Aiding Participation and Engagement in a Blended Learning Environment

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ABSTRACT

This research was conducted as a field experiment that explored the potential benefits of anchoring in asynchronous online discussions for business statistics classes required for information systems majors. These classes are usually taught using traditional methods with emphasis on lecturing, knowledge reproduction, and treatment of students as dependent learners. Course activities are typically centered on the teacher as the source of all knowledge and understanding. Moreover, student interactions are often limited to face-to-face meetings in the classroom, where students have exerted little effort towards engaging themselves. Online discussions show promise for improving students' learning in business statistics classes. We examined and compared the impact of anchored asynchronous online discussions (AAODs) and standard asynchronous online discussions (AODs) on students' participation and engagement in a blended learning environment. The findings show that AAODs facilitated more and better quality participation and engagement for undergraduates. AAODs were more likely to be perceived as helping increase students' efforts. The findings provide useful insights for improving student interaction and aiding learning.

Keywords: Asynchronous learning, Blended learning, Information & communication technologies (ICT), Student responsibility, Active learning

1. INTRODUCTION

Statistics is a required component of business curricula, but many students exhibit lack of interest and effort in business statistics classes. Through observations and solicited feedback from faculty members and students, we found that the lack of interest can be attributed to students having a negative perception of statistics, which translates into not doing their homework. Statistics courses have been traditionally lecture-based and students depend heavily on the teacher for their learning. The classroom meeting and office hours provide some student-teacher interaction, but the courses require students to be more active and engaged. This provided the motivation to examine anchored asynchronous online discussions as a potential creative solution.

Several instructional theories predict that a course environment where teachers and students are able to co-construct pedagogical practices in a participatory manner (Chickering and Ehrmann, 1996; Chickering and Gamson, 1987) will produce better learning outcomes. Williams and Chinn (2009) found that online assignments using Web 2.0 technologies increased student engagement and contributed to the level of connectivity. When students actively share ideas, information, and engage themselves in discussions using information & communication technologies (ICT), they can mutually benefit. A greater degree of student involvement can improve the asynchronous learning of the student (Stefanou and Salisbury-Glennon, 2002).

Moreover, several researchers (Gunawardena et al., 2001; Pena-Shaff and Nicholls, 2004; Veerman and Veldhuis-Diermanse, 2001; Weinberger and Fischer, 2005; Sfard, 1998; Zhu, 1996) have proposed measures for assessing students' knowledge construction through posts in online discussions. The criteria these studies used are varied, but all of them considered understanding of concepts/terms

to given topics/questions as parts of knowledge students learn. For example, Zhu (1996) considered knowledge that students built from their discussions, which were restricted to questions posted by instructors; Gunawardena et al. (2001) suggested that the first stage of knowledge building in online discussion is sharing/comparing information, which can be observed from how students learn from clarifying a problem; and Veerman and Veldhuis-Diermanse (2001) focused on understanding of concepts' meanings together with how students used these concepts.

In this study, we examine the effectiveness of two kinds of asynchronous online discussions to increase the interest and involvement in business statistics for information systems majors. Online discussions can facilitate the co-construction of knowledge (Lord and Lomicka, 2008) and student participation. Students who are apprehensive about learning statistics and those who have trouble doing computations tend to have a high level of anxiety (Pace and Barchard, 2006; Bawden and Robinson, 2009). Vandergrift (2003) described it in terms of a fear that "often springs from a tacit assumption that [students] must understand every word, as well as [their] unsatisfactory experiences with a 'listen and answer the following questions' approach to listening activities [in the classroom]" (p. 426). An instructor can use asynchronous online discussions as a tactical resource to help students avoid some of the in-class frustrations and assist them when they are outside of the classroom to supplement their face-to-face (F2F) meetings in a blended instructional approach. This blend of classroom and online learning modes stands to enhance the student experience provided that individuals are typically not single-method learners (Masie, 2002).

The rest of the paper is laid out as follows: First, we discuss the theoretical foundations of the research and restate our key research question. Then, we describe the study methodology. Next, we specify the results of the study. Finally, we draw conclusions, discuss limitations, and outline future research ideas.

2. THEORITICAL FOUNDATIONS

2.1 Media Synchronicity Theory

The media synchronicity theory (MST) (Dennis et al., 2008; Dennis and Valacich, 1999) provides a theoretical lens that can help improve the understanding of potential influences from employing AAOD as a computer mediated communication (CMC) medium. MST focuses on the ability of media to provide a shared pattern of coordinated behavior among individuals communicating while working together on some task (Dennis et al., 2008). MST views that the development of a shared understanding as a form of communication performance, which can be attributed to the media's ability to facilitate synchronicity. Synchronicity is defined as "the extent to which the capabilities of a communication medium enable individuals to achieve synchronicity" (Dennis et al., 2008, p. 581). It is important to note that MST can apply to asynchronous communication types of media such as email (DeLuca and Valacich, 2006; Dennis et al., 2008), fax, or voice mail (Dennis et al., 2008) and not just synchronous communications (i.e., phone conversations or chats).

To successfully utilize media to accomplish a task, MST relies on information transmission (conveyance) and information processing (convergence) as the two fundamental communication processes. MST suggests that media vary in their abilities to support these two fundamental processes. Dennis et al. (2008) suggested that individuals participating in conveyance provide substantial information that requires significant processing, whereas convergence establishes a shared understanding that can require less information processing by reducing the scope and increasing the focus. Shared understanding (meaning) can be co-constructed by the students (Dennis et al., 2008; Miranda and Saunders, 2003) through their participation in online discussions. Convergence is objectified through agreement on the meaning of the information that requires students to reach a common understanding and to "mutually agree" that they have arrived at this understanding (Dennis et al., 2008). Moreover, Garrison, Anderson, and Archer (2001) modeled that "integration" occurs when meanings are weaved and constructed from ideas that are well connected and reasoned from convergence among group members (i.e., I agree, because…) or convergence within a single message (i.e., justify and/or extend).

2.2 Constructivism

Constructivism is a psychological theory of knowledge that was attributed to Jean Piaget and Lev Vygotsky (Hala, 1997). The foci of the constructivism paradigm are cognitive development and deep understanding (Fosnot and Perry, 2005). Cognitive development is important to this study because of its concern with the construction of meaningful learning. Garrison (2003) noted, "The learner [student] takes the responsibility to construct meaning actively, not in isolation, but through dialogue with oneself as well as with others" (p. 201).

Constructivism suggests that learning is the process of making adjustments to our understanding of the world as we reflect on our own experiences (Akers, 2001). Social constructivism postulates that in a group setting, knowledge is socially constructed by the participants (Dougiamas, 2005). The online discussion environment provides the virtual setting for social interaction through which students are able to participate in dialogues, thereby extending the setting of the physical classroom. The creation of these environments allows students to discover and construct knowledge for themselves (Barr and Tagg, 1995). In this blended course environment, social constructivism can be supported.

2.3 Good Teaching Practices and Design

The seven principles of good practice (Chickering and Ehrmann, 1996; Chickering and Gamson, 1987) and instructional design theory (Reigeluth, 1999) are highly regarded frameworks that offer complementary perspectives for learners and instructors. These two frameworks can be relevant to designing a constructivist-learning environment that can effectively benefit students.

Chickering and colleagues suggested seven principles of good practice in teaching: 1) stimulate student-teacher contact, 2) stimulate cooperation among students, 3) stimulate active learning, 4) offer fast feedback to students, 5) highlight the time invested in the assignment, 6) transmit

high expectations, and 7) respect different talents, abilities, and ways of learning (Chickering and Ehrmann, 1996; Chickering and Gamson, 1987). The seven principles of good practice in undergraduate education are now widely accepted among post-secondary institutions as a set of standards by the American Association of Higher Education (Anderson and Elloumi, 2004).

Traditional teaching practices (TTP) emphasize teaching, knowledge reproduction, classroom activities as teacher centered, and students as passive listeners (Rovai and Jordan, 2004). Under TTP, teaching and learning appear segmented, separated, and disconnected (see Figure 1). Yet, the reality is that there is no teaching if there is no learning. Hence, the focus should be more on learning rather than on teaching. Learning encompasses acquisition and participation (Sfard, 1998). Acquisition primarily covers the products of learning (e.g., skills, knowledge, understanding, content, and values), while participation deals with the active involvement of the participants (Rovai et al., 2009).

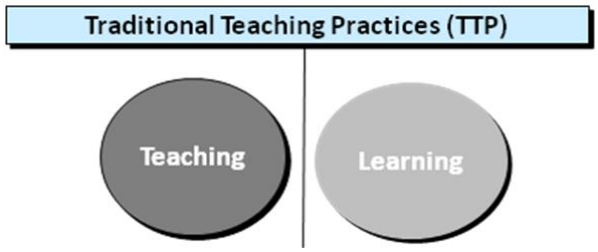

Figure 1. Traditional Teaching Practices (TTP)

However, a procedural framework is needed to support the learning process and provide a structure by which instruction is guided. An instructional design that is learner-centered is supported by the constructivist paradigm according to instructional design theory (IDT). The instructional conditions of IDT include the nature of what is to be learned (i.e., understanding), learner (i.e., motivation), learning environment (i.e., blended environment), and developmental constraints (i.e., time and cost). The responsibility of the instructor is to recognize the main idea, facilitate interaction among students, and have students reflect upon their shared understanding and conception (Garrison, 2003).

2.4 Blended Learning

Blended learning is a mixture of classroom and online learning that includes the conveniences of online interaction without the loss of face-to-face contact (Rovai and Jordan, 2004). The combination of classroom and online learning modes stands to enhance the students' experience through more opportunities for additional interaction and learning from peers (Masie, 2002). An online discussion board is one of the tools that can be implemented to facilitate more discussions and interactions (Lord and Lomicka, 2008). Online discussions can promote learning and interaction at a distance and can, in fact, promote a sense of community among the learners (Lord and Lomicka, 2008). When students actively contribute ideas and discuss them together, they mutually benefit. Faculties generally desire to have a greater degree of student involvement to improve understanding of the subject matter (Stefanou and Salisbury-Glennon, 2002). We define understanding as the degree of comprehension and the ability to provide meaningful explanations. If a learner has the understanding, then the learner can apply this understanding in either familiar or new situations (Richlin, 2006).

2.5 Research Questions

Finding effective teaching and learning mechanisms are key reasons to examine the two forms of asynchronous online discussions. Since learning encompasses participation (Sfard, 1998) through the active involvement of participants (Rovai et al., 2009), the online environment provides a common venue for student involvement to enable the construction of knowledge. Van der Pol (2007) proposed a promising solution for the use of anchored discussions as a versatile tool with many possible uses that concern the text-based discussion of online materials. In general, online discussions can be used to help increase interaction among students. However, anchored online discussions differ from standard online discussions in that anchoring uses an annotating feature that allows for the selection of any part of the text to become the topic of that discussion thread. The selected (annotated) text becomes a focus and a linked reference. Consequently, we define anchoring as a process of creating reference points between parts of a document and comments in the discussion (comment) space to help prevent drifting away from the context. It was found that anchored forums had longer threads than unanchored forums (Guzdial and Turns, 2000). We sought to see whether AAODs can be more effective at increasing the effort and engagement of the students than AODs. Effort is expressed as participation. Participation refers to the number of times a student posts a comment (message) to a discussion. The discussion is an interactive process that can produce engagement as an outcome (Rafaeli and Sudweeks, 1994). Consequently, we hypothesize:

H1: Students using AAODs will have a higher overall participation rate than students using AODs.

H2: Students using AAODs will have a better engagement than students using AODs.

3. RESEARCH METHODOLOGY

A field experiment was conducted at a state university in the western United States to compare two types of asynchronous online discussions that were different in terms of anchoring. This design was chosen because of the lack of tight controls available and of the desire to examine differences between the two online discussions (ODs) in a natural educational setting. In this setting, students were not bound by time and place in order to participate. They had 24/7 access to the ODs. In carrying out this research, we highlight the following three challenges (Robson, 2002):

1) Random assignment that is generally hard to do outside of the lab in the real world. But, in this context, it was feasible for us to randomly assign students to treatments.
2) The possibility of the control group getting influenced by the researcher, which may result in questionable validity. We gave both groups (treatment and control) the same

attention and instruction. We maintained awareness of all of the communications to ensure no favoritism. We obtained IRB approval and adhered to the research protocol and followed the guidelines thoroughly.

3) Managing interactions between subjects of the different groups. We told the students that the class would have two groups of students for the online discussions, and that the groups were assigned randomly. We sent an email to each student to let him/her know about his/her group assignment.

3.1 Discussion Forums

3.1.1 Asynchronous Online Discussion Forums: The interface is represented by a standard Blackboard® instance that served as the baseline for an asynchronous online discussion forum used in this research. This online discussion forum had a very long thread with many replies from students. We have observed and received feedback from students about the difficulty of navigating through these long threads. Students found themselves consuming a significant amount of time by having to go over the replies and often through many repeats such as "I agree," and "Thank you very much." MacLean (2004) found that this kind of interaction increases information overload and decreases the quality of the interaction. Accordingly, the expected usefulness of this type of online discussion forums may not possibly be as valuable as theory predicts.

3.1.2 Anchored Asynchronous Online Discussion: The anchored asynchronous online discussion (AAOD) allowed for the selection of any part of a document such as a word, sentence, paragraph, or page to become the focus of a discussion thread. The advantage is that the highlighted text creates a "visual marking" of the selected text. The selection feature establishes an explicit link intended to direct more attention to the selected text. The comments are situated alongside the article and in that manner; a clear link is formed on the same screen (Kaplan and Chisk, 2005). The anchored (annotated) interface shows the discussion article on the right side of the screen and the discussion comments on the left side of the screen. Each discussion thread has a number that relates it to a highlighted part of the text on the right hand side of the screen. When a thread is selected (by clicking on its number) a red frame appears on both sides of the screen, which shows the correspondence between the selected text and the related comment. This connection between the discussion thread and the article tends to make it harder for students to drift away from the idea, thereby creating a focus. When an idea becomes more explicit, it permits clarity into the discussion (Siemens, 2006) and it becomes more inviting for others to either introduce their own perspectives or elaborate further to reach a common understanding of that idea. Tversky and Kahneman (1974) found that anchoring creates a bias towards that idea.

3.2 Subjects

The subjects for this study were students enrolled in the following two business classes:

1) One section of Introduction to Business Statistics, Class A. Students in this course were 3rd year (juniors) undergraduates, majoring in business.
2) One section of Statistics and Management Science, Class B. Students in this course were 4th year (seniors) undergraduates, majoring in business.

A total of 86 subjects participated; 42 used AAODs and 44 used AODs (see Table 1). Additionally, each student was asked to write an essay about his/her experience for using online discussions. There was a 94% response rate for AAOD students and an 86% response rate for AOD students.

	AAODs	AODs
Class	**n1**	**n2**
A	23	23
B	19	21
Total	42	44

Table 1. Subjects

The subjects were randomly assigned using Excel's RANDBETWEEN function because it mimics the manual selection of balls, which meets the statistical properties for randomness. Each selection has an equally likely chance of occurring. This was intended to ensure that if differences were found, that they would be related to the discussion tool.

3.3 Procedure and Data Collection

The instructor was cognizant of the responsibility of serving as a facilitator (Garrison, 2003). One of higher education's objectives is to aid students in becoming more "self-regulated" (Nicole, 2006). The instructor posted the same initial message, which consisted of one sentence (e.g., "Discuss this article" or "How can this be possible?"). The instructor provided a number of articles and a set of practice problems for the online discussions.

Students from both classes participated in discussions of the articles and tried to help each other find solutions to the practice problems. The treatment group used the AAODs while the control group used AODs. The discussion articles and practice problems were exactly the same for each group from each class. Table 2 lists the discussion items for both classes. For example, in Class A, both groups had the following articles: 1) "Winning Traditions," 2) "Making Heads or Tails of Shark Attacks," 3) a multiple regression article that dealt with watching TV, and 4) two sets of practice problems.

Class	Discussion Item
A	Article: "Winning Tradition"
	Article: "Shark Attacks"
	Article: "Watching TV"
	Problem Solving: Practice Problems #1
	Problem Solving: Practice Problems #2
B	Case: Linear Program. #1
	Case: Linear Program. #2
	Article: "Watching TV"
	Article: Pert/CPM

Table 2. Discussion items

The discussions were designed to promote active participation and knowledge construction. We obtained data from the log counts of the messages posted by students.

4. DATA ANALYSIS AND FINDINGS

We observed that at times, students attempted to relate relevant concepts to the course. At other times, they tried to identify the type, method, and approach to solve the assigned practice problems.

4.1 Participation

Participation refers to the number of messages posted by each group for every discussion item. For each class and group, we obtained the log counts of both online discussion systems. The number of messages for each item from both online discussion groups is shown in Figure 2 as a display of the counts in a column chart for Class A. For Class A, the AAOD group had a total of 347 messages; while the AOD group had a total of 235 messages (see Figure 2).

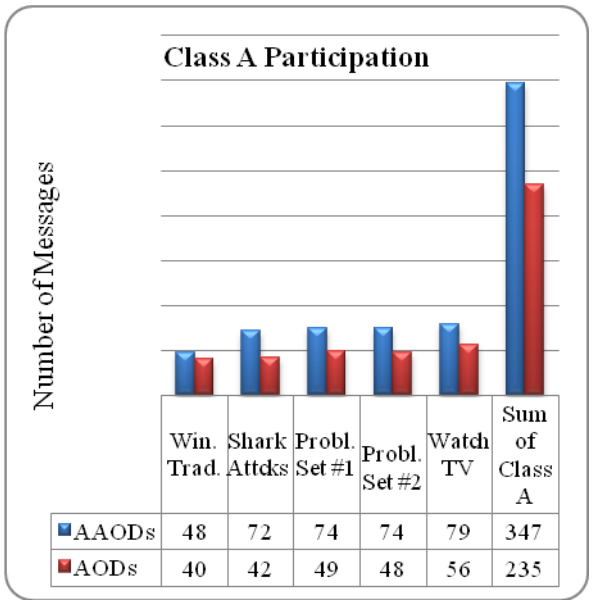

Figure 2. Class A Participation

Figure 3 shows a column chart for class B participation of both online discussion groups. The AAOD group had a total of 409 messages, while the AOD group had a total of 281 messages.

In both classes (A and B), the participation rates were higher for students using AAODs for all of the discussion items. Table 3 shows the overall participation from each class across all discussions. Students who used AAODs had significantly higher participation rates than students who used AODs in both classes (A and B).

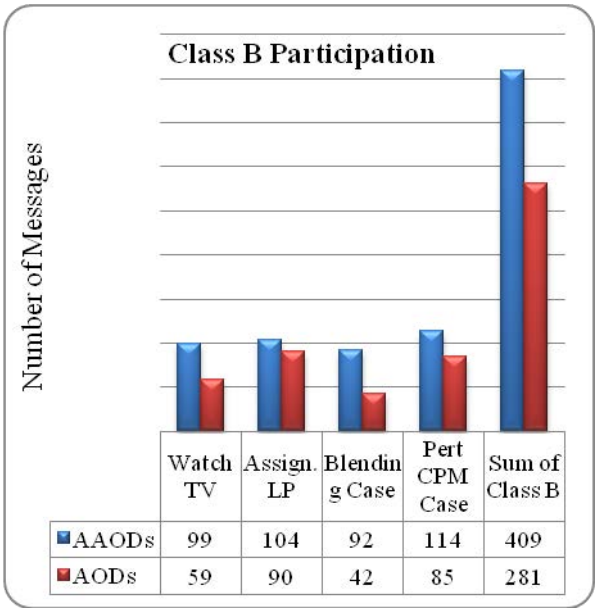

Figure 3. Class B Participation

The majority of items for AODs had medians equaled one or zero, an indication that about half of the students in each of those AODs had very little participation. In both classes, the AODs were dominated by a small number of students, while participation in the AAODs covered more students. In this case, we can consider the median as a natural and robust measure of participation quality, because the median is resistant to extreme values, unlike the mean. For example, if a student participant makes a large number of posts (extreme case); the mean would be affected and would show a high number, whereas the median is not affected and therefore would serve as a better measure for broader participation. For both classes, the medians were higher for the AAOD group than the AOD group, an indicating that there was more expansive participation within the AAOD groups.

Table 4 shows the descriptive statistics for the number of messages posted per student for each discussion item. The participation rates per student for AAODs were statistically significantly higher for five discussion items (i.e., for Class A: Shark Attacks discussion article had $t=3.06$ and $p=.002$, Practice Problems #1 had $t=1.73$ and $p=.045$; for Class B: the Linear Programming #2 case had $t=4.58$ and $p<.001$, Watching TV article had $t=3.57$ and $p=.001$, and PERT/CPM discussion had $t=3.17$ and $p=.020$).

Class	AAODs				AODs				t	Sig. (One- tail) p
	n1	Mean	Std. Dev.	Median	n2	Mean	Std. Dev.	Median		
A	23	15.09	5.94	15	23	10.22	7.1	8	**2.5**	**0.0076**
B	18	22.72	8.08	21.5	21	13.38	7.44	12	**3.8**	**0.0003**

Table 3. Overall Participation

Although some of the other discussion items for Classes A and B did not have statistically significant higher participation rates, they were very close to being significant (i.e., for Class A: the Watching TV article had t=1.64 and p=.053, Practice Problems #2 had t=1.67 and p=.051; for Class B, the Linear Programming #1 case had t=1.59 and p=.061). These patterns were also reflected in the higher medians of AAODs for the items already noted.

Each AAOD contained several threads, while each AOD typically contained one long thread. There was a statistically significant higher number of threads for AAODs than for AODs (AAOD mean=10.50, AAOD standard deviation = 6.52; AOD mean=1.17, AOD standard deviation=0.38, t=6.06, p<.001). The higher number of threads for AAODs indicates that more viewpoints and perspectives were present for AAODs than for AODs. This was confirmed through analysis of the threads using interaction maps. An interaction map is "a visual representation of the frequency of individual participation, discussion threads development and whether discussions are one-way or two-way" (Pawan et al., 2003). Neither of the two types of ODs showed a consistently higher depth level than the other. But, this was shallower one. For example, when a student posts a reply to a message, the student maintains the context of that message (MacLean, 2004). However, a larger number of replies to a message at the same level increases the breadth, but does not necessarily mean more viewpoints and perspectives. Many of the posts that were made at the same level may have not been different from each other.

Class	Discussion Item	AAODs			AODs			t	Sig. (One-tail) p=
		Mean	Std. Dev.	Median	Mean	Std. Dev.	Median		
A	Winning Tradition	2.1	1.41	2	1.74	1.39	1	0.84	0.202
	Shark Attacks	3.1	1.39	3	1.83	1.5	1	3.06	**0.002**
	Watching TV	3.4	1.67	4	2.43	2.39	1	1.64	0.053
	Practice Problems #1	3.2	2.37	3	2.13	1.87	2	1.73	**0.045**
	Practice Problems #2	3.2	2.49	3	2.09	2.09	1	1.67	0.051
B	Linear Program. #1	5.8	2.78	5.5	4.29	3.05	4	1.59	0.061
	Linear Program. #2	5.1	2.19	5	2	2.05	2	4.58	**0.000**
	Watching TV	5.5	2.2	5	2.81	2.46	3	3.57	**0.001**
	PERT/CPM	6.3	2.57	5	4.05	1.94	4	3.17	**0.002**

Table 4. Participation Per Class and Group

4.2 Interaction and Engagement

Quality learning is collaborative and social instead of isolated and competitive (Chickering & Ehrmann, 1996). Interaction can be described as a shared and collaborative communication that assumes understanding as an outcome of participation and as a reaction to the actions and thoughts of other students (Pawan et al., 2003). The geometry (depth and breadth) of the discussion can provide insights into the quality of the interaction. In this study, the depth refers to the hierarchical structure (the maximum number of levels) in a thread, whereas the breadth refers to the maximum number of messages in a level in a thread. A deeper thread is most likely to include more viewpoints and perspectives than a

not the case when comparing breadth levels, which were consistently higher for AODs, particularly at a lower level of hierarchy. For both classes, the highest breadth occurred mostly at depth level 1, an indication that most of these students were influenced by the initial message (posted by the instructor), and that they were merely posting replies out of compliance.

In interaction maps, the unit of analysis is the complete message posted (Pawan et al., 2003). Interaction maps are created to specifically show the direction of the posted messages (replies) and whether the posts were on or off-task (Pawan et al., 2003). The interaction maps show on-task (on-topic) as a measure of focus on the subject matter (Howell-Richardson and Mellar, 1996).

Figure 4 illustrates a typical example of an influential thread (from students essays) for an AOD. The on-topic focus (on) was present for most of the messages. Most of the messages had further elaboration (+). Four of the messages simply stated agreement (ag) or disagreement (disag) without any further elaborations (Eun at level 2, Jes at level 3, Adam at level 4, and Darren at level 6). Most of the interactions took place at levels 1 and 2; this showed a lack of attempt to integrate with peers at the same level, seeing that many of the messages may simply have been reiterations of the same message from peers (MacLean, 2004).

A large number of the messages (13 out of 29) were posted as replies (at Level 1) to the initial message (at Level 0). This pattern was evident across all AODs. In this thread, 13 students out of 23 from Class A participated in the AOD (nearly 57%). Of the 29 messages posted, 17 were made by 4 of the students (Jes, Tia, Eun, and Tracy). This pattern of a few students dominating the discussion thread was evident throughout the AODs; the average depth (number of posts per student at any level) was 1.33. In contrast the average depth for AAODs was 2.22. The difference was statistically significant at $p < .01$.

Figure 5 illustrates an example of an influential thread for an AAOD from Class A. This thread is different from the thread in Figure 4 in that most of the messages were not clustered at the top levels. More posts from students were made at both the lower and the higher levels (i.e., MartM at levels 2, 4, and 5, Ezell at levels 1 and 3, Nqqua at levels 1 and 4), all of the messages were on-topic (on), and agree or disagree messages were supported with further elaborations. In this thread, there were a total of 23 messages. Fifteen students out of 23 participated in this thread (65%) and only 5 (at level 1) of the 23 messages were replies to the initial message (level 0).

In Figure 5, the highest number of messages at any level was equal to 6. We wish to note that there were other threads for this discussion item, but the previously discussed

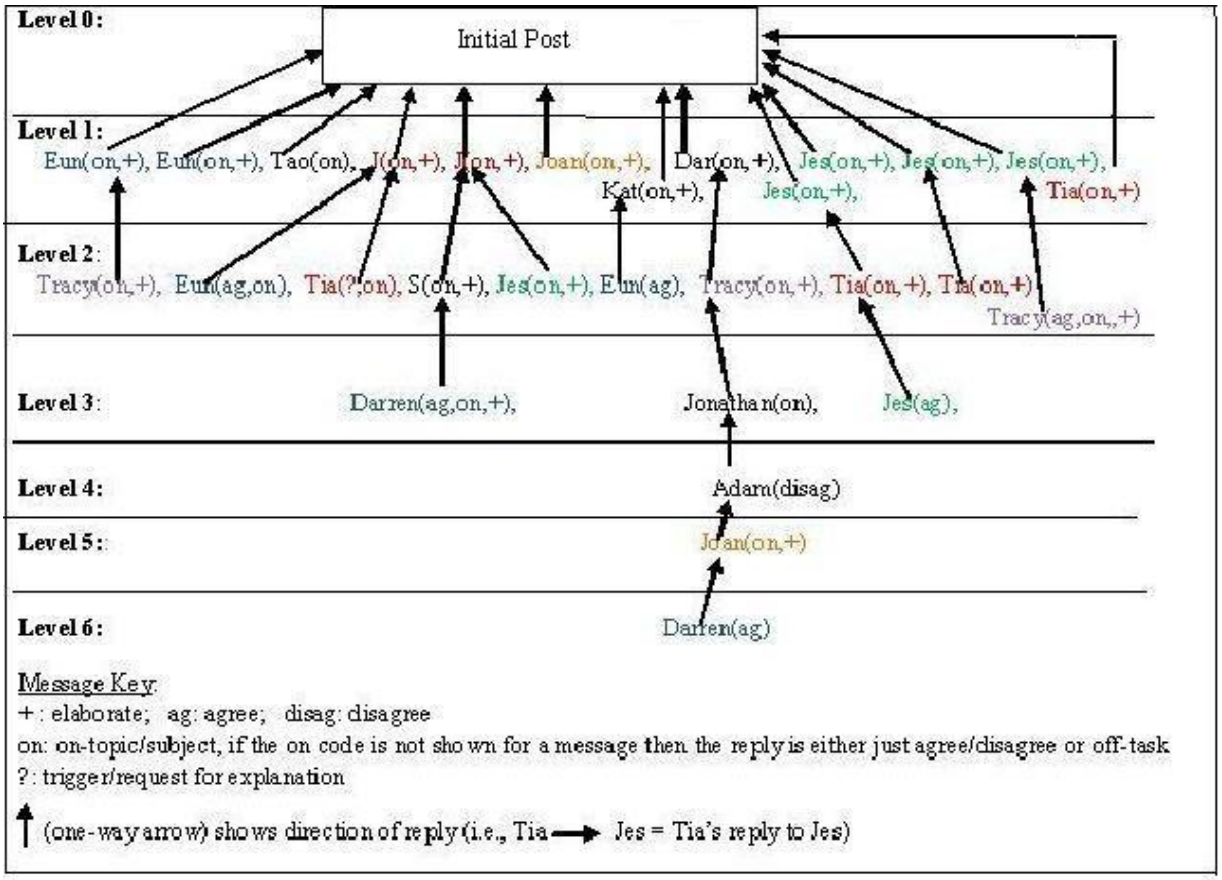

Figure 4. Example of an AOD 'influential thread' interaction map from Class A (Depth = 6, Breadth= 13 at level 1)

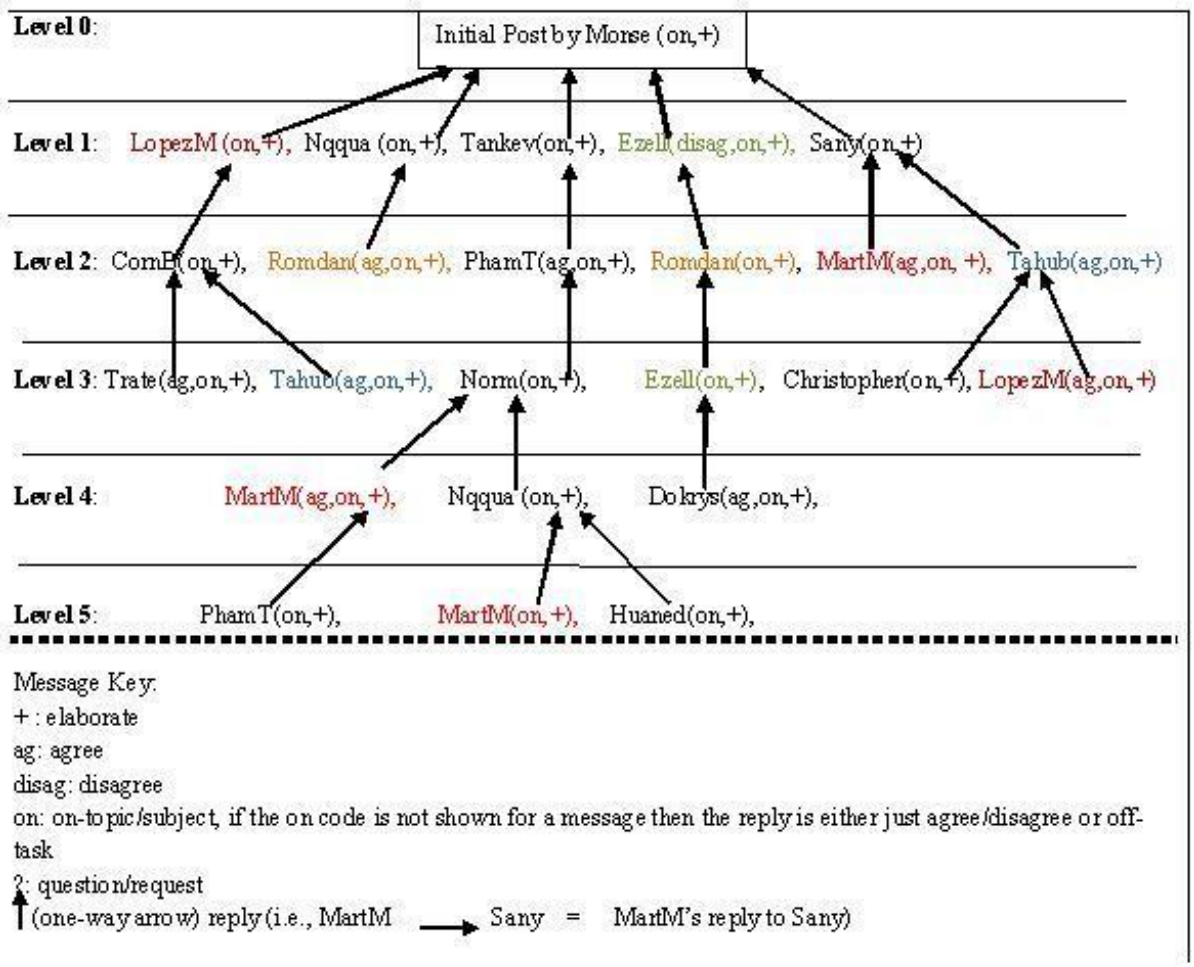

Figure 5. Example of an AAODs influential thread's interaction map from Class A (Depth = 5 and Breadth= 6 at levels 2 & 3)

thread (the one in Figure 4) was the only thread for that discussion item. This thread was not dominated by a few students; messages were spread among many of the participants. The average number of posts per student was 1.53. Six students made two posts each (LopezM, Nqqua, Ezell, Romdan, PhamT, and Tahub), and the rest of the participants made one post each. The maximum number of posts by a student was 3 (i.e., for MartM). Seven students made a total of 15 posts (65%) against 17 (59%) posts that were made by 4 students in the thread in Figure 4. A higher count for posts at the higher levels may indicate better integration, quality, and interactivity (MacLean, 2004). Since the outcome of interactivity is engagement (Rafaeli and Sudweeks, 1994), this thread would also signify better engagement for AAODs.

To illustrate further, an AOD thread from Class A shows a part of a long thread where many of the posts were made to comply with the posting requirement. As underlined in most of the posts, many of these posts were actually repetitions of each other. In this thread, some of the students seemed to have made their posts without reading the replies of others to the same question. An example of a thread from Class A using AOD is shown here:

How can this be possible? [Initial post]

- I don't see how can this[ese] two relate. For me they are two different subjects that share a similar pattern but have nothing to do with each other. [Carl, Class A, AOD]

- I think this is just a coincidence. What leads to this coincidence is the two possible outcomes in both the football game and the presidential election: win or lose. [Kat, Class A, AOD]

- I have strong doubts as to the reality of a football game determining the next president. My opinion is that the whole situation is nothing more than coincidence. If enough people believe in this, however, I do believe that the actual vote could be

swayed by sort of a self fulfilling prophecy. [Chris, Class A, AOD]

- Well, there's a 50% chance that the incumbent will win the election and a 50% chance the Redskins will the game before election day. Therefore, there's a 25% chance on any election year that this phenomenon can occur. But I have to agree that this incident can occur 15 consecutive election years. [Elis, Class A, AOD]

- What I would like to say is definitely along these lines. The probability is exactly 50-50. Of course everyone wants to have reasoning behind the pure coincidental incidences; however that's all it is, just coincidence. [Joan, Class A, AOD]

- There is no evidence for the Redskins winning or losing the game having any effect on the elections; therefore, it is a coincidence. [Tim, Class A, AOD].

- [I] think those events are just a coincidence and have nothing to do one with another. [Rob, Class A, AOD]
*- These two events are coincidental. There is a 50% chance the Redskins will win and there is 50% chance that their prediction would be correct. P(A*B) is .5*.5=.25. Therefore there is a 25% chance that the prediction will be right every four years.* [Mar, Class A, AOD]

- I agree that this is just a coincidence, however I do think the fact that this has taken place for the last fifteen years is something to be noted. It's amazing the events that take place especially in sports and in politics. [Jess, Class A, AOD]

- [T]the Redskins Rule is nothing if not a coincidence. It just happens to be 68 years' worth of coincidence, which transcends logic and ventures into the realm of Buckhantz-like improbability. Plus, there's the other thing: "As it currently stands, the Redskins Rule has been a more reliable indication than the popular vote itself. [Eun, Class A, AOD]
- The connection between politics and football are truly a phenomenon. The fact that this theory involves two different events that have shared a similar pattern for a number of years yet have nothing to do with one another is amazing. Each event has the chance of two possible outcomes, win or lose, leading me to the conclusion that this is just a coincidence. [Jess, Class A, AOD].

An example of a thread from an AAOD shows that the comments here reflect an increased sense of awareness of posts from others and the students were more responsive to one another. In this discussion thread, the comments had more details and appear to integrate the views of others in a convergent manner. The posts reveal a more thought-out, focused, and a better quality discussion. We observed that the two processes of synchronicity, conveyance (transmission of information) and convergence (mutual agreement) were present in both of the online discussion forums. But a closer look tells that AAODs facilitated higher convergence than AODs. An example of a thread from Class A using AAOD is shown here:

-Well, that was a doozie. [Initial post]

I'd have to agree. There are too many factors determining the results of an election to simply pass it all off on the outcome of a football game. It isn't statistically impossible, but so highly improbable that it really doesn't warrant an investigation. I'm sure there are a variety of coincidences occurring in the past 15 elections that could replace the football games and still seem as "decisive". The section I highlighted sums up the situation well enough; people will force a connection between two seemingly independent events to give themselves a sense of control and stability. It's highly superstitious and prevalent in a variety of situations, such as controlling the gender of an unborn baby by using different positions or knocking on wood for luck and positive conflict resolution. As more people vouch for the supposed validity of these connections, more people begin to believe; they selectively choose specific situations to support their claims and the whole business just snowballs. [Ngben, Class A, AAOD]

-I have to agree with you guys, I can't seem to find any connections between a president's election and a football game. Yes, there are many 'proofs' in this article that supports the belief that a football game can predict which party will take office next but I think everything is just luck/coincidence. [Phamt, Class A, AAOD]

-I can honestly say that I would have to completely agree with what Trate has stated. While the fact that the two scenarios seem to be directly correlated it is not at all impossible that a pure coincidence is the answer no matter how rare or unusual. After reading the article I don't see any evidence that a football game can dictate the outcome of a presidential election. I believe more often then [than] not, the incumbent party has it easier when it comes to reelection. Moreover, is it absurd to think that maybe the reason for the reelection of the incumbent party is due to the fact that "we the people" like them and what they stand for? We all know people are more apt to stay with a familiar face. [Phamt, Class A, AAOD]

-I agree. There are too many variables involved in an election. I believe smart campaigning and popularity are some major factors in an election. The fact that a few Redskin ballgames may have been just a fun coincidence. [Tahub, Class A, AAOD]

-Definitely! I think your right. The odds are so small, yet it makes for an amazing story. It works off

of chance. But it does make a lot of difference because the events are separate. Nothing connects these events together. Very interesting though. [Cornb, Class A, AAOD]

**Hi guys,*

Honestly, we all know that there is no real relationship between the presidential election and the football game. Statistically, there is a 50% chance of either party winning so there are only so many possible outcomes. There are also a lot of sports teams. If somebody was going to look at the history of the wins and losses of every sports team, it would be very highly likely to find some sort of pattern. I could probably find at least one sports team with a pattern that relates to my family members giving birth to a boy or a girl. The truth is that they have nothing to do with one another. [Tank, Class A, AAOD]

**50% chance-retort*

Tankev-

There is not a 50% chance of either party winning. There are many different factors that play into the election of a political party into office including the economic health of the country, whether or not we are at war, and a mess of other factors. Take for instance, the approval rating of President Obama now compared to one year ago. Would he have a better likelihood of being elected today as opposed to one year ago? I would wager to say that he would have had a much better chance one year ago, based off of a variety of different polls provided by CNN, Reuters, AP etc. Assuming each party has a 50% chance of winning is an unfair judgment (remember Ross Perot in 1996?). [Norm Class A, AAOD]

** Yeah [I] agree with what you said. That is exactly what i was thinking as well and it is very easy to make connections between two things that do not really have much in common. They both have the save outcome which is to win or to lose and it just so happens that they correlate with one another.* [Dok, Class A, AAOD]

Bloom's Taxonomy (Bloom et al., 1956) was revised by Anderson and Krathwohl (2001), which offers a further explanation of the learning conceptions and the order of thinking skills (see Figure 6). Bloom's Taxonomy shows the types of learning conceptions on a continuum of thinking skills that starts from remembering (lower level of thinking skills) to creating knowledge (higher level of thinking skills). Learning at the higher level relies on understood knowledge and skills that occurred at the lower level. For example, application of knowledge such as solving a problem requires understanding of the concept to be able to solve that particular problem. A student cannot have an understanding without the knowledge or the ability to remember the knowledge. Since exam performance requires solving problems correctly (application), a student may only be at the understanding or remembering level of learning. Applying learning in terms of problem solving requires a higher order for thinking than either understanding or remembering. Students may or may not have arrived at this higher order of thinking from their participation in the ODs. This warrants a future study to examine the effects of anchoring on the levels of learning conceptions and a measure of success in terms of exam performance.

Students reported that the online discussions helped them learn. Almost every student in the two business statistics classes studied was able to specify five discussion threads that were influential in their learning of the course material. We found AAODs to be more effective than AODs, thereby confirming previous research about the potential of anchoring in online discussions to increase sharing of ideas and perspectives, enhance participation, and improve engagement to support learning efforts. These findings provide useful insights about the use of ODs and especially AAODs for increased participation, sharing of ideas and perspectives for undergraduate students in a business statistics course. Table 5 provides a summary of the results. The principles of good practice correlate directly to our findings about AAODs stimulating cooperation among students and providing a mechanism for motivating active learning

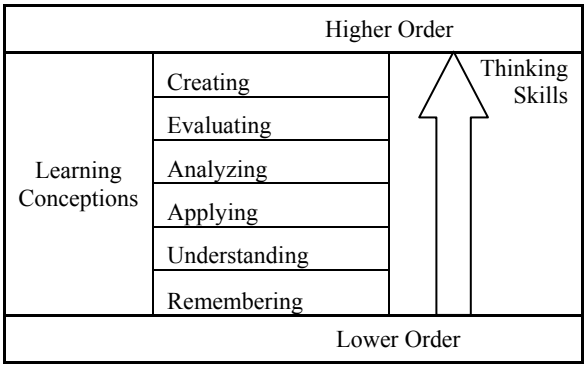

Figure 6. Bloom's Taxonomy adapted from Anderson and Krathwohl (2001).

5. CONCLUSION

The online discussion systems could have facilitated contributions not only because of interest in the subject matter, but also for "social reasons, such as to make friends, impress others, or out of social responsibility" (Horst et al., 2007, p. 668). There might be some reasons as to why students may have gained more from using one discussion system over another; one reason could be due to the anchoring feature as perhaps providing a better aid to constructivist learning than a discussion system without anchoring. Moreover, students' actual higher rate of use to engage at a deeper level and not just out of compliance, is a performance in and of itself and a more truthful learning effort. In both of the online discussions, we observed a greater sense of student responsibility towards aiding classmates who were seeking help to improve their understanding of the concepts.

Hypothesis	Supported	Comments
H1	Yes	Students using AAODs had a significantly higher overall participation rate ($p = 0.0076$ and 0.0003 for classes A and B, respectively).
H2	Yes	Students had significantly higher engagement and interactivity through AAODs (highest breadth level occurred at lower thread levels, $p < 0.0001$ and < 0.003 for classes A and B, respectively)

Table 5. Summary of results

This study focused on business courses that deal with quantitative business analysis. The value from using online discussions may vary depending on the subject and context. The subjects were undergraduate students, mainly at the junior and senior levels majoring in one of the business fields (i.e., Information Systems and Decision Sciences, Management, Accounting, and Marketing). In this regard, we may be limited in our ability to generalize the findings to other students or courses. Another limitation is that one of the authors (researchers) was the instructor for the classes. This researcher held the view that any finding is a possible contribution. The researcher recognized that own preconceptions could influence the study and as a result of this awareness, steps were taken to minimize potential threats to the findings. Efforts were made to treat students the same way regardless of which discussion board they used. The data were collected, saved, and analyzed without prejudice. Awareness of the responsibility to obey the rules made reporting of the findings a critical matter, whether they agreed or disagreed with the researcher's preconceptions.

A future study could be more revealing if it was designed as an experiment that specifically measures the effects of anchoring in ODs on participation and enjoyment based on factors such as: 1) required versus optional, 2) with incentive versus without incentive (i.e., extra credit), and 3) student's motivations and change over time (i.e., trend). Additionally, this type of experiment can be performed with a larger sample size for the same course. The extent of the relationship between participation and enjoyment under the above conditions and their effect on performance can be examined in a study that would provide more insights about ways to improve performance by way of using online discussions. A future study would lend further support to the findings if designed questions from the discussed material were to be included in an exam to give more thorough evaluation measures of retention and performance.

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