The fact that quantitative analysis also showed a statistically significant difference in means on all seven Likert questions contributes to the tentative position that the suspense model may be preferred by students. Unfortunately, performance was higher with the conventional model. Although students may believe that the suspense model helped them to retain information better (utility) and may even like it better, these two variables do not appear to be related in this study.

Selected comments from students on an open-ended question further explain their perception of the two models:

My group was more engaged in the first (suspense) one. There was limited participation in the second.

It (suspense model) had more issues which made me dig a lot deeper and analyze facts.

The (conventional) model was easier to retain. There is no gray area. Everything is black/white.

It (suspense) was more challenging.

Conclusion

Asynchronous discussion boards play a central role in online learning. Exploring the ways in which discussion boards can be used to maximize student engagement and learning is relevant to the evolving dynamics of today's educational environment and its real-world applications. The current work exemplifies these elements. The goals of the suspense model were to foster student participation in a group, to encourage interaction among the group members, and to disseminate instructional material in a novel manner to promote improved student engagement. Students' level of interaction was greater in the suspense model than in the conventional discussion board model. Students also began their participation earlier in the suspense model than in its traditional counterpart. The findings suggest that pacing the release of information triggers student interest in the topic and motivates them to begin the exercise earlier. The promptness of student participation increases the potential to interact with peers and maximizes the potential to gain full benefit of the exercise. There is also limited support to conclude that the graduated release of information works to help students retain information better than a one-time, front-loaded release. Albeit somewhat more challenging, students also prefer the suspense model that acts to maximize social connection and greater interactivity within the learning community.

Limitations and Future Study

The limitations in the study stem from the size of the participant pool and the timing of the exercises. Although the sample size was adequate for a qualitative analysis based on the number of factors studied (Offir, Bezalel, & Barth, 2007), a larger sample size could provide a broader base from which to assess the suspense model theory, and incorporate quantitative analysis with more reliability.

Second, participants in the study cited higher satisfaction with a clearer understanding of course concepts with the suspense model than the conventional model. Although students were happier with the experience of the suspense model, the quality of their posts was not appreciably different. This could be attributed to other influences, such as the timing of the studies, the greater amount of effort required by students in the suspense model, and the students' unfamiliarity with the suspense model structure compared to students' prior experiences with asynchronous discussion boards. Variations of the suspense model should be explored to better understand the effectiveness of a suspense model of information delivery.

References

An, H., Shin, S. & Lim, K. (2009). The effects of different instructor facilitation approaches on students' interactions during asynchronous online discussions. *In Computers & Education, 53*(3), 49-60.

Anderson, T. (2003). Getting the mix right again: An updated and theoretical rationale for interaction. *International Review of Research in Open and Distance Learning*. Retrieved March 7, 2013 from <http://www.irrodl.org/index.php/irrodl/article/view/149/230>.

Blackmon, S.J. (2012). Outcomes of chat and discussion board use in online learning: A research synthesis. *Journal of Educators Online, 9*(2), 1-19.

Bliss, C.A. & Lawrence, B. (2009). From posts to patterns: A metric to characterize discussion board activity

in online courses. *Journal of Asynchronous Learning Networks*, 13(2), 15-32.

Boslaugh, S. & Watters, P.A. (2008). *Statistics in a nutshell: A desktop quick reference*. Cambridge: O'Reilly Media.

Brooks, C. & Jeong, A. (2006). Effects of pre-structuring discussion threads on group interaction and group performance in computer-supported collaborative argumentation. *Distance Education*, 27(3), 371-390.

Bye, L., Smith, S., & Rallis, H.M. (2009). Reflection using an online discussion forum: Impact on student learning and satisfaction. *Social Work Education*, 28(8), 41-55.

Carr-Chellman, A. & Duchastel, P. (2000). The ideal online course. *British Journal of Educational Technology*, 31(3), 229-241.

Chang, Z. (2012). Student satisfaction, performance, and knowledge construction in online collaborative learning. *Journal of Educational Technology & Society*, 15(1), 127-136.

Clark, S. (2011). Peer interaction and engagement through online discussion forums: A cautionary tale. *Liverpool Law Review*, 32(2), 149-163.

Dietz-Uhler, B. & Lanter, J.R. (2011). Perceptions of group-led online discussions: The benefits of cooperative learning. *Journal of Educational Technology Systems*, 40(4), 381-388.

Dennen, V.P. (2005). From message posting to learning dialogues: Factors affecting learner participation in asynchronous discussion. *Distance Education*, 26(1), 127-148.

Elliott, A. & Woodward, W. (2007). *Statistical analysis: Quick reference guidebook with SPSS examples*. Thousand Oaks: Sage.

Irizarry, R. (2002). Self-efficacy and motivation effects on online psychology student retention. *United States Distance Learning Association Journal*, 16(12), ISSN 1537-5080.

Jarosewich, T., Vargo, L., Salzman, J., Lenhart, L., Krosnick, L., Vance, K., & Roskos, K. (2010). Say what? The quality of discussion board postings in online professional development. *New Horizons in Education*, 58(3), 118-132.

Ke, F. (2010). Examining online teaching, cognitive, and social presence for adult students. *Computers & Education*, 55(2), 808-820.

Lapsley, R., Kulik, B., Moody, R., & Arbaugh, J.B. (2008). Is identical really identical? An investigation of equivalency theory and online learning. *The Journal of Educators Online*, 5(1), 1-19.

Leong, P. (2011). Role of social presence and cognitive absorption in online learning environments. *Distance Education*, 32(1), 5-28.

Ling, T. & Ku, H.Y. (2006). A case study of online collaborative learning. *The Quarterly Review of Distance Education*, 4(1), 31-41.

Lodry de Bruyn, L. (2004). Monitoring online communication: Can the development of convergence and social presence indicate an interactive learning environment? *Distance Education*, 25(1), 67-81.

Mabrito, M. (2006). A study of synchronous versus asynchronous collaboration in an online business writing class. *The American Journal of Distance Education*, 20(2), 93-107.

Mandernach, B.J., Gonzales, R.M., & Garrett, A.L. (2006). An examination of online instructor presence via threaded discussion participation. *Journal of Online Learning and Teaching* 2(4). Retrieved April 21, 2013 from <http://jolt.merlot.org/vol2no4/mandernach.pdf>.

- Matheson, R., Wilkinson, S.C. & Gilhooly, E. (2012). Promoting critical thinking and collaborative working through assessment: Combining patchwork text and online discussion boards. *Innovations in Education & Teaching International*, 49(3), 257-267.
- Maurino, P. (2006). Looking for critical thinking in online threaded discussions. *Journal of Educational Technology Systems*, 35(3), 241-260.
- McFarland, D. & Hamilton, D. (2006). Factors affecting student performance and satisfaction: Online versus traditional course delivery. *Journal of Computer Information Systems*, 46(2), 25-32.
- McLoughlin, D. & Mynard, J. (2009). An analysis of higher order thinking in online discussions. *Innovations in Education and Teaching International*, 46(2), 147-160.
- Moore, J.C. (2006). Collaboration online: Sloan-C resources. *Journal of Asynchronous Learning Networks* 10(1), 81-89.
- Nisbet, D. (2004). Measuring the quantity and quality of online discussion group interaction. *Journal of eLiteracy I*, 122-139.
- Offir, B., Bezalel, R., & Barth, I. (2007). Introverts, extroverts, and achievement in a distance learning environment. *American Journal of Distance Education*, 21 (1): 3-19.
- Palmer, S., Holt, D, & Bray, S. (2008). Does the discussion help? The impact of a formally assessed online discussion on final student results. *British Journal of Education Technology*, 39(5), 847-858.
- Pao-Nan, C. (2012). Teaching strategies in online discussion boards: A framework in higher education. *Higher Education Studies*, 2(2), 25-30.
- Puzziferro, M. & Shelton, K. (2009). Supporting online faculty: Revisiting the seven principles (a few years later). *Online Journal of Distance Learning Administration*, XII(III). Retrieved February 11, 2013 from <http://www.westga.edu/~distance/ojdla/fall123/puzziferro123.html>.
- Resnik, D.B. (2005). Using electronic discussion boards to teach responsible conduct of research. *Science & Engineering Ethics*, 11(4), 617-630.
- Robinson, J. (2011). Assessing the value of using an online discussion board for engaging students. *Journal of Hospitality*, 10(1), 13-22.
- Rovai, A. (2002). Building a sense of community at a distance. *International Review of Research in Open and Distance Learning*, 3(1) 1-16.
- Tallent-Runnels, M.K., Thomas, J.A., Lan, W.Y., Cooper, S., Ahern, T.C., Shaw, S.M., & Liu, X. (2006). Teaching courses online: A review of the research. *Review of Educational Research*, 76(1), 93-135.
- Xie, K. & Ke, F. (2011). The role of students' motivation in peer-moderated asynchronous online discussions. *British Journal of Educational Technology*, 42(6), 916-930.
- Xin, C. (2012). A critique of the community of inquiry framework. *Journal of Distance Education*, 26(1), 1-13.