Columbia International Publishing
Journal of Communication Technology and Human Behaviors
(2015) Vol. 2 No. 1 pp. 1-20
doi:10.7726/jcthb.2015.1001
Research Article

# Investigating and Comparing Communication Media Used in Higher Education

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Received 14 November 2014; Published online 25 April 2015



## Abstract

A variety of communication technologies are used in higher education classrooms, however, limited research has been conducted comparing the relative educational impact of these media. This paper explores four types of communication media: email, instant messaging, text messaging, and video chat. Comfort level, frequency of use, usefulness, reasons for using these media, and differences between peer-to-peer and peer-to-instructor interactions were examined. Over 90% of students were comfortable with email, instant messaging, and text messaging compared to a 50% comfort level using video chat. Email, instant messaging, and text messaging were used frequently and significantly more with peers compared to the instructor. Video chat was used infrequently with both peers and the instructor. Email was perceived as significantly more useful when used with the instructor vs. peers, while instant messaging was rated as significantly more useful when communicating with peers vs. the instructor. Text messaging was viewed as equally useful with peers and the instructor. Video chat was ranked as the least useful communication media with both peers and the instructor. Student comments described unique benefits and challenges for each type of communication medium.

*Keywords:* Higher education; Tools; Media; Email; Instant messaging; Text messaging; Video chat; Skype

## 1. Introduction

Communication media play a prominent role in higher education students' personal and academic lives. Sixty percent of students own three or more technology devices and expect anytime, anywhere access to academic resources and instructors (Dahlstrom et al., 2013). Based on an extensive survey of over 110,000 participants from 13 countries and 251 colleges/universities, students said that they want to be able to contact their instructors using email (70%), text messaging (50%), instant messaging (40%), and video chat (40%), much like they do with their peers (Dahlstrom et al., 2013). Student desire for increased contact with their instructors through a

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variety of communication media may reflect inherent problems associated with lectures such as lack of personal contact, not addressing individual needs, and low motivation (Becker and Huagen, 2004). Some research has suggested that communication media such as email, instant messaging, text messaging, and video chat might address limitations of a lecture-based format by providing increased individualized instruction, personal interaction, interest, enthusiasm, and participation (Buckley et al., 2004; Charron and Raschke, 2014; Kim, 2008). However, these media can also be distracting for students, primarily because they are used for both personal and academic purposes (Dahlstrom et al., 2013). Students report that they are often discouraged by instructors from using communication media in class because of the potential for misuse (Dahlstrom et al., 2013).

Limited research has been conducted comparing the relative use of different types of communication media in higher education classrooms. Simonson et al. (2000) argue that differences in technological affordances could have a significant impact on the effectiveness of particular communication devices. For example, email is typically asynchronous and permits the sender to reflect and send longer messages. Text messaging and instant messaging are more immediate and produce shorter, more spontaneous synchronous interaction. Video chat is synchronous, uses audio, and allows the participants to see facial and hand gestures. Unique characteristics for each device could dictate the type, quality, and effectiveness of the message delivered (Roblyer and Wiencke, 2004; Wagner, 1997).

The purpose of this study was to investigate and compare the use of four communication media (text messaging, instant messaging, email and video chat) in a higher education environment.

# 2. Literature Review

### *2.1. Email in Higher Education*

Email, involving the exchange of digital messages across the internet using computers or mobile devices, is sent over 145 billion times per day (Outlook, 2012). It is efficient, cost effective, and convenient for most higher education students (Kim, 2008) and provides several advantages over face-to-face interactions including more immediate and frequent support for requests and questions outside of class (Kim, 2008) and time for reflection (Hassini, 2006). See table 1 for a summary of characteristics associated with using email.

There are at least three benefits for using email in higher education classrooms: administration, instruction, and connection with the instructor. Regarding administrative benefits, email has been used by instructors to remind students of important dates, notifications, forgotten material that was intended to be covered in class, and assignment modifications (Hassini, 2006). In terms of instructional benefits, email has been employed to lead students toward rich, supplemental information (Hassini, 2006), provide individualized instruction and support (Cascio and Gasker, 2001; Cifuentes and Shih, 2001), and encourage interest and motivation (Cascio and Gasker, 2001; Clingerman and Bernard, 2004; Davenport, 2006; Overbaugh, 2002). In addition, an unusually high number of student emails can provide effective formative feedback to the instructor indicating a need to revisit misunderstood concepts (Hassini, 2006). Finally, email can facilitate stronger student-to-instructor connections. Emails between students and the instructor can help reduce anxiety (Kim, 2008) and increase feelings of security by knowing that support is available when

needed (Hassini, 2006). Email is particularly advantageous for students who are reluctant to approach an instructor in person (Hassini, 2006). Furthermore, email can increase instructor accessibility (Atamian and DeMoville, 1998) and the quality of student-instructor relationships (Boles, 1999; Clingerman and Bernard, 2004; De Montes and Gonzales, 2000).

**Table 1** Characteristics of Email, Instant Messaging, Text Messaging, and Video Chat

| **Characteristic** | **Email** | **Instant Messaging** | **Text Messaging** | **Video Chat** |
|---|---|---|---|---|
| **Date of Origin** | 1971 | 1997 | 1995 | 2003 |
| **Hardware Required** | Computer, Tablet, Mobile Device | Computer, Tablet | Mobile Phone | Computer, Tablet, Mobile Device |
| **Length** | Unlimited | 160 characters | Average of 14 to 20 words | Unlimited |
| **Cost** | Free | Free | Fee for Service | Free |
| **Primary Information Type** | Text & Files | Text | Text | Video & Audio |
| **Interaction Type** | Asynchronous | Asynchronous & Synchronous | Asynchronous & Synchronous | Synchronous |
| **Desire to Use with Instructor** | 7 out of 10 students | 5 out of 10 students | 5 out of 10 students | 4 out of 10 students |

While email has clear advantages in higher education classes, there are also notable challenges. First, there is a clear loss of non-verbal information in an email message and therefore more sensitive issues are probably best addressed in person (Hassini, 2006). Second, while email is more immediate than face-to-face encounters, it may not be perceived by students as being particularly efficient or convenient compared to text or instant messaging (Lauricella and Kay, 2010; Naismith, 2007). Students expecting anytime, anywhere instant access may be frustrated by the relatively slow pace of email exchanges (Dahlstrom et al., 2013). Third, at least one study reported that student-instructor bonding is not always enhanced by the use of email and that text messaging is more effective (Rau, Gao and Wu, 2008). Finally, the volume of student messages can be unwieldy for instructors of large courses making it difficult to respond in a timely and effective manner (Hassini, 2006; Sumecki et al., 2007).

### *2.2. Instant Messaging in Higher Education*

Instant messaging, like email, involves the transmission and exchange of text-based information over the internet, however the size of message is usually limited to 160 characters, and the

interaction is immediate and often synchronous (Lauricella and Kay, 2013; Harley, Winn, Pemberton, and Wilcox, 2007; Hill et al., 2007). To engage in real time interactions, instant messaging requires that both the sender and receiver of messages have their computer devices and instant messaging software on at the same time. Originating in 1997 (Petronzio, 2012), it is estimated that instant messaging is used by 60 to 80% of higher education students on a daily or weekly basis (Johnson, 2007; Kennedy, Judd, Churchward, Gray and Krause, 2008) making it one of the more frequently employed communication media (Dahlstrom et. Al., 2013). See table 1 for a summary of characteristics associated with using instant messaging.

A review of research suggests that instant messaging provides a number of educational benefits to higher education students. Perhaps most importantly, as long as computers and the correct software are turned on, instant messaging offers immediate, two-way interaction allowing students quick responses to pressing issues or questions (Yao, 2011). Furthermore, instant messaging can be used effectively for virtual office hours thereby offering flexibility in location and time for students and the instructor (Jeong, 2007). Instant messaging can foster a more intimate student-instructor relationship (Jeong, 2007) and meaningful social connections among higher education students (Timmis, 2012). Ease of collaboration is another benefit, as instant messaging has been found to promote study-related conversations and longitudinal, dialogue important for practical support (Timmis, 2012). Finally, instant messaging is readily available, free, simply requiring the use of a computer with internet access, which over 90% of higher education students own (Dahlstrom et al., 2013; Lauricella and Kay, 2013). Therefore, and not surprisingly, at least two studies outlined that higher education students would readily welcome the use of instant messaging in their studies (Jeong, 2007; Kennedy et al., 2008).

There are also challenges associated with using instant messaging in higher education environments. Junco and Cotton (2011) noted that more than 50% of students in their study reported that instant messaging was a detriment to learning because it required the student to divide his/her attention between messaging and paying attention to the instructor. Related to this issue is the difficulty that students have with using instant messaging in both their personal lives and in academic settings (Contreras-Castilloet al., 2007; Jeong, 2007). Students are clearly challenged by the potential and simultaneous crossover between these two domains and do not always want to appear visible to their instructor on the instant messaging software (Jeong, 2007). Instant messaging is also perceived as not being as immediate or user-friendly as text messaging because of the need for both the sender and receiver of messages to be signed in (Bullen et al., 2011). Finally, because instant messages are restricted to 160 characters, it is particularly challenging to deal with significant issues, questions, or student concerns that require more detailed and nuanced communication (Hill et al., 2007).

### *2.3. Text Messaging in Higher Education*

Text messaging, unlike email and instant messaging, does not require a computer to transmit messages. Rather, mobile phones, owned by the vast majority of higher education students (Dahlstrom et al., 2013; Ofcam, 2014), are used to exchange relatively short (15 to 20 words on average), text-based information (Lyddy et al., 2013; Metro Reporter, 2013). Initially developed for commercial purposes by Sprint Telecommunications, text messaging is a significant communication

activity with an estimated 7.8 trillion texts sent yearly (The Economist, 2012). See table 1 for a summary of characteristics associated with using text messaging.

There are a number of benefits to using text messaging in higher education environments. The primary benefit is arguably the immediacy with which messages can be exchanged. Many individuals have their mobile phones with them at all times, so quick questions, issues, and concerns can be addressed almost instantaneously (Jones et al., 2007; Shih and Mills , 2007). Because of the anywhere, anytime interaction, Harley et al. (2007) claim that text messaging is the dominant mode of e-communication among students. It is particularly helpful that text messages are typically short and therefore well suited to brief, time sensitive administrative issues (Anderson and Blackwood, 2004; Young et al., 2010). For example, text messaging has been used successfully for communicating about missed or rescheduled classes (Brown et al., 2008; Smith et al., 2009), reminding students of due dates (Harley, 2007; Kennedy et al., 2008), and improving time management skills (Jones, Edwards and Reid, 2007; Lauricella and Kay, 2013).

A number of researchers have noted that because text messaging plays a central role in daily social interactions, most higher education students want this form of communication integrated into their studies for educational purposes (Dahlstrom et al.,2013; Harley et al., 2007; Kennedy et al., 2008; Lauricella and Kay, 2013; Litchfield et al., 2007). For example, Hill, Hill and Sherman (2007) reported that students willingly accepted text messaging with their tutors. Rau et al. (2008) added that text messaging between students and the instructor increases bonding and precipitates positive attitudes toward classroom activities. Reid and Reid (2004) noted that text messaging helps develop more productive relationships among students. Finally, immediate response and attention from an instructor via text messaging can improve student motivation (Allen et al., 2006; Martinez-Torres et al., 2007).

At least three challenges to using text messaging in higher education have been identified in the literature. First, Dahlstrom et al. (2013) reported that students are extremely sensitive regarding the boundaries between personal and academic lives. Therefore, they may resist the use of academic-based text messaging if they perceive that it encroaches on their privacy (Brett, 2011). Second, similar to instant messaging, text messaging can be distracting when it shifts student attention away from an instructor to a personal interaction in class (Markett et al., 2006). Third, text messaging, unlike email and instant messaging, usually incurs fees by way of a mobile phone plan and the cost may be a barrier to some students (Markett et al., 2006).

### *2.4. Video Chat in Higher Education*

Video chat (e.g., Skype© or Google Hangout©) allows users to communicate synchronously using video and audio over the Internet through computers, tablets or mobile devices (Macharaschwili and Coggin, 2013). As of January 2013, there were over 50 million users of Skype, a leading provider of video chat, worldwide. Unlike email, instant messaging, and text messaging, video chat permits users to take advantage of verbal and nonverbal cues similar to a face-to-face conversation. See Table 1 for a summary of characteristics associated with using video chat.

Relatively limited research has been conducted on the use of video chat in higher education. Dahlstrom et al. (2013) reported that seven out of ten students prefer in-person communication with their professors, a statistic that would predict a preference for using video chat. However, only four out of ten students wanted to use video chat to communicate with their professors (Dahlstrom

et al., 2013). Newman (2007) noted that students were enthusiastic about video chat and found it easy to use, but paradoxically rarely took advantage of it with their instructors. Macharaschwili and Coggin (2013) observed, in a small case study, that video chat increased students' social interactions, attention, interest, and learning satisfaction. Video chat can also be effective when bringing in an expert from a distant geographical location (George and Dellasega, 2011). It is not yet clear, though, why a majority of higher education faculty and students do not use video chat (Charron and Raschke, 2014; Zelick, 2013).

### *2.5. Purpose of the Study*

The purpose of this study was to investigate and explore the use of four communication media (email, instant messaging, text messaging, and video chat) in a higher education environment. Specifically, six factors were examined and compared including comfort level with using tool, frequency of use, perceived usefulness, reasons for use, and peer-to-peer as well as peer-to-instructor interactions with the media.

# 3. Method

### *3.1. Participants*

Participants consisted of 75 students (30 males, 45 females) from a small university located in a large metropolitan area of over six million people. Three separate classes were polled including Advanced Professional Writing (n=39), Foundations of Professional Writing (n=16), or Public Speaking (n=20). Students were enrolled in their first (n=32), second (n=40), third (n=2) or fourth year (n=1) of study. Most students reported average course grades of either 70 to 79 percent (n=19) or 80 to 90 percent (n=36). All students were issued a laptop from the university and had ubiquitous wireless access inside and outside their classrooms.

### *3.2. Availability of Communication Media*

Students were provided with the instructor's email address, instant messaging address, mobile phone number, and video chat contact information at the beginning of the course. They were told that they could contact the instructor using any one of these communication media to request course information or ask questions. The instructor invited (but not required) students to provide the contact information of their preferred communication tool to receive course information.

### *3.3. Procedure*

During the final class meeting, students from three classes were invited to fill in an online survey about the use of communication media. The total number of students enrolled in all three classes was 101, resulting in a response rate of 74%. Note that a 34% coverage rate is typical for social science survey research (Shih and Fan, 2009). Participation was voluntary and anonymous. The data were not analyzed until all grades for the courses were submitted. It took, on average, 10-15 minutes for students to complete the survey.

### *3.4. Data Sources*

Each student was asked their age, gender, year of study, course, and average grade. They were also asked to rate their comfort level with each medium using a four-point Likert scale (see question 5, Appendix A in Kay, 2014a).

Students estimated how often they used email, instant messaging, text messaging, and video chat with their instructor (see question 6 - Appendix A in Kay, 2014a) and with their peers (see question 12 - Appendix A in Kay, 2014a). Six choices were available: never, monthly, 2-3 times per month, weekly, 2-3 times per week, and daily.

Students were asked to rate the usefulness of email, instant messaging, text messaging, and video chat with their instructor (see question 7 - Appendix A in Kay, 2014a) and with their peers (see question 13 - Appendix A in Kay, 2014a). Students were also presented with open-ended questions about why they did or did not use email, instant messaging, text messaging, and video chat with their instructor (see questions 8 to 11 - Appendix A in Kay, 2014a) and with their peers (see questions 14 to 16 - Appendix A in Kay, 2014a).

A content analysis was conducted on the open-ended questions (e.g., Cavanagh, 1997; Hsieh & Shannon, 2005; Kondracki & Wellemn, 2002). The two researchers immersed themselves in the data and allowed categories and labels to emerge. These emergent categories were discussed, agreed upon, and eventually used to organize responses into meaningful clusters. Criteria for each category were developed to aid in the coding process (see Kay, 2014b for a detailed presentation of the coding scheme). The researchers used these criteria to independently categorize all student comments. The reviewers then compared coding of all comments and discussed items where categories and subcategories were not labeled the same. These inconsistencies were then rated a second time. Using this coding process, inter-rater reliability estimates ranged from 89% to 100% (see Table 2). Finally, for the purpose of reporting the results, exemplars were agreed upon by the two researchers to represent each category.

**Table 2** Inter-rater Reliability for Student Comments

| Communication Activity | Number of Comments | Inter-Rater Reliability |
|---|---|---|
| Text messaging with Instructor | 97 | 100% |
| Instant Messaging with Instructor | 50 | 97% |
| Email with Instructor | 54 | 89% |
| Skyping with Instructor | 44 | 98% |
| Text messaging with Peers | 65 | 97% |
| Instant Messaging with Peers | 62 | 94% |
| Email with Peers | 47 | 96% |
| Skyping with Peers | 31 | 100% |

# 4. Results

*4.1. Comfort Level with Communication Media*

Students rated their comfort level with four different communication media (email, instant messaging, text messaging, and video chat) using on a four-point Likert scale (see question 5, Appendix A in Kay, 2014a). Ninety to 95% of students reported being comfortable or very comfortable with using email (M=3.7, SD=0.53), instant messaging (M=3.6, SD=0.73) and text messaging (M=3.7, SD=0.53). However, only 51% of students were comfortable or very comfortable with using video chat (Skype, M=2.5, SD=1.1) (see Table 3).

**Table 3** Comfort Level with Using Communication Media (n=75)

| Tool | Not at all comfortable | Somewhat Comfortable | Comfortable | Very Comfortable |
|---|---|---|---|---|
| Text Messaging | 0% | 4% | 18% | 78% |
| Email | 0% | 4% | 20% | 76% |
| Instant Messaging | 3% | 7% | 17% | 73% |
| Video Chat (Skype) | 24% | 24% | 28% | 23% |

*4.2. Frequency of Communication Tools Use*

Email was one of the more popular communication media used by students to communicate with their instructor with the average student emailing their instructor almost weekly. Students also used email weekly to communicate with their peers. An independent t-test revealed that students used email significantly more often with their peers than their instructor ($p < .005$, see Table 4) with a moderate effect size (Cohen's D = 0.44) according to Cohen (1988, 1992).

**Table 4** Student Use Communication Media Use with Instructors and Peers (n=73)

| | Instr. | | Peers | | | |
|---|---|---|---|---|---|---|
| Tool | *M* | *S.D.* | *M* | *S.D.* | t | Cohen's D |
| Email | 3.6 | (1.0) | 4.1 | (1.4) | -3.0 ** | 0.44 |
| Instant Messaging | 1.7 | (1.3) | 4.7 | (1.7) | -13.8 * | 1.94 |
| Text Messaging | 3.6 | (1.2) | 4.8 | (1.7) | -7.7 * | 0.88 |
| Video Chat (Skype) | 1.4 | (1.2) | 1.8 | (1.4) | -1.9 | --- |

* $p < .001$
** $p < .005$

Students used instant messaging relatively infrequently to communicate with their instructor - on average, once per month. By contrast, students used instant messaging almost as much as text messaging to send messages to their peers - on average, nearly two to three times per week. Students used instant messaging significantly more often with their peers than their instructor ($p < .005$, see Table 4) with a large effect size (Cohen's D = 1.94) according to Cohen (1988, 1992).

Text messaging was one of the most commonly used methods used to contact the instructor, with students, on average, sending texts on a weekly basis. Text messaging was also popular with students when communicating with their peers and used nearly two to three times per week, on average. Students used text messaging significantly more often with their peers than their instructor ($p < .001$, see Table 4) with a large effect size (Cohen's D = 0.88) according to Cohen (1988, 1992).

Students did not use video chat often to communicate with either the instructor or their peers. On average, this tool was used less than once a month. There was no significant difference between student use of video chat with their instructor vs. their peers (see Table 4).

*4.3. Perceived Usefulness of Communication Media*

Email was rated, on average, as a useful communication tool with both instructors and peers. However, based on an independent t-test, students rated email as being significantly more useful when communicating with their instructor than their peers ($p < .005$, see Table 5) with a moderate effect size (Cohen's D = 0.39) according to Cohen (1988, 1992).

**Table 5** Perceived Usefulness of Communication Media with Instructors and Peers *(n=72)*

| | Instr. | | Peers | | | |
|---|---|---|---|---|---|---|
| Tool | *M* | *S.D.* | *M* | *S.D.* | t | |
| Email[1] | 3.6 | (0.6) | 3.4 | (0.8) | -3.12 ** | 0.39 |
| Instant Messaging[1] | 2.6 | (1.2) | 3.6 | (0.8) | -6.63* | 1.94 |
| Text Messaging[1] | 3.7 | (0.5) | 3.7 | (0.6) | -1.4 | --- |
| Video Chat (Skype)[1] | 2.1 | (1.0) | 2.0 | (1.1) | -0.94 | --- |

[1] Likert Scale (1=Not at all useful, 2=Somewhat Useful, 3= Useful, 4=Very Useful)
* $p < .001$
** $p < .005$

Students perceived instant messaging, on average, as somewhat useful to communicate with their instructor. An independent t-test showed that students rated instant messaging as significantly more useful when communicating with their peers ($p < .001$, see Table 5) with a large effect size (Cohen's D = 0.39) according to Cohen (1988, 1992).

Text messaging was rated, on average, as a very useful communication medium for sending messages to both instructors and peers. There was no significant difference, based on an independent t-test, between student ratings of text messaging usefulness with their instructor vs. their peers (See Table 5).

Students rated video chat (Skype), on average, as somewhat useful when communicating with both their instructor and their peers. An independent t-test, indicated that there was no significant difference with respect to usefulness ratings when comparing use with instructors vs. peers (Table 5).

*4.4. Why Students Use Communication Media*

The main reason students noted for using email with their instructor was for sending longer, more detailed messages (n=24 comments). Students also commented that email was appropriate for messages that were not urgent. Other students noted that email was helpful when sending quick messages because they perceived everyone as having their computers on most of the time. Several students thought email was convenient or easy to use (10 comments) (see Table 6 for sample comments).

**Table 6** Sample Student Comments about Emailing the Instructor and Peers

| **Category** | **Instructor # comments** | **Peers # comments** | **Sample Comments** |
|---|---|---|---|
| Academic | --- | 30 (64%) | "It is useful because your peers can give you clarification on something you did in class or an assignment."<br>"Email is helpful when I want to send out a general question to the class in hopes someone has the answer."<br>"Again, email is useful [when] an attachment needs to be sent or a larger message." |
| Longer Messages | 24 (49%) | | "[A] great way to communicate longer or more serious messages."<br>"I'm able to leave my message to the professor and I can take my time in writing my emails so I have my thoughts clearly put out."<br>"Although text messages are best, they are not always appropriate and because they need to be short in length they cannot always communicate messages of detail." |
| Time | 15 (31%) | --- | "It is useful if the message that needs to get across isn't urgent."<br>"Email is slightly less useful for communicating with my instructor in this course because it is not as instantaneous or convenient as a mobile phone or instant message." |

| | | | |
|---|---|---|---|
| Convenient / Easy | 10 (20%) | 10 (21%) | "We are at school and we are used to this form of communication."<br>"Email is the classic means of communication, simple and effective." |
| Barriers | --- | 7 (15%) | "Not as useful because I don't check it often."<br>"Can be useful but it usually takes too long for peers to respond." |
| Total | 49 | 47 | |

Students provided a number of academic reasons for using email with their peers including clarification of dates and assignments, collaboration and group projects, sending more detailed, longer messages, and sending files (n=30). Students also felt that email was convenient and easy to use (n=10). Finally, a number of students noted that email was not that useful because they did not check it frequently (n=7) (see Table 6 for sample comments).

While a number students noted that sending instant messages to their instructor was time efficient (n=19 comments) and convenient/easy (n=10 comments), a majority of students commented on barriers (n=28) to instant messaging. Some students claimed that instant messaging was more personal and better suited to communicating with their peers. Others noted that the restriction of their instructor having to be signed in limited their use of this medium (see Table 7 for sample comments).

**Table 7** Sample Student Comments about Using Instant Messaging with the Instructor and Peers

| **Category** | **Instructor # comments** | **Peers # comments** | **Sample Comments** |
|---|---|---|---|
| Barriers | 28 (49%) | 3 (5%) | "[It is] not useful because not everyone is on an IM program at once."<br>"It is more of a personal communication method, which is not appropriate for school."<br>"Instant messaging is okay for talking one to one with a friend or something, but I prefer dealing with "official" matters over e-mail rather than instant messaging." |
| Academic | --- | 22 (37%) | "This is useful for using during classes to ask questions."<br>"It is useful … if you need information about an assignment."<br>"Good, allows us to discuss things back and forth quickly."<br>"It is a quick and efficient way of communicating and is especially useful to share quick links to websites that are useful for the course and sharing files that can help with assignments." |

| | | | |
|---|---|---|---|
| Time | 19 (33%) | 17 (29%) | "It's instant, so that's important,"<br>"Instant messaging is useful if I have a quick question for my assignment that will help me improve." |
| Convenient/ Easy | 10 (18%) | 17 (29%) | "It is an easy way to get a hold of [my instructor] and ask whatever questions I may have." |
| Total | 57 | 59 | |

Students clearly used instant messaging more with their peers than with their instructor. Students enjoyed that communication was instant (n=17 comments), convenient because they were always signed on and easy to use (n= 17 comments). A variety of academic reasons were provided for using instant messaging with peers including getting help from fellow students, having discussions, being able to multi-task, and sending files (see Table 7 for sample comments).

Students cited four reasons for using text messaging when communicating with instructors. First, and foremost, students appreciated being able to obtain instant responses from their instructor, particularly when there was an urgent concern (n=38 comments). Second, students liked that text messaging was convenient, did not require a computer, was always on or available, and easy to use (n=32 comments). Third, students enjoyed receiving regular reminders of what was needed for class or upcoming assignments (n=21 comments). Finally, using a mobile phone helped several students develop rapport with their instructor (n=3 comments) (see Table 8 for sample comments).

Reasons given by students for using text messaging to communicate with peers were similar to those cited for communicating with their instructor: getting an instant response (n=22 comments), convenience, and ease of use (n=26 comments). Students also commented that text messaging was useful for organizing group projects and getting academic help from their peers (n=21 comments) (See Table 8 for sample comments).

**Table 8** Sample Student Comments about Using Text Messaging with the Instructor and Peers

| Category | Instructor # comments | Peers # comments | Sample Comments |
|---|---|---|---|
| Time | 38 (40%) | 22 (34%) | "We are able to text and get an answer right away."<br>"The mobile is very useful. You're almost guaranteed an immediate response." |
| Convenient/ Easy | 32 (34%) | 26 (41%) | "It is useful because I have my phone with me everywhere."<br>"My peers always have their phones on them so it allows me to get an answer to a question I have immediately."<br>"Easy way of getting in touch with someone at any time." |

| | | | |
|---|---|---|---|
| Academic | --- | 21 (33%) | "You can find out from peers about assignment information."<br>"Allows you to get help on assignments through peer to peer help instead of student to teacher."<br>"[The]mobile phone allows us to get into contact for meetings." |
| Reminders | 21(22%) | --- | "It was great to be able to get quick updates and reminders delivered straight to my phone." |
| Rapport | 3 (3%) | --- | "It's friendly and makes the professor more approachable." |
| Total | 94 | 64 | |

Video chat was not used often by students to communicate with their instructor - many simply stated that they did not need or want to use Skype, did not know how to use it, or thought it was too personal (n=32 comments). The handful of students who used Skype thought it was useful when they wanted to actually speak to their professor (n=4 comments). Four students observed that using Skype was time efficient (see Table 9 for sample comments).

Overall, student comments indicated that they did not use Skype to communicate with their peers (n=22 comments). Some students liked this tool when they wanted face-to-face communication or were working in groups (n=5 comments) (see Table 9 for sample comments).

**Table 9** Sample Student Comments about Video Chat with the Instructor and Peers

| **Category** | **Instructor # comments** | **Peers # comments** | **Sample Comments** |
|---|---|---|---|
| Barriers | 32 (80%) | 22 (76%) | "Skype is not useful in this course because I have three other communication mediums I can use to get a hold of my instructor."<br>"Since I do not have a Skype account it is not useful to me personally."<br>"Not many people have skype so it might not be the most efficient way to communicate with peers." |
| Speaking | 4 (10%) | 5 (17%) | "Sometimes you simply need to hear someone's voice. Skype is great for giving clear explanations and answering detailed questions."<br>"Able to get together over skype to work in group projects." |
| Time | 4 (10%) | 1 (3%) | "Way faster than typing it out on the keyboard."<br>"I am able to contact him/her immediately without delay." |
| Total | 40 | 47 | |

# 5. Discussion

The purpose of this study was to examine the use of four communication media (text messaging, instant messaging, email, and video chat) in a higher education environment. Four aspects of each communication tool were examined including comfort level in using the tool, frequency of use, perceived usefulness as an academic aid, and reasons for using each type of messaging. In addition, these media were explored and compared with respect to peer-to-instructor and peer-to-peer use.

### *5.1. Comfort Level and Communication Media*

Almost all higher education students in this study were comfortable or very comfortable using email, instant messaging, and text messaging. This finding is consistent with the high frequency in which these tools are used in higher education environments (Dahlstrom et al., 2013, Outlook, 2012; Petronzio, 2012). One could also speculate, based on comfort level, that higher education students regularly use multiple methods of communication on campus. This claim is partially supported by the figure that more than 60% of college/university students own three or more devices (Dahlstrom et al., 2013). The choice of communication media may reflect the particular device that a student is using in the moment (i.e., computer or phone). Markedly lower comfort levels with using video chat is consistent with lower levels of use reported in the literature (Charron and Raschke, 2014; Dahlstrom et al., 2013; Zelick, 2013). However, it is not clear whether lower comfort level or perceived ineffectiveness leads to less frequent use.

### *5.2. Frequency of Communication Tool Use*

Email was used more frequently by higher education students to communicate about academic issues with instructors and among peers. This result is consistent with its widespread use in higher education and everyday life (Dahlstrom et al., 2013; Kim, 2008). In addition, email was used to communicate with peers significantly more often than with the instructor, perhaps reflecting the reality that peers communicate with each other more than they do with the professor.

Instant messaging was used infrequently with instructors and very frequently with peers. Students may have been reluctant to use instant messaging with their instructor because of privacy concerns; using this type of media might encroach on their personal lives as suggested by previous research (Contreras-Castillo et al., 2007; Jeong, 2007). The key issue may be having to be visibly logged in when using instant messaging. Students may not want their professor knowing that they are logged in to an instant messaging service. In addition, instructors may not always be logged in to an instant messaging service, making text messaging and email, which do not require a user to login, a more attractive “anytime, anywhere” option.

Text messaging was the most frequently used media employed by higher education students to communicate with instructors and peers. This finding is consistent with near ubiquitous ownership of mobile phones and high use of text messaging in college and university environments (Dahlstrom et l., 2013; Harley et al., 2007; Kim, 2008). Text messaging was employed significantly more among peers than with the instructor, a result that is consistent with use of email and instant messaging in this study. As Harley et al. (2007) predicted, text messaging is a convenient tool to send short questions or requests to instructors and peers from any location at any time.

Video chat (Skype©) was the least frequently used media by higher education students to communicate about academic issues with both their instructor and peers. This result is consistent with lower comfort levels for using video chat and limited use reported in the literature (Dahlstrom et al., 2013, Newman, 2007). Text messaging for brief, time sensitive questions and reminders coupled with emailing for more involved, detailed communication is a very effective and time efficient combination (e.g., Cascio and Gasker, 2002; Hassani, 2006; Jones et al., 2007; Shih and Mills, 2007), Using video chat requires more effort and time - both parties have to sign on to a computer for a pre-arranged appointment. For more delicate or personal issues that require visual contact, non-verbal cues and/or voice, video chat is an ideal option, but the need for this kind of communication may be somewhat rare in an academic environment. Additionally, some students may simply opt for face-to-face communication, particularly with peers.

### *5.3. Perceived Usefulness of Communication Media*

Perceived usefulness of the four communication media in this study closely mirrored patterns of use with instructors and peers. First, higher education students rated email and text messaging as the most useful tools for communicating with their instructors. Second, they rated email, instant messaging, and text messaging as being very useful when contacting their peers for academic reasons. Third, video chat was perceived as only somewhat useful for interacting with both the instructor and peers. These patterns of use and perceived usefulness provide triangulated evidence suggesting that (a) instructors should be open to using both text messaging and email as key communication media, (b) instant messaging is an unlikely media for students to use with their instructor, (c) video chat is cumbersome and may be limited to specific kinds of communication, and (d) students will communicate with each other using a medium that is convenient at the time or best aligns with their intended message. Nonetheless, it is critical to understand why students choose to use each medium with their instructor or peers.

### *5.4. Why Students Use Communication Media*

Previous research on the benefits of using email in higher education focused almost exclusively on the perspective of the instructor: to inform students of administrative issues, to communicate important information, and to provide personal instruction (Hassini, 2006). This study looked at email use from the perspective of the student. Students used email to communicate with their instructor because it was convenient, but not as convenient as text messaging. They also used email when the issue being addressed was not urgent or required longer explanations. Higher education students did not report using email to acquire supplemental resources or to obtain instructional guidance, a result that somewhat contradicts previous research on why instructors use email with their students (Hassini, 2006; Cascio and Gasker, 2001; Cifuentes and Shih, 2001). In this study, students used email extensively for academic reasons with their peers, but not their instructor, to request information about assignments and important dates, collaborate on group projects, and send files. This behaviour may simply reflect a greater comfort level or familiarity with their friends as opposed to their instructor.

It is worthwhile to note that only a few students commented that email was not that useful because they or their peers checked it sporadically. This resistance, while consistent with previous research indicating that email is relatively slow and inconvenient (e.g., Dahlstrom et al., 2013; Nasimith,

2007), was minimal and indicates that email is still a relevant and useful tool for higher education students.

Some students thought instant messaging was a convenient way to ask quick questions of their instructor, but most students stated that instant messaging was not useful because one had to sign on, it was a personal forum, and/or instant messaging was not appropriate to use for official or formal communication. This result is consistent with previous research (Bullen et al., 2011; Contreras-Castillo et al., 2007; Jeong, 2007). Therefore, while some students venture into the instant messaging realm to communicate with their instructors, most chose not to because they view instant messaging as a personal, not academic, forum. However, students use this personal forum regularly to communicate with their peers about academic issues, because it is easy to use and convenient, particularly during class when they instant ask questions of each other. It is interesting that students in this study did not report that instant messaging was a distraction, a finding that does not match the results of Junco and Cotton (2011). Finally, students did not comment about the 160 character limitation noted by Hill et al. (2007). It is conceivable that they naturally shift from instant messaging to email depending on the intent of their communication.

The two key reasons that students used text communication with both their instructor and peers was convenience and time. As one student noted "You are almost guaranteed an immediate response". This finding is consistent with the anytime, anywhere culture of today's higher education students (Harley et al., 2007) and expectations of instant replies reported in the literature (Anderson and Blackwood, 2004; Jones et al., 2007; Shih and Mills, 2007). Somewhat surprisingly, but in line with email and instant messaging use in this study, peers interact far more with each other about a wide range of academic issues than with their instructor. The principal use of text messaging with the instructor for students was to receive reminders. As noted above, students may contact peers first due to familiarity and only default to their instructor if a peer is not available or if a more "official" response is required.

As noted in previous studies (Macharaschwili & Coggin, 2013; Newman, 2007), even though video chat was viewed in a relatively positive manner, students chose to use other communication media. While several students acknowledged that video chat (Skype) was useful when they needed to hear someone's voice or for providing clear explanations, most students commented about barriers to using this medium with instructors and peers. These barriers included not knowing how to use video chat, other media being more effective, or video chat being too personal. Unless an instructor or peer is unavailable, higher education students believe they have better communication options than video chat. There is no compelling reason to book and arrange a video chat when they could simply attend an instructor's office hours or visit a peer when an issue required personal, face-to-face interaction.

### *5.5. Caveats and Future Research*

There are at least five areas where the method, analysis and/or focus of this study could be improved. First, the sample size, while acceptable at 75, was composed of students from the Faculty of Social Science and Humanities. Future research should target a wider range of disciplines where the use of communication media with the instructor and peers may be different. Second, the study relied on a scale which focused on approximate use of communication media. Future studies could

use additional metrics of interactions such as actual frequency, length of communication, and time of day/semester when communication occurred to provide a deeper understanding of how these media are used. Third, while students offered comments about why they used particular communication media, it would be helpful to investigate in more detail the specific qualities of interactions including content, purpose, level of detail, urgency, and quality of connection. Fourth, the role of course design and the method of instruction was not examined in this study. Highly interactive teaching strategies might lead to more frequent and effective communications exchanges than a lecture-based approach using passive transmission of knowledge. It would be informative if future research endeavors articulated and examined the influence of course design and pedagogical approaches on the use of communication tools. Finally, the study did not collect information from higher education instructors. Additional research in this area might consider the perspective of faculty members' use of communication media in order to identify potential opportunities or barriers.

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