STUDENT PERCEPTIONS OF ASYNCHRONOUS AND SYNCHRONOUS WEB BASED TOOLS AND PERCEIVED ATTAINMENT OF ACADEMIC OUTCOMES

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ABSTRACT

With an increasing presence and continual adaptations related to distance learning, there is a recognized need for up-to-date research in the area of effectiveness of online education programs. More specifically, assessing the capacity to attain academic goals by use of asynchronous and synchronous web based tools within Learning Management Systems (LMS) requires further evaluation. Research within this study was designed to assess student perceptions of the abilities of the various asynchronous and synchronous web-based tools to assist in the perceived attainment of academic outcomes.

The mixed method study included 33 participants (n=33) enrolled in a Master of Arts in Teaching distance learning program. A post-only Likert scale survey was employed to collect quantitative data linked to perceptions of the ability of various web-based instructional tools to assist in the perceived attainment of learning outcomes. Descriptive statistics revealed preference for the live synchronous Class Time sessions, live synchronous Chat Pod messaging, and asynchronous ongoing email communication. Additionally, qualitative feedback was gathered via open-ended response and observation of twenty-one recorded Class Time sessions. The qualitative findings within this study were consistent with the research detailing the benefits of varied ongoing interactions and immediacy of feedback in the online learning setting.

Keywords: Asynchronous, Synchronous, Online Learning, Academic Outcomes, Distance Learning, Perceptions, Adobe Connect Pro, Chat Pod, Email.

INTRODUCTION

Since its inception, distance learning continues to grow at significant rates. This increased development of online learning has created a competitive market among universities, which is rapidly altering the face of the traditional on campus classroom setting. As a result, universities are launching a number of online degree programs available to students around the world, twenty-four hours a day, seven days a week.

More than 6.1 million students were taking at least one online course during the Fall 2010 term, which is an increase of 560,000 students from 2009 (Allen & Seaman, 2011). These numbers confirm that distance learning is providing the elasticity in time and location that many post-secondary students are seeking (Zhang & Nunamaker, 2003, p. 209).

This flexible and global based learning has led to the ongoing construction of platforms, or Learning Management Systems (LMS), designed to support the technical demands and structure of online learning and the type of instruction necessary for interactive, effective teaching to take place across great distance. Learning management systems allow for asynchronous and synchronous online learning to occur. Through these platforms, course content is not only disseminated, but, engaged with in practical, collaborative and constructive ways. As a result, the shift from on ground to online learning is necessitating a reinvention of the delivery of course content for university faculty and requiring greater depth of understanding of the asynchronous and synchronous tools within the LMS that can assist in this process.

Many are searching for ways to make instruction that has

proven effective on ground, as promising online. This study has been designed to assist those involved in improving online teaching and learning and emphasizes the delivery of instruction via various asynchronous and synchronous web based tools. More specifically, this study seeks to identify the asynchronous and synchronous web based instructional tools that students perceive as assisting in the attainment of academic learning outcomes in an online learning environment.

Transactional Distance Online

This learning from abroad has led many researchers to conceptualize the unique nature of online learning and the results of teaching and learning at a distance. Moore (1993) provides an intricate understanding of the nature of this type of learning in his theory of transactional distance. He argues that when learning takes place online, there is a transactional distance, or a separation and a psychological and communications space to be crossed (Moore, 1993, p. 22). He asserts that, although this space exists, it can be controlled, is not absolute, and varies greatly from one distance education program to another (Moore, 1993, p. 23).

Moore (1993) suggests that such space can be bridged by communications medium associated with the distance education program. Asynchronous and synchronous web based tools are examples of such medium. Specifically, he notes, each communication medium has a direct impact on the extent and quality of dialogue between instructors and learners (Moore, 1993, p. 24). The level of dialogue, by way of the learning management system and web based tools, becomes the essential component in minimizing what he refers to as transactional distance.

Moore (1993) cautions, though, that in order to accomplish this minimization of communications and psychological distance it is necessary for the instructor to select the appropriate medium to allow for adequate class interaction (p. 30). This requires a change in the traditional role of teacher, as the instructor must now possess greater understanding of the capacity of various technological tools or medium and those best suited for accomplishing each learning task (Moore, 1993, p. 28). As a result, research and training related to use of the various asynchronous and synchronous web based tools to accomplish learning tasks and deplete transactional distance becomes essential.

The Relationship Between Technology and Presence in Online Learning

The necessary dialogue and interaction between learners and instructors online described by Moore (1993) is similar to the vision shared by Garrison, Anderson, and Archer (2000), as well. Garrison et al. (2000) suggest that distance learning environments require three elements when educational transactions or interaction occur (p. 87). These elements include, social presence, cognitive presence, and teaching presence (Garrison et al., 2000, p. 88). First, social presence is defined as the ability of participants to project their personal qualities into the learning community (Garrison et al., 2000, p. 89). Cognitive presence is the ability to construct meaning via ongoing communication (Garrision et al., 2000, p. 89). Sense of puzzlement, information exchange, connection and application of new ideas are all considered indicators of cognitive presence (Garrision et al., 2000, p. 89). Finally, the third of the elements, teaching presence, includes two functions. The first function is the design, organization and presentation of course content (Garrision et al., 2000, p. 90). The second function of teaching presence is rooted in the capacity to facilitate learning (Garrision et al., 2000, p. 90). Garrison et al. (2000) suggest that teaching presence is critical in maintaining a balance between cognitive and social issues aligned to achieve the desired academic outcomes (Garrision et al., 2000, p. 101). Garrison et al. (2000) assert that these three areas are necessary in achieving a successful online higher education experience (p. 87).

Interaction in the Online Learning Setting

This social, cognitive, and teaching presence can be supported through various interactions that encourage learning in an online setting. Specifically, Moore (1993) notes that there are three dominant forms of interaction present within successful distance education programs. These three levels of interaction include learner-content, learner-instructor, and learner-learner (Moore, 1993, p. 19).

Leaner-content interaction is a hallmark of education and

occurs when the learner is processing the content that was presented. This content was formerly available only through, what Moore refers to as, didactic text (Moore, 1993, p. 20). Vehicles for transmitting content online have since expanded and include live synchronous web-based conferencing, videos and other technological routes for delivering information.

Learner-instructor interaction includes both the learner and the expert or presenter of the content (Moore, 1993, p. 20). Moore (1993) notes that many consider this a critical opportunity for distance educators to achieve an on campus feel in an online setting (p. 20). It is during this learner-instructor interaction when instructors provide new information or demonstrations of the skill.

Learner to learner interaction is the third type of interaction. During this interaction, learners engage with one another with or without the moderating presence of the instructor. This reciprocal experience requires that the students not only develop their expertise, but also are given an opportunity for it to be challenged (Moore, 1993, p. 23).

Swan (2002) also reinforces the importance of interaction in the online learning setting and links such practice to students' perceptions of satisfaction and learning. Similar to Moore (1993), her study notes three factors that have a positive influence on student perception of satisfaction and learning online. These factors include: interaction with course content, interaction with course instructors, and interaction among course participants (Swan, 2002, p. 44). Swan (2002) additionally notes that these interactions allow for an increased social presence, as associated with Garrison, et al. (2000) and provide the benefits of immediacy behaviors, as well (p. 42).

In addition to Moore (1993) and Swan's (2002) work in the area of interaction, Hillman, Willis, and Gunawardena (1994) argue that there is a fourth interaction that must be considered within distance education programs. This interaction is based on the learner and their interaction with the technology (Hillman et al., 1994, p. 30). Thus, Hillman et al. (1994) introduce learner-interface interaction (p. 33). Learner-interface interaction can be defined as, "interaction with technological medium in order to interact with the content, instructor, and other learners" (Hillman et al., 1994, p. 33).

Hillman et al. (1994) suggest that successful learner-interface interaction is reliant upon the understanding of the procedures associated with implementation of the interface, and also knowledge of how each specific technology assists in attaining positive outcomes (p. 34). They caution that this in-depth understanding of the technology and its ability to aid learners can be inhibiting if limited. The learner who is less skilled in interacting with the technology is found dedicating their cognitive resources toward the medium and has less mental space to process the content (Hillman et al., 1994, p. 35).

Overall, transactional distance as described by Moore (1993), can be lessened by increasing social, cognitive and teaching presence within a variety of interactive experiences. Web based asynchronous or synchronous tools allow for this presence to be increased and for meaningful interactions to occur. For this reason, adequate knowledge of the various tools within learning management systems used to limit transactional distance becomes essential. Additionally, understanding which web based tools best assist learners in their perceived attainment of academic outcomes becomes critical, as well. This study seeks to answer the following research question: Which asynchronous and synchronous web based instructional tools do students perceive as assisting in the attainment of academic learning outcomes?

Setting

This mixed methods study was conducted in collaboration with a large urban research university located in southern California during the Fall 2011 semester. Specifically, the data was collected from the online Master of Arts in Teaching program affiliated with the university's school of education. The Master of Arts in Teaching utilizes a learning management system comprised of both synchronous and asynchronous tools developed by a for-profit, educational technology partner that supplies the school of education with the Learning Management System used by all students and faculty within the program. Courses within the LMS meet both asynchronously via tools such as email and discussion threads, as well as synchronously during live face to face weekly two hour Class Time audio video

conferencing sessions powered by Adobe Connect Pro.

Participants

This study was designed to uncover student perceptions of the web-based learning tools that offer the greatest capability of assisting in the perceived attainment of learning outcomes related to online coursework. The participants within the study were students associated with a Master of Arts in Teaching online graduate degree program. This population included students enrolled in three courses. All students within the three courses were participants within the observation portion of study, which included viewing of recorded sessions of weekly live face to face synchronous Class Time audio video conference meetings. Participation within the electronic post-only survey segment of the study was voluntary.

There were a total of 33 participants (n = 33). This population included 23 females, 9 males and 1 not reported of which 48% were elementary majors and another 48% secondary majors within the Master of Arts in Teaching program. Due to the online nature of the program, the participant population was comprised of students throughout the United States and internationally. This included the following description of residence: 3% international, 3% Midwest, 3% southeast, 6% mid-Atlantic, 9% northeast, 18% northwest and 52% from the southwestern portion of the United States.

Differences existed in the amount of experience in online education participants had attained prior to enrolling within the Master of Arts in Teaching. Specifically, 21% had taken online course work prior to the Master of Arts in Teaching, while 76% had not. The number of technology preparedness trainings the population experienced varied from 1 through 5. 61% attended one training related to the LMS and technology associated with the Master of Arts in Teaching. Another 18% reported enlisting in two trainings. 6% attended three trainings, 3% four trainings, and 3% five trainings.

The amount of online experience within the Master of Arts in Teaching program differed, as well. Participants were at various stages within the graduate program. 42% of participants had completed three Master of Arts in Teaching courses at the time of the study. 30% of participants had taken six previous Master of Arts in Teaching courses, leaving 15% with two completed Master of Arts in Teaching courses, 6% nine courses, and 3% one Master of Arts in Teaching completed course.

Instruments

In efforts to gather data regarding student perceptions of the effectiveness of the web based learning tools, a quantitative 5-point Likert survey was used to assess the value of each tool to assist in the perceived attainment of academic learning outcomes. This post-only survey was administered electronically to student participants upon the commencement of the Fall 2011 semester.

All of the available tools were included within the survey, yet it is important to note that only select tools were utilized or deemed essential within the course structure of each of the three courses in this study (Table 1). Decisions related to tool use were based on the individual instructor or course lead.

In addition to the quantitative Likert scale measure, a qualitative portion of open-ended stems was also included in the survey. These stems asked participants to share additional insights about the various tools. Specifically, these items were enacted to gather free response regarding student justification of their perception of the various web based learning tools in attaining the academic outcomes. Here, students were able to detail why or why not the various tools were helpful in achieving learning goals.

Tool	Course X	Course Y	Course Z
Breakout Rooms	Yes	Yes	Yes
Chat Pod	Yes	Yes	Yes
Class Time	Yes	Yes	Yes
Community	Yes	Yes	Yes
Course Wall	Yes	Yes	Yes
Drag and Drop	No	No	Yes
Email	Yes	Yes	Yes
Flipbook	No	Yes	No
Forum	Yes	Yes	Yes
Notes	Yes	Yes	Yes
Office Hours	Yes	Yes	Yes
Overview	Yes	Yes	No
Polling	Yes	Yes	Yes
Portfolio	Yes	Yes	No
Share Pod	Yes	Yes	Yes
Whiteboard	No	No	No
Video	Yes	Yes	Yes

Table 1. Tool Utilization By Course

Additionally, in efforts to triangulate the data, an observation protocol was utilized. Qualitative data was collected using the protocol. This qualitative data was based on all student feedback pertaining to the asynchronous and synchronous tools. The protocol was applied to all pre-recorded face to face synchronous Class Time audio video conference sessions of the three courses. Implementation of the observation protocol took place at the close of the semester, as well.

Findings

Descriptive statistics (Table 2) were employed to uncover students' overall perceptions of various asynchronous and synchronous tools' abilities to assist in the perceived attainment of academic learning outcomes. Here, data from the Likert scale survey revealed the top three preferred tools. These tools were Class Time, Chat Pod, and Email with means of 4.68, 4.63 and 4.52 respectively on a 5 point Likert scale.

Discussion

Garrison, et al. (2000) reinforces the tremendous value of presence in distance learning. Specifically, he reminds those involved in online learning of the importance of social, cognitive, and teaching presence (p. 87). The synchronous Class Time audio video conferencing tool found within the Master of Arts in Teaching program, powered by Adobe Connect Pro, not only allows for a visual presence when separated by distance, but also for such social, cognitive, and teaching presence to exist. Students interact with one another, with course content, and the instructor in a live face to face audio video conference. Similar in nature to Skype or other teleconferencing tools, Class Time, allows for students to feel as though they attend class for two hours each week, despite geographical separation. As one student noted, "It was like being in a real classroom."

Additionally, Class Time allows for immediacy of teacher and peer feedback supported by Swan (2002). As Park and Bonk (2007) describe, "Of the advantages of synchronous interaction, teacher immediacy and dynamic interaction are highlighted by researchers as elements benefitting students who work in different times and locations" (p. 308). "You could see the teacher and have your questions answered immediately", one student notes. Another student confirms, "Being able to ask questions and clarify information on the spot is very helpful to me understanding material in the class".

Tool	N	Minimum	Maximum	Mean	Std. Deviation
Class Time (synchronous)	28	3	5	4.68	.723
Chat Pod (synchronous)	30	2	5	4.63	.669
Email (asynchronous)	27	3	5	4.52	.700
Overview (asynchronous)	25	3	5	4.44	.712
Notes (synchronous)	25	3	5	4.40	.707
Share Pod (synchronous)	25	3	5	4.36	.638
Video -University (asynchronous)	21	3	5	4.33	.658
Breakout Rooms (synchronous)	31	3	5	4.32	.653
Video -Other (asynchronous)	21	3	5	4.19	.750
Course Wall (asynchronous)	27	3	5	4.19	.736
Forum (asynchronous)	28	2	5	4.07	.940
Office Hours (synchronous)	26	2	5	4.00	.938
Portfolio (asynchronous)	25	2	5	3.92	.909
Polling (synchronous)	23	3	5	3.87	.694
Flipbook (asynchronous)	11	2	5	3.82	.982
Whiteboard (synchronous)	14	3	5	3.79	.802
Drag and Drop (synchronous)	18	3	5	3.78	.878
Community (asynchronous)	20	2	5	3.50	1.051

Table 2. Descriptive Statistics – Asynchronous and Synchronous Tools

Overall, Class Time provides a vital vehicle for distance learning interaction. Here, we are reminded of Moore's (1993) work reinforcing the importance of this interaction defined more specifically as, learner-content, learner-instructor and learner-learner interaction (p. 20). Each of these interactions are clearly supported through weekly

Class Time meetings. When meeting synchronously as a class, students are able to receive and question new content, see and speak with their instructor, and interact with their peers, as well. These interactions have proven positive via the descriptive statistics presented within this study and with comparable research, as well. Swan (2002) asserts, "students who rated their level of activity as high, also reported significantly higher levels of course satisfaction and significantly higher levels of perceived learning" (p. 30).

The Chat Pod was another tool rated highly for assisting in the perceived attainment of learning outcomes. Similar to instant messaging tools, here, students are provided with the opportunity to post various synchronous written responses to questions posed by the instructor and other messages in an identifiable box that appears on the screen during the live synchronous Class Time session. Many students noted the use of the Chat Pod as allowing for additional clarification and minimal interruption during class. One student stated, "It creates side dialogue which creates a more academic atmosphere without interrupting instruction." Another student shared, "The chat pod was very useful in continuing a discussion without disrupting class." As Gibbons and Wentworth (2001) note, "dialogue is at the methodological heart of the online learning program." One student confirmed this theory and stated, "It helped to keep the dialogue going." Another noted, "I felt like the chat pod helped to stimulate class discussions and keep them going." Hence, dialogue and continual interaction are, again, observed. Arbaugh (2001) reiterates, "the more learners perceive interaction with others, the higher the e-learning satisfaction."

Finally, email was the third tool ranked favorably for assisting in the perceived attainment of academic learning outcomes. As one student noted, "Email is a must!" Checkering and Ehrmann (1996) support this claim, as they encourage seven principles of effective online learning. Specifically, one of these seven principles notes the importance of ongoing interaction inside, as well as outside of the online classroom.

One reliable route for this out-of-class interaction, or communication, is email. Although it began as an essential asynchronous tool at the onset of distance learning, it continues to remain a very valuable tool within some of the more advanced learning management systems and online programs. Email has been referenced as crucial in clarification or delivery of additional content. One student noted, "I was able to obtain information and share information utilizing email outside of class." This delivery of additional material is often essential in deepening the learning of content and also allows for the instructor to gather necessary feedback and material from students, as well. Swan (2001) reminds us of the importance of ongoing email communication as she finds, "students who do not have adequate access to their instructors feel they learn less and are less satisfied with their courses" (p. 316).

Conclusion

The findings within this study revealed those asynchronous and synchronous web based tools that students perceive as most useful in assisting in the attainment of academic outcomes in the online learning setting. The data that resulted highlighted the role of interaction in online learning environments, as those tools rated most favorably allowed for increased interaction between learner and instructor, learner and other learners, learner and content, and learner and technology interface. The strength of these interactions was specifically enhanced by two synchronous tools, Class Time and Chat Pod, as well as one asynchronous tool, email. These tools not only provided a productive forum for interaction, but also enabled a significant amount of social, cognitive, and teaching presence, as well. The research revealed that asynchronous and synchronous tools can help limit the amount of transactional distance defined by Moore (1993) and, as a result, increase student perception of the tools' abilities to assist in the attainment of academic outcomes when learning online.

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