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Using Social Media to Improve Student-Instructor Communication in an Online Learning Environment

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ABSTRACT

The lack of effective faculty-student interaction has been identified as a main contributor to the high dropout rate in online education. For this paper, the authors conducted an empirical study using a social networking tool, specifically Facebook, to improve student-instructor communication and student performance in an online learning environment. They recruited three sections of an introductory IT course at a public university and divided them into two groups: (1) a treatment group where Facebook was used as an additional communication tool and (2) a control group where the course setting wasn't changed. The authors surveyed the participants' opinions on the use of Facebook in the treatment group, and collected participants' academic performance data for both the treatment and control groups. Their research findings show that the use of Facebook as a supplemental communication method can help an instructor better reach out to students, reduce a course's failure rate, and improve student course performance.

1. INTRODUCTION

Online learning has enjoyed exponential growth in recent years due to the flexibility and convenience it offers students (Moore & Kearsley, 2011). Not only has online enrollment been growing very fast, but more and more colleges and universities consider online learning a critical aspect of their long-term strategies (Allen & Seaman, 2016). One of the greatest challenges in online learning is its high dropout rate (Clay, Rowland, & Packard, 2009), which refers to student failure in or failure to complete a course (Lee & Choi, 2011). Among the various factors contributing to the dropout problem is a lack of instructor-student interaction (Bocchi, Eastman, & Swift, 2004; Ivankova & Stick, 2007; Lee & Choi, 2011). In an attempt to address the lack of instructor-student interaction problem, we adopted a social media tool, namely Facebook, to engage students enrolled in an online introductory IT course and investigated the effectiveness of such an approach.

The remainder of this paper is organized as follows. In section two, we review the literature on online learning and its challenges, as well as the use of social media and Facebook for educational purposes. Section three introduces the research hypotheses. Section four describes the research method for this study. In section five, we present our research findings to illustrate the effectiveness of using Facebook to improve instructor-student communication and student performance. Last, in section six, we discuss the contributions of this study.

2. LITERATURE REVIEW

2.1. Online Learning and Its Challenges

An exciting field in higher education that has recently enjoyed exponential growth is online learning (Moore & Kearsley, 2011). Educators have noted that "online learning has been promoted as being more cost effective and convenient than traditional educational environments as well as providing opportunities for more learners to continue their educations" (Richardson and Swan, 2003, p. 69). Students appreciate the convenience and flexibility of online classes, which allow them to study from anywhere, at their own pace and in their own time. Due to these benefits, online enrollment has been growing substantially. According to a 2015 survey of online education in the United States, in fall 2014, more than 5.8 million students took at least one online course – accounting for more than one fourth (28 percent) of all enrolled students – and over 2.8 million students were currently taking courses exclusively online (Allen & Seaman, 2016). Online learning has also become strategically important to many academic institutions. The same 2015 survey revealed that among more than 2,800 colleges and universities participating in the survey, 63.3 percent reported online learning as critical to their institution's long-term strategy.

Despite the exponential growth of online learning and its strategic importance, challenges still exist. The high dropout rate in online courses (as compared to traditional courses) is one of the greatest problems facing educators (Clay et al., 2009). Dropout refers to either a student's failure in or failure to complete a course (Lee & Choi, 2011). Researchers have identified various factors that contribute to the dropout problem, with a lack of instructor-student interaction being one of the main contributors (Bocchi et al., 2004; Ivankova & Stick, 2007; Lee & Choi, 2011). To encourage students to persist in online courses, instructors should give appropriate feedback in a timely manner, provide support to students, and involve students in interactive activities (Ivankova & Stick, 2007).

To address the lack of instructor-student interaction issue, researchers offered multiple suggestions, including using communication technology tools (Poellhuber, Chomienne, & Karsenti, 2008). We chose to use a social media tool, Facebook, to improve instructor-student communication in an online learning environment. Before we describe our approach, a review of the use of social media in general, and Facebook in particular, for educational purposes is discussed.

2.2. Using Social Media for Educational Purposes

In a broad sense, social media refers to any media that helps integrate technology into the lives of people for the purpose of communication (Olofsson, Lindberg, & Stodberg, 2011). The use of social media has grown exponentially over the past decade - so has the use of social media in higher education. More and more universities are using social media tools such as social networking sites, wikis, or blogs to interact with and engage students. According to a survey of nearly 1000 university faculty members, 52 percent use social media tools such as wikis, blogs, and podcasts in their classes and more than 30 percent use social networks to communicate with students (Parry, 2010).

There is compelling evidence that social media is a valuable tool to engage students in and outside of the classroom, thereby improving their academic performance. Many recent studies have shown that social media play a central role in online education (Wilson, 2013). Barczyk and Duncan (2013) identified the ways social media have been used in classroom teaching, from replacing email to increasing access to online classroom interaction for "shy" students. Researchers also found that the use of social media tools can promote interaction between instructors and students, thus improving teaching quality in large online classes (Nagel & Kotzé, 2010).

2.3. Using Facebook for Educational Purposes

Facebook is one of the most popular social media tools used in the field of education, due to two main reasons. First, Facebook is very popular among students, who are already familiar with its features; this reduces the risk of user resistance to adopt Facebook for learning (LaRue, 2012; McCarthy, 2010;

Shih, 2011). Second, Facebook meets the learning expectations of the millennial generation, who need a new channel to express themselves and share information beyond traditional communication tools (Bahner et al., 2012; C.-M. Wang, 2011). When used for educational purposes, a recent literature review about Facebook found that the most commonly used Facebook features are the private group and the Facebook page (Manca & Ranieri, 2013). Private groups are used as a learning management system to share resources, post comments and hold discussions (Chou & Pi, 2015; Dougherty & Andercheck, 2014; Q. Wang, Woo, Quek, Yang, & Liu, 2012), while the Facebook page feature is used to deliver course content and resources (Bahner et al., 2012; DiVall & Kirwin, 2012; Lim & Ismail, 2010). The same literature review identified various aspects of teaching and learning to which Facebook can positively contribute (Manca & Ranieri, 2013), including delivering extra-curricular resources (Bahner et al., 2012; Pilgrim & Bledsoe, 2011), facilitating community building (Buzzetto-More, 2012), engaging students in academic conversations (LaRue, 2012; Lim & Ismail, 2010), and encouraging information exchange among students (DiVall & Kirwin, 2012).

Research also identified student and teacher concerns about using Facebook for academic purposes. On the one hand, students feel that Facebook mixes study with entertainment (Çoklar, 2012); it does not provide sufficient privacy protection (Wang et al., 2012); and students are reluctant to use it for academic work (Madge, Meek, Wellens, & Hooley, 2009). In fact, several researchers discovered that students resist formal use of Facebook for learning purposes (Madge et al., 2009; Selwyn, 2009). On the other hand, educators see Facebook groups and/or Facebook pages for teaching as an increase in their workload and are concerned with the professional consequences of using Facebook (DiVall & Kirwin, 2012).

Due to the inconsistent results of Facebook's educational value, researchers advocate for additional empirical research on the use of Facebook for educational purposes, especially research that looks beyond the opinions/attitudes that educators and learners have towards Facebook usage and focuses on evaluating learning results (Manca & Ranieri, 2013). Given the importance of effective communication for online learning and the potential of social media tools, such as Facebook, in facilitating communication with students outside of traditional course delivery systems, we investigated whether an innovative way of communicating with students – using Facebook to reach out to students with course updates – can improve instructor-student communication and student performance.

3. RESEARCH HYPOTHESES

For this paper, we proposed to investigate the use of a social media tool, namely Facebook, to improve instructor-student communication in an online learning environment. We specifically focused on an introductory IT course that historically has a high student failure rate. In our experience teaching this course, we found many students failed not because they had difficulties with the subject matter, but because they often forgot to complete the required assignments, which constitute a significant portion of the course grade. When a student completed an assignment, he/she would usually do a fairly good job on it. Thus, more students could pass the course if they were better informed about upcoming assignments, which required effective student-instructor communication. There were sufficient efforts inside the course management site to push out information to the students using tools such as a course calendar, announcements, and email. However, it seemed that those traditional types of communication fell on deaf' ears to many students. We believe that the problem wasn't the frequency, but the channel of communication. In order to be better heard, the instructors need to speak the students' language using the students' communication channels.

As one of the most popular social networking sites, Facebook is college students' preferred communication tool and has proven effective in engaging students in higher education (LaRue, 2012; Lim & Ismail, 2010). Given the introductory IT course, we argue that Facebook can help instructors more effectively get their messages out to students. Subsequently, students in this class would be less likely to miss assignments, and more likely to succeed in the class. Our research hypotheses are:

H1. For an online introductory IT class, using Facebook as a supplemental communication tool will help the instructor reach students more effectively than not using Facebook

H2. For an online introductory IT class, students who are offered Facebook as an additional communication tool will perform better academically than students who aren't offered Facebook

4. RESEARCH METHOD

For this research, we conducted an empirical study to test our research hypotheses. First, we carefully chose the research subjects and divided them into a control group and a treatment group. Then a social media tool was selected and used among the treatment group and its usage was recorded. At the end of study, the performance data of both the control group and treatment group were collected and compared. A web-based survey was designed and administered to the treatment group to measure their perceptions of the effectiveness of the social media tool to engage and complete the course.

4.1. Research Context

We conducted this research in an online skill-based introductory IT course in a public university located in the southeast U.S. This course is required for all business students. The course was well designed and met rigorous Quality Matter ™ standards. The course includes a well-established course management website for communication (a Desire 2 Learn product): student emails are guaranteed to be replied to within 12 hours; a bulletin board is set up for course updates; due items are clearly listed in both the learning module overviews and the course calendar. The instructor also provided a cell phone number to which students could text their questions. Per the course syllabus, students were required to email the instructor through the course management site, but students could use the school's email for emergency purposes. In summary, there were sufficient efforts within and outside the course management site for effective student-instructor interaction.

This course has ten weekly hands-on exercises that account for 50 percent of the total course grade. In other words, if a student cannot earn good grades on the assignments, he/she will be very likely fail the course.

The majority of students enrolled in this course were sophomores or juniors from a wide range of majors. We invited students from three online sections to participate in our study. All three sections were taught by the same instructor using the same teaching material. This reduced potential confounding factors. Enrollment in each section ranged from 30 to 50 students, which gave our study a relatively large sample size.

4.2. Selection of Social Media Tool

There are many popular social media tools on the market, such as Twitter, Facebook and Instagram. The Pew Research Center (Duggan, Ellison, Lampe, Lenhart, & Madden, 2015) found that Facebook is the most popular social media site over the past several years. We also conducted an informal in-class survey and found that Facebook was the most frequently used social networking site by students. Thus, Facebook was selected as the social media tool for this study.

4.3. Research Design

One hundred twenty-nine students from three online sections of the skill-based introductory IT course participated in our study. One section was selected as the treatment group and the other two sections were used as the control group. The course settings for both groups were the same except that Facebook was offered as an additional communication tool for the treatment group. A course Facebook page was created for the treatment group. Students in the treatment group were encouraged, but not required, to join the course Facebook page. The instructor posted course updates, such as assignment reminders,

on the course Facebook page using the same frequency as on the course management site. Students could also use the course Facebook page to ask questions.

The frequency and content of the course Facebook activities were recorded. At the end of the study, a questionnaire was administrated to the treatment group to collect their opinions on the use of Facebook as an additional course communication method. Student course performance data for the both control group and treatment group were collected and analyzed to test the research hypotheses.

4.4. Questionnaire

A web-based questionnaire was designed and distributed to the treatment group only. The survey instrument had three sections: section one collected participants' demographic information; section two gathered participants' preferred method of communicating with their instructor; section three investigated the usage and perceived effectiveness of Facebook. The display logic was carefully added to the questionnaire. For example, if a student didn't have a Facebook account, all questions related to the usage of Facebook weren't made available to him/her. Participation in the survey was voluntary and anonymous to ensure the validity of the survey.

5. RESEARCH FINDINGS

The questionnaire was distributed to the treatment group, which had 35 participants. We received 32 entries and one entry was removed because of incompleteness. The response rate was 89 percent. For this group of participants, over 90 percent were sophomores or juniors; 51.6 percent were male students; and 67.7 percent were between 18 and 24 years old. The demographic information is consistent with the general student population of the participating university except for gender. In general, there are slightly more female students in the general student population, but the difference wasn't significant.

5.1. Preference of Communication Methods

In the survey, participants were asked to select (a) their preferred methods for communication when they had a question about the course and (b) the actual method they used in the class to ask questions. As shown in Table 1, email was the most preferred and most used method, followed by texting. Facebook was participants' third preferred method for interacting with the instructor, although the percentage was fairly low. We weren't surprised by the findings since our main purpose in using Facebook was to push out information to the students. Another interesting finding is that no student used traditional communication methods such as calling the instructor or dropping by during office hours.

Our survey results also showed that participants checked the course management site and accessed their school emails fairly frequently, as illustrated in Table 2. However, only 10 percent of the participants accessed the course management site daily. By comparison, 48.39 percent of participants checked their Facebook pages every day. All participants had Facebook accounts and 94 percent were aware of the course Facebook page. Seventy-one percent of the participants liked the course Facebook page. Those numbers showed that Facebook was a very good candidate to be an additional channel for reaching out to students.

In summary, our survey results showed that traditional instructor-student interaction methods, such as a phone call and office hours, have lost traction among the current generation of college students. Emails, including email in the course management site and official school email, have becomes a preferred communication method for questions and answers. Social media sites, such as Facebook, could be a supplemental communication method to push out information to students since students use it frequently.

5.2. Effectiveness of Facebook

In addition to other communication methods, Facebook was used fairly extensively in the treatment group: the instructor published 20 posts on the course Facebook page, pushing out information about

Table 1. Participants' preferred communication methods

Communication Method to Ask a Question	Most Preferred Method	Methods Used
Email the instructor	74.19%	70.97%
Text the instructor	12.90%	25.80%
Post question on Facebook page	9.68%	3.23%
Call the instructor	3.23%	0.00%
Ask online during virtual office hours	0.00%	0.00%
Drop by instructor's office during office hours	0.00%	0.00%
Make an appointment with the instructor	0.00%	0.00%

Table 2. Usage frequency of communication tools

Usage	Course Management Site	Email	Facebook
Daily	10%	58.06%	48.39%
2-3 Times a Week	73%	12.90%	25.81%
Once a Week	15%	22.58%	6.45%

upcoming assignments, exams and other course related updates; thirty-nine percent of the students reported that they checked the course Facebook page for updates. There were also seven question-and-answer sessions initiated by the students through the Facebook message system.

We surveyed the treatment group participants' perceptions about using Facebook in the course. Their responses were quite positive. As shown in Table 3, 35.48 percent of the participants thought Facebook was "very helpful" and "quite helpful" in getting course updates and only 6.45 percent reported the use of Facebook as "not helpful". Even though 58.06 percent of the respondents rated the helpfulness of Facebook as neutral, Facebook indeed enabled the instructor to effectively reach more than one third of the class. Based on this result, we believe Facebook, as an additional communication tool, helped the instructor communicate more effectively with his/her students. Hypothesis one is supported.

5.3. Student Course Performance

To investigate the impact of offering Facebook as an additional communication method on student course performance, we collected participants' course performance data for both the control group and the treatment group. Student performance in the course was evaluated using three metrics.

Table 3. Participants' perceptions of facebook's effectiveness

Helpfulness of Facebook	Percentage
Very helpful	12.90%
Quite helpful	22.58%
Neutral	58.06%
Not so helpful	0.00%
Not helpful	6.45%

1. Assignment Completion Rate = number of students who submitted each assignment/total number of students
2. Assignment Success Rate = number of students who received a C or better in each assignment/number of students who submitted each assignment
3. Course Success Rate = number of students who received a C or better in the course/total number of students

To compare the assignment completion rates among the three sections, we calculated the average assignment completion rate for each section. For each section, we calculated the assignment completion rate for each assignment, added those rates together, and divided the sum by ten (there are ten assignments in the course). Similarly, we calculated the average assignment success rate by calculating the assignment success rate for each assignment in a section, adding them together, and dividing the sum by ten. We used a two-sample t-test (assuming unequal variances) to examine the differences between the control group and the treatment group on a specific measurement item and all p values reported in this paper were two-tailed value.

There were two sections in the control group and we tested whether there was any difference in their course performance, before we combined data from the two sections. A two-tailed t-test showed that there was no significant difference between the two sections in terms of average assignment completion rate ($p = 0.54$), average assignment success rate upon completion ($p = 0.46$), and course success rate ($p = 0.95$). Thus, it's safe to combine the data of the two course sections in the control group.

As illustrated in Table 4, the average assignment completion rate of the treatment group was significantly higher than that of the control group ($p = 0.000$). The treatment group also clearly outperformed the control group in terms of average assignment success rate ($p = 0.001$).

We also compared students' final grades. Student letter grades were first converted to numeric grade values following the standard academic practice for grade point average (GPA) calculation: "A" equals 4, "B" equals 3, "C" equals 2, "D" equals 1 and ""F equals 0. One section's student numeric grade values were averaged to calculate each section's numeric grade value. A t-test showed that the average numeric grade value of the treatment group was significantly higher than the grades of the control group with a p-value of 0.001.

Table 5 compared the letter grade distribution between the control group and the treatment group. The percentage of students who received letter grade "A" in the treatment group was noticeably higher than that in the control group, while the percentage of students who received "F" showed the opposite trend. This indicated that the average course success rate of the treatment group was clearly higher than that of the control group.

As shown in Tables 4 and 5, the treatment group significantly outperformed the control group in all academic metrics. Given the fact that the treatment group and control group had the same learning environment except for the use of Facebook in the treatment group, we can conclude that, for an online class, students who are offered Facebook as an additional communication method outperform those students who do not have such an option. Thus, hypothesis two is supported.

6. DISCUSSION AND CONCLUSION

Effective course communication plays an important role in student success in online learning environments. In this paper, we answered the call for more empirical research on Facebook that focused on evaluating learning results (Manca & Ranieri, 2013) and investigated the effectiveness of using Facebook as a supplemental communication method for an online class. Our research findings showed that a social networking site, such as Facebook, can indeed help instructors better reach out to students in an online environment, thereby reducing the class failure rate and increasing student academic performance.

Table 4. Course evaluation comparison

Evaluation Metrics	Treatment Group	Control Group			P-value
	Section 1	Section 2	Section 3	Subtotal	
Average Assignment Completion Rate	89.4% (5.27%)	72.34% (7.09%)	70.41% (7.93%)	71.37% (7.42%)	0.000
Average Assignment Success Rate upon Completion	90.0% (5.86%)	76.43% (14 .1%)	80.01% (11.97%)	78.22% (12.92%)	0.001
Average Numeric Grade Value	3.00 (1.28)	2.00 (1.62)	2.02 (1.58)	2.01 (1.60)	0.001

Note: Numbers in the parentheses are standard deviations.

Table 5. Letter grade distribution comparison

Letter Grade	Treatment Group	Control Group		
	Section 1	Section 2	Section 3	Subtotal
A	48.57%	23.40%	25.53%	24.47%
B	25.71%	21.28%	19.15%	20.21%
C	11.43%	21.28%	17.02%	19.15%
D	5.71%	2.13%	6.38%	4.26%
F	8.57%	31.91%	31.91%	31.91%
Course Success Rate	85.71%	65.96%	61.70%	63.83%

Another interesting finding of this study is that, consistent with the discovery of a previous study (Li & Pitts, 2009), students preferred email and other electronic communication media over traditional channels, such as telephone calls or office hour visits, for faculty-student interaction. This reinforces the importance of effective use of social media tools such as Facebook, in facilitating communication with students.

As in the case of all research, our study has some limitations. In the research design, we tried to minimize confounding effects by only including course sections taught by the same instructor using the same content. As a side effect, our treatment group only had one course section, which limits the generalizability of our study. Second, we assumed that the students in the control group and the treatment group had similar academic capability as they entered the participating course. This is generally true given the fact that the participating class is a required introductory course for all business students. However, we couldn't obtain the participants' academic records at the time of the study.

This research can be extended in the following directions. First, the research methods can be applied to a different type of class, for example, an upper-level undergraduate course or a graduate level course. It would be interesting to find if our research findings hold true in a different setting. Second, researchers can explore different types of social media or communication tools such as Google Hangouts to improve the instructor-student interaction. Third, we used Facebook as a supplemental communication tool in this research. How will Facebook impact instructor-student interaction if we designate it as the primary communication tool in an online learning environment? In addition, communication is more than interaction between instructors and students. Can social media tools improve other aspects of the communication in online learning, such as interaction among students? More research can be done to address these questions. Finally, we also can look into the side effects of using social media tools in the classroom. For example, the instructor asked the students to create

a separate Facebook account for the class. However, some students still used their personal accounts. As a result, the instructor saw many unnecessary personal updates from the students. On the faculty side, does using social media mean the instructor has to be available 24 hours a day, 7 days a week? What are the boundaries between sufficient communication and too much communication? These "social" impacts of the social media use in classroom certainly deserve more discussion and studies.

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