Text Messaging and the Community of Inquiry in Online Courses

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Abstract

Text messaging is emerging as a tool educators are using for multiple purposes in both face-to-face and online courses. This research study investigated the impact of using text messages to convey course information for six online courses, taught by one instructor, as measured by the Community of Inquiry survey. Text messages communicated course information, including reminders of assignment due dates, notification that assignments have been graded, and short feedback on discussion postings. Students completed two surveys for the study; 1) the Community of Inquiry (COI) survey and 2) a survey created by the first author to gather information on student reaction to using text messages in the courses. Overall results indicate that students reacted positively to receiving text messages. COI survey results indicated, however, that there were no significant differences between students who received text messages and students who did not receive text messages in their perception of social presence, cognitive presence, and teaching presence as represented by the COI framework. This lack of significance may be partially attributable to the instructor's extensive prior experience and success in online teaching.

Keywords: online learning, cellular telephones, mobile technologies

Introduction

The current trend in research regarding cell phone usage in higher education documents its use as a learning tool and instructional delivery device. In the research, two terms associated with cell phone use are used interchangeably, namely, text messaging and Short Messaging Service (SMS). Both of these terms refer to the ability to send and receive short text messages on a cellular device. A third term, instant messaging (IM), is also found in this body of literature. Instant messaging refers to conversational and immediate text communication between two people. IM communication can occur between two computers, two phones, or a computer and a phone.

Mobile technologies, especially cellular phones, are intriguing to educators because these technologies are small, relatively inexpensive, and ubiquitous—almost every student has a cell phone. As Markett, Sánchez, Weber, and Tangney (2005) note, mobile phones "require no technology training, and are not intimidating" (p. 282), therefore their use is often seen as low risk and low cost. However, the use of cell phones in education is often contentious. Some educators support the idea of exploring educational uses of cell phones (Kolb, 2007), while other educators stress the potential problems that cell phones can introduce in educational settings (Allen, 2007). One often mentioned potential problem with cell phones is the ability of students to text each other information related to tests. For example, in a nationwide survey (Obringer & Coffey, 2007), 80% of the high school principals who completed the survey indicated that they felt text messaging is a problem, or a potential problem, during tests and examinations. Those who argue in favor of using cell phones point to the potential positive aspects of text messaging, including the ability to help students learn course content, help people change their behavior, and help build a stronger community of learners in online courses.

In the area of course content, learning vocabulary is a common focus of text messaging research. Researchers such as Lu (2008) examined the effectiveness of Short Messaging Service (SMS) on second language acquisitions, while Cavus and Ibrahim (2009) used SMS to support the learning of new technical English language words. In another study, Thonton and Houser (2005) found Japanese students learned significantly more vocabulary when they received vocabulary lessons via text messages on their phones compared to students who received the same information in a paper format. Goh and Hooper (2007) explored the use of SMS crossword puzzles as a means to engage students and to promote interaction through learning activities, and Uzunboylu, Cavus and Ercag (2009) used SMS combined with student photographs to portray local environmental blights thereby increasing students' environmental awareness. Text messaging has also been studied in the context of changing behavior patterns.

In a study by Riley, Obermayer, and Jean-Mary (2008), student smokers were aided in a smoking cessation intervention through the use of a combination of text messages and web-based resources. The outcome indicated positive results in the number of study participants who quit smoking, and those participants who continued to smoke reported reduced smoking rates. Another example of the use of text messaging in relation to health behaviors is a study by Gerber, Stolley, Thompson, Sharp, and Fitzgibbon (2009). In this study, healthy eating and activity tips, expressions of encouragement, and general health text messages were sent three times a week to participants who had already undergone a weight reduction program. These messages were designed to encourage continued healthy behaviors. In a review of 14 studies of text messages used to support changes in health behavior, Fjeldsoe, Marshall, and Miller (2009) found 13 of those studies showed positive behavior changes, especially when messages were tailored to a specific situation.

While these aforementioned studies are all very worthwhile endeavors, there is a gap in the research regarding the use of cell phone text messaging as a tool for learning course content or affecting behavior, and using text messaging for building a community of inquiry and promoting interaction in online courses.

Although there are many opportunities for students and the instructor to interact in an online environment, text messaging provides a means of contacting students about the course in a way that does not necessitate them being online and takes advantage of the ubiquity of cell phones on today's college campuses. Additionally, research findings point to the importance of creating a Community of Inquiry (COI) in the online environment (Anderson, 2004; Garrison, Anderson, & Archer, 2000; Garrison & Arbaugh, 2007; Swan, 2001). A COI as defined by Garrison et al. (2000) refers to the environment created by teachers and students where meaningful learning and interaction occur among three defined elements: cognitive presence, social presence, and teaching presence.

Cognitive presence (Garrison et al., 2000) is defined as the extent to which participants are able to construct meaning through sustained communication. Categories for cognitive presence include triggering events, exploration, integration, and resolution. Shea, Pickett, and Pelz, (2003) elaborate the term by adding that it is achieved in conjunction with satisfactory social presence and effective teaching presence. Examples of cognitive presence include student questions, expressions of confusion and indictors of students making connections and building new knowledge.

Kehrwald (2008) defines social presence as "… the means by which online participants inhabit virtual spaces and indicate not only their presence in the online environment but also their availability and willingness to engage in the communicative exchanges which constitute learning activity in these environments" (p. 94). Garrison et al. (2000) describe social presence as the ability to project oneself as a real person (one's full personality) both socially and emotionally in the online environment. The categories of social presence, as defined by Garrison and Arbaugh (2007) are affective expression, open communication, and group cohesion. Social presence can be identified by the use of emoticons to express oneself, idioms, more informal and familiar language, and evidence of students helping each other out in a collaborative manner. Garrison and Arbaugh also suggest that activities which cultivate social presence can enhance the learner's satisfaction with the Internet as an educational delivery medium. We propose that the use of SMS also supports student satisfaction.

Teaching presence as defined by Anderson, Rourke, Garrison, and Archer (2001) is "…the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (p. 5). Based on this definition, Anderson et.al distill three components or elements of teaching presence: instructional design and organization, facilitating discourse, and direct instruction. Examples of teaching presence are the instructor resolving misunderstandings and correcting misinformation that appears in discussion postings, moving the

discussion along in a timely manner, keeping the discussions relevant and on track, as well as encouraging students to participate online and share their thoughts and ideas.

The Community of Inquiry framework emerged from research done between 1997 and 2001 as a project of the Canadian Social Sciences and Humanities Research Council entitled, "A Study of the Characteristics and Qualities of Text-Based Computer Conferencing for Educational Purposes." The intent of the original study was to "provide conceptual order and a tool for the use of computer mediated communications (CMC) and computer conferencing in supporting an educational experience" (Garrison, Anderson, & Archer, 2000, p. 87). Since then, interest and use of the COI as a theoretical framework for investigating the complexities of online learning and the online environment has spread. Due to the widespread use and support of the COI framework for defining attributes of effective online learning, and as a vehicle for conceptualizing the online experience (Garrison & Arbaugh, 2007), as well as its subsequent validation (Arbaugh, Cleveland-Innes, Diaz, Garrison, Ice, Richardson, & Swan, 2008), the COI survey was selected as the tool to measure student perception of teaching presence, social presence, and cognitive presence in this study.

Research questions

This research project investigated the affect of text messages on student perception of the sense of community of inquiry and sought student reaction to receiving cell phone text messages that conveyed course information in online courses. The specific research questions were:

- Does the use of text messaging in online courses affect student perception of the community of inquiry?
- What is student reaction to receiving text messages related to course content?

Methodology

Participants in this study were students in six graduate-level courses, taught online by the first author, at a large Midwestern university during two consecutive academic semesters. Students were solicited to participate in the study during face-to-face orientation sessions and also via email. Since the study entails the use of a cellular phone and text messages, some students were unable or unwilling to participate due to a number of reasons, including not owning a cellular phone, not having unlimited text messaging, or simply not wanting to receive text messages. All students who volunteered for the study signed a consent form. Students in the study were randomly assigned to one of two groups. One group received text messages throughout the semester; the other group did not receive text messages. To avoid inundating students with text messages, the consent form indicated that students would receive no more than two text messages per week. Fifty-two students signed up for the study; however 41 students completed the surveys for a 78% response rate.

Students in the study supplied a cellular phone number to the instructor and indicated the types of messages they wanted to receive. There were five options for types of messages students could receive: 1) reminders of due dates for assignments; 2) important vocabulary; 3) short feedback on discussion postings; 4) notification that an assignment had been graded; and 5) course related teasers (e.g., quality web sites related to course content, links to online videos related to course content, relevant research articles). All students elected to receive text messages to remind them of due dates for assignments and to be notified when an assignment had been graded. The other options were chosen less frequently. Approximately half of the students elected to receive all five types of messages. There was no limit regarding how many of the five types of messages the students could choose to receive.

Procedures

At the beginning of each semester, the first author entered student-supplied cellular phone numbers into her cellular phone, along with the student's name. During the first week of class, the instructor sent a text message to each student to insure that text messages were received. Throughout each semester, one or more of the five types of text messages were sent to students. The most frequently sent messages had to do with due date reminders and notification that assignments had been graded.

The instructor typed and sent all text messages through her cell phone rather than using an online text messaging service. While this approach added time and complexity to the process, the instructor believed it was important to keep student cellular phone numbers private and to control when text messages were sent.

Due date reminders were sent approximately two days before assignments were due, but were only sent to students who had not yet submitted the assignment, therefore even if a student was participating in the

study, that did not mean the student would receive a particular text message. A typical reminder stated, "Just a reminder that project 3 is due by Wednesday, Feb 25 by 11:00 pm."

In order to take advantage of the immediate nature of text messages, text messages to alert students that projects had been graded were sent within minutes of a grade being posted in the online grade book. A typical text message alerting a student that a project had been graded was, "I've graded your tool project. Excellent! You earned the max # of points." Since the instructor wanted students to access the course management system to review detailed feedback, the text message only indicated that the project had been graded and the number of points earned.

An example of a discussion posting text message was, "I enjoyed reading your posting about mobile learning. I can see from your post that you have given the use of mobile technologies serious thought and consideration. It will be interesting to learn about the results of your trial of using text messaging with your students." For vocabulary, one of the terms defined through a text message was *cloud computing*. The text message to define *cloud computing* was lengthy and time-consuming to enter. An example of a teaser was a text message about a new technology, *siftables.* The text message of the teaser was, "Check out this video on siftables. Looks pretty cool. http://siftables.com".

At the end of the semester, all students who participated in the study were asked to complete the validated Community of Inquiry survey (Arbaugh, Cleveland-Innes, Diaz, Garrison, Ice, Richardson, & Swan, 2008; Shea, Swan, Li, & Pickett, 2005) to provide data to answer the first research question, does the use of text messaging in online courses increase student perception of the community of inquiry? Only students who received text messages were asked to complete a second survey, the Cell Phone Text Messaging Survey, designed to gather data to answer the second research question, What is student reaction to receiving text messages related to course content?

The COI survey consists of 37 Likert scale items with ordinal responses scored using a scale of 1 representing strongly disagree, 2 disagree, 3 neutral, 4 agree and 5 representing strongly agree. Additional background questions were: 1) What grade do you expect to receive in this course? 2) Select your gender 3) Select your age group 4) Did you receive text messages during this course? and 5) How many online course have you taken?

The Cell Phone Text Messaging Survey was designed to measure student reactions to and impressions of the cell phone text message strategy. This survey consisted of 13 Likert scale questions and two open-ended questions that 1) solicited additional comments from students about their thoughts related to receiving text messages and 2) asked for suggestions on how to improve text message usage within an online course.

Results

Community of Inquiry Survey

Descriptive statistics for each of the three COI constructs follow: *Teaching Presence* items yielded a mean score of 4.68 (s.d. = 0.45); *Social Presence* items yielded a mean score of 4.17 (s.d. = 0.54); and *Cognitive Presence* items yielded a mean score of 4.45 (s.d. = .51). Scores from the three constructs were combined to derive a community of inquiry score for each participant. The group receiving text messages had a mean COI score of 4.53 (s.d = .44) and the group who did not receive text messages had a mean COI score of 4.30 (s.d. = .42).

A one-way ANOVA was computed to compare the Community of Inquiry survey score across the two levels of cell phone text messaging. The dependent variable was the score from the COI survey and the independent variable was the cell phone text message, received yes or no.

Table 1. ANOVA Results of Community of Inquiry Score by Cell Phone Text Message

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	560.784	1	560.784	2.623	.114
Within Groups	7911.882	37	213.835		
Total	8472.667	38			

There was not a significant effect of cell phone text messaging on the COI score at the $p < .05$ level for the conditions $F(1,37) = 2.623$, $p = .114$, n = 38. The full data set is represented by n = 41, however due to missing item-level data only 38 observations were recorded. R Squared = .066 (Adjusted R Squared = .041), therefore only 6.6% of the variability in the COI score is explained by the cell phone text messages.

Cell Phone Text Messaging Survey

The Cell Phone Text Messaging Survey was designed to gather data about student reaction to the use of text messages in an online learning environment. There were 15 items in the survey, 13 Likert-scale items and two open-ended items. Only students who had received text messages completed the survey. A total of 24 students completed the survey. See Appendix for response item percentages.

Descriptive statistics indicate that the majority of students agreed or strongly agreed that text messages were a good way to receive course information (95.2%), that receiving text messages were useful (91.3%), and that receiving text messages was fun (95.2%). Over eighty percent of the students (82.6%) indicated that it is normal for them to receive text messages, and even though the majority of students did not think that receiving text messages was annoying, there were students (13%) who thought receiving text messages was annoying at times. A majority of students did log into the course management system shortly after receiving a text message (82.6%) and they were either neutral about (30.4%) or liked (69.6%) being able to determine the types of messages they received. Similar results were obtained when students were asked about their satisfaction with the number of text messages they received. Thirty percent were neutral about the number of messages received, while 69.6% agreed or strongly agreed that the number of messages received was about right.

Over half of the students indicated they did not text back (52.5%) to the instructor and only 13% of the results indicated that a text message to the instructor was initiated at least once during the semester. Less than 10% of students thought that the text messages did *not* help them stay up-to-date with the course, a little over one-quarter of students were neutral on this item (26.1%), but the majority (65.2%) either agreed or strongly agreed that receiving text messages did help them stay up-to-date. Just over 90% of the students (91.3%) felt that text messaging can serve a useful purpose in education and over eighty percent (82.6%) felt that receiving text messages was a positive aspect of the course.

Students who provided responses to the open-ended questions were positive about receiving text messages. Examples of statements include:

> *"The text messages about links to different technology (siftables) was really engaging. It helped [me] to stay engaged in what we were working on."*

> *"I loved receiving text messages with course info and grades! It was never annoying."*

> *"It was very rewarding to receive a positive text message like, 'Good job on your journal.'"*

> *"The text messaging kept me on track and I felt connected to the teacher for the course. The feedback was very beneficial and I'm so thankful that I was able to participate. This was my first experience with online course work and the texting helped me feel in touch. [The instructor] does an awesome job with keeping online learners actively engaged!"*

Although few suggestions were offered for how to improve the use of text messages in the online classes, one student recommended that the first message be an introductory message that clearly identifies that the message is from the instructor. Another student recommended that "other professors should use this technique to communicate."

Discussion

This study was undertaken to investigate the effect of cell phone text messages on student perception of the effectiveness of the learning environment they experienced in online courses, as measured by the Community of Inquiry framework. The researchers sought information to inform how the use of text messages in online courses could enhance the online learning experience. While the results of the COI survey did not show significant differences between students who received text messages and students who did not receive text messages, there were, nevertheless, important and noteworthy results.

First, the instructor found that texting students contributed to a stronger feeling of connectedness to those students. In much the same way that students appreciate interaction from an instructor, many instructors

are pleased when students engage in both formal and informal modes of communication with them. Even though only a few students sent text messages back to the instructor, those who did opened additional lines of communication and reinforced the use of text messages and the notion that text messages can be a positive aspect of an online learning experience.

Second, the use of text messaging appeared to encourage students to log into the course management system (over 80% of students indicated they logged in shortly after receiving a text message). Since much of the work of online courses takes place within a course management system (e.g., online discussions, emails, course announcements, submission of assignments), when students log in on a frequent and regular basis, they may be more successful in meeting course goals, feel more connected, and be less prone to drop out since they are more apt to be up-to-date on course expectations, requirements, and announcements.

Third, students were positive about receiving text messages. As results from the Cell Phone Text Messaging Survey indicate, students thought that communicating course information via text messages was a good idea as well as a useful one. Giving students choice and control over the types of messages they received was also seen as positive by students.

Several aspects of this research proved challenging and should be considered in future studies of this nature. When the study first begins, the instructor should clearly indicate whether he or she is open to receiving text messages from students. Students were unsure about whether they were to text back to the instructor or initiate text messages to the instructor. Informing students that they were welcome to send text messages to the instructor may have further enhanced communication about course content as well as increasing the students' perceptions of social presence. As one student noted, "I guess I didn't realize that texting back was an option. If I had been more aware of that I would have definitely sent back information."

The process of composing and sending text messages is another area warranting careful thought and planning to better control the level of complexity in sending text messages. The instructor compiled a list of students participating in the study along with the types of text messages these students elected to receive. In order to send reminders of due dates, for example, the instructor had to refer to the list to determine if a particular student was to receive a text message, verify which type of text message they were to receive, insure that the student had not already turned in the assignment to be graded (early), compose the text message, and finally send it. The instructor also discovered that providing feedback on discussion postings via cell phone text messages was extremely time consuming, since to be most effective, the instructor felt the text message needed to be customized to a student's specific posting. In addition, these text messages were fairly lengthy. For these reasons, only a few text messages were sent providing feedback on discussion postings. An option for future consideration is the use of pre-written posting responses that would be, of necessity, more general in nature, but could nevertheless convey the instructor's assessment of the overall quality of the posting.

Two types of the five text messages provided were problematic; text messages for vocabulary and text messages for course content teasers. Since vocabulary is addressed in this instructor's courses through targeted terminology assignments, there were not many additional vocabulary terms that students needed to learn. And, with the high level of activity in online courses, the instructor struggled with what types of teasers to send, as well as when these types of messages are best sent.

In addition to the above challenges, there are several limitations in this study worth noting. First, this study was conducted across several online classes taught by the same instructor. Participants in this study were very satisfied with the instructor, rating her 4.8 on a scale of 5.0. Secondly, students rated their overall satisfaction with the course as 4.66, and they rated their learning 4.56 out of 5.0. Because of their satisfaction with the course, their learning, and the instructor, the findings of no significance in this study appear logical. The instructor has many years of experience teaching online and is well versed in effective online teaching strategies. Because of these high average scores regarding student satisfaction, it is possible that the addition of cell phone text messaging did not significantly add to students' perception of a community of inquiry because teaching presence, social presence, and cognitive presence were already established. The authors encourage further investigation into the effect of cell phone text messaging on student perceptions of a community of inquiry across a variety of instructors and with a larger sample size.

Convenience sampling was used, from which the cell phone participants were randomly assigned to receive text messages or not. However, non-probability sampling limits the generalizability of the results

to other similar populations, and introduces potential sampling bias into the study. It is also important to note that participants in the study were limited to those who had cell phones and who were willing to incur possible additional fees associated with text messaging.

Conclusion

As instructors continue to explore ways to enhance online learning experiences, text messaging may be one technique worth further investigation. In this study, mean scores on the three constructs of the COI survey indicated that student perception of these elements were high. Students were also highly positive toward the use of text messages, as reflected in the Cell Phone Text Messaging Survey responses. Student comments further support the positive reaction to the use of text messaging to convey course information. As one student stated, "I would…continue with it."

Future studies may want to limit the types of text messages students can receive to two or three, rather than five; include larger sample sizes and multiple instructors across a variety of online classes and institutions, and investigate the use of online text messaging services to facilitate the dissemination of the text messages. Another area warranting investigation is the use of text messaging in traditional courses that have no online component. Additionally, other theoretical frameworks for investigating the educational and social effects of instructor initiated, course relevant, cell phone text messaging should be considered.

Another area warranting investigation is the use of text messaging in traditional classes which have no online components. In this context the addition of text messaging may be perceived by students as a "value-added" component. It is possible that online students are more comfortable with electronic communication options such that the addition of text messaging does not add to their perception of the COI. Using text messages in a traditional face to face course, however, may have a greater effect on student perception of the COI since these students may not be as inclined to use electronic communication as a means of receiving course-related information and establishing a sense of community.

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Appendix A. Text Message Survey Response Percentages

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Receiving text messages on my cell phone is a good way to communicate course information.	0.0%	0.0%	4.3%	34.8%	60.9%
I received course information that was useful to me through text messages on my phone.	4.3%	4.3%	0.0%	34.8%	56.5%
I tended to login to Vista within several hours of receiving a text message.	8.7%	8.7%	26.1%	26.1%	56.5%
Receiving text messages was a fun way to get course information.	0.0%	0.0%	4.3%	34.8%	60.9%
Receiving text messages was annoying at times.	60.9%	13.0%	13.0%	8.7%	4.3%
I frequently texted back to the instructor after receiving a text message from her.	34.8%	17.4%	21.7%	8.7%	17.4%
I constantly use my cell phone, so receiving text messages is normal for me.	4.3%	4.3%	8.7%	26.1%	56.5%
I liked being able to determine the types of text messages I would receive.	0.0%	0.0%	30.4%	34.8%	34.8%
I received just about the right number of text messages from my instructor per week.	0.0%	0.0%	30.4%	34.8%	34.8%
I initiated text messages to my instructor at least once during the semester.	52.5%	21.7%	13.0%	8.7%	4.3%
Receiving text messages helped me stay up-to-date with this course.	0.0%	8.7%	26.1%	17.4%	47.8%
Text messages may serve a useful purpose in an educational setting	0.0%	4.3%	4.3%	30.4%	60.9%
Receiving text messages was a positive aspect of the course	0.0%	0.0%	17.4%	21.7%	60.9%