Measuring the impact of out-of-class communication through instant messaging

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Abstract

Purpose - Despite the growing body of literature demonstrating the role of communication in educational settings, there are limited up-to-date studies exploring the use of an Instant messaging (IM) tool and its impacts on students’ learning outcomes, especially in the tertiary education in Vietnam. This study approached instant messaging as an out-of-class communication (OCC) approach in computer-mediated communication (CMC). The aim of this study was to investigate students’ perceived quality of information received and its influence on their perceived performance proficiency as a result of their lecturers’ clarification of their enquiries through an online instant message application, namely Remind (https://www.remind.com/).

Design/methodology/approach - The target groups were first year Business students in an International University in Vietnam. The analysis of the data gathered from the questionnaire was carried out using a measurement model and a structural equation model.

Findings - The findings indicate using out-of-class communication technology creates social bonding between students and lecturers by allowing students to clarify the ambiguity of concepts learnt in class and create a sense of connection with their lecturers which leads to better student engagement and hence improved learning outcomes.

Originality/value - The author highlights the evidence of effective usage of IM tool by university students as a meaningful communication tool and the need to integrate technology into all educational settings.

Keywords Student engagement, out-of-class communication, Instant messages, remind, technology in teaching and learning, classroom communication

Paper type Research paper

Introduction

The purpose of this study is to investigate the extent to which the use of Out-of-Class Communication (OCC) between students and lecturers using an online instant message application known as ‘Remind’ (https://www.remind.com/) influences students’ learning. Developing an effective teaching and learning process has been a profound area of interest in education today. The areas are expanded into various influencing factors to be successful in achieving the teaching and learning goals. In a traditional teaching method a lecturer passes on the knowledge to the students who would passively receive the knowledge and learn them by heart. This didactic teaching and learning method is found to have negative effects towards students’ learning ability and hence prevent them from unleashing their potential (Dolan et al., 2002). In order to overcome this, one
Increasingly accepted view is to consider teaching and learning as a two-way process in which students, not only passively receive knowledge from lecturers, but also engage actively in pre-, in- and post-class activities. Therefore interaction plays a vital role in ensuring a mutual and thorough understanding between lecturer and student about each other’s issues and concerns. According to Kansanen (1999), besides the direct face-to-face interactive phase in the classroom, interaction process also includes an indirect phase when students seek private consultations with their lecturers or stay in touch with them outside the classroom using computer-facilitated communication.

In this study, consultation outside the classroom is known as Out-of-Class Communication (OCC). OCC have been observed to be varied but not limited to short message service (Abu and Abdul, 2012) and social networks (Petersen and Johnston, 2015; Woods et al., 2012). Kansanen (1999) describes this phase as a convenient and effective means of interaction. Students’ learning dynamics and level of performance using the OCC will provide insights into the way teaching is administered, especially to first year students. There are also limited studies that address this in the higher education sector in Vietnam where students are taught in a socialist education environment which practices teacher-centered approach as opposed to a more blended learning environment, and thus suggests an avenue in need of further investigation to look into the perception of students who are new to an international learning environment using different forms of communication technology and learning methods. In this study, the impact of learning OCC using everyday technology such as Instant Messaging, where short messages are sent to students electronically through their mobile phones and emails are examined closely. This study will test two models, which are the measurement model and structural equation model researched by Young et al. (2011), Lu and Lee (2010), and Yu et al. (2010).

Out-of-class Communication (OCC)
The concept of OCC has been suggested by extensive research from academic journals. Using Google Scholar and RMIT Databases, this paper provides a comprehensive revision of existing literature on OCC. The most common theme in OCC research has been the ability of OCC to facilitate the closeness between lecturers and students (Hayes and Weibelzahl, 2015 - p.279). This is particularly valued by first-year students as a vital element in fostering their confidence and success in higher education (Jones et al., 2009). OCC is defined as learner-lecturer interaction which occurs outside of the classroom setting with the purpose of handling the students’ needs (Imlawi et al., 2015). It includes structured actions like emailing or visiting the lecturer during office hours to seek help; and unstructured actions including informal pre- or post-class conversations (Kurucay and Inan, 2017, Sidelinger, 2015). It is this unstructured interaction that is favourably considered to be an effective way
of promoting social bonding and social learning (Nardi et al., 2000, Pai et al., 2017), which can ultimately lead to positive outcomes for students such as increased student motivation and reduced pressure (Rau et al., 2008, Kommoraju et al, 2010), improved commitment and involvement within the classroom (Dobransky and Frymier, 2004) and increased readiness for the job market (Kommoraju et al, 2010) since informal OCC offers students the chance to clarify concepts and ideas from class activities and readings (Hoffman, 2014; Goldman, Goodboy and Bolkan, 2016). Jones (2008) found that higher levels of out-of-class supports provided by lecturers have a positive impact on students' motivation to learn and increase their satisfaction. Moreover, empirical studies have shown well-established benefits of OCC include improved GPAs, better GRE scores, better-prepared career plans, superior college experiences, and better intellectual and personal development (Nadler and Nadler, 2000).

Despite its positive impacts on students, promoting OCC has not been an easy task. Researchers have found many hindrances to OCC. Martin and Myers (2006) found that communication apprehension, which is defined as the overall anxiety a person has about oral communication, has a negative impact on students' OCC. In addition, Williams and Frymier (2007) have raised concerns toward students' learning orientations as determinants of their willingness to take part in OCC. Their results showed that students who have learning orientation, which means learning to pursue intellectual development, are more likely to engage with their lecturers. In the meantime, grade oriented students mainly engage with their lecturers for sycophancy and excuse making purposes. Personal traits of students have also been investigated to examine their effects on OCC. Sidelinger et al. (2016) pointed out that students who are self-managed can effectively manage their college life and participate to a lesser extent in OCC as they tend to seek support from a diversity of campus resources. In contrast, those who are argumentative and assertive are more inclined to interact using OCC with their instructors (Mansson et al., 2012). However this may not reflect all students’ personalities and traits of those who are accustomed to a different education setting. Hence it would be interesting to investigate how the Vietnamese students respond to the OCC, how they perceive the quality of OCC received and finally if the OCC encourages them to be more engaging and responsive in their classroom education.

Many researchers have pointed out the perceived qualities of lecturers such as kindness, humor, sympathy and helpfulness as the major promoters of informal lecturer-student conversation (Jones, 2008). Similarly, Sidelinger et al. (2016) reported that lecturer rapport, which refers to the overall feeling a person has of another including trust, pro-social bond and personal engagement, plays an important role in motivating students to engage in OCC with their lecturers. Lecturers need to find ways to develop rapport as well as confidence of students to encourage students to engage in OCC. In a Vietnamese education setting, a lecturer’s position is perceived to be highly
respected and hence trust and bond is easily created. However there are challenges in getting Vietnamese students engaged in classroom discussions and activities (Maheshwari and Thomas, 2017) and it is hoped using OCC and IM will make a difference.

**Academic utility of computer-mediated technologies**

Email, social networking sites (SNS) and instant messaging (IM) are prevalent technologies in higher education. Since the adoption of computer-mediated communication (CMC) by College and University students continue to grow, it is critical to understand the utility of each technology to select the most appropriate one to foster learner-lecturer relationship.

Students are utilizing a diversity of CMC technologies in an effort to fulfil their academic needs. Uddin et al. (2014) argued that despite the rapid growth in the acceptability and popularity of other social mediums, email is still one of the most widely accepted tools for asynchronous communication. Email offers means of communication between students and instructors in which students might ask for extra information that was somehow lost in the classroom (Hassini, 2006). According to Recchiuti (2003), email is utilized by university students considerably more than online chat rooms and IM for task related communication, especially enquiring tutors regarding materials used in lecture. It cannot be denied the use of email as a supplement to teaching fosters the development of the learner and lecturer relationship.

In recent years, SNS like Twitter and Facebook have become an integral part of university life and a student’s daily routine. In spite of continuous interest for social utility of SNS, there is limited empirical research concentrated on the academic utility of SNS. Extant research associating with the academic utility of SNS shows that majority of students tend to use SNS for peer-to-peer, informal and social communication instead of formal discussion with instructors (Vrocharidou and Efthymiou, 2012). In a recent review, the majority of studies involved the academic use of Facebook mentioned it as a platform for collaborative peer-to-peer learning activities such as group discussion and knowledge sharing rather than a communication platform between students and instructors (Greenhow and Askari, 2017). According to a study about the academic use of SNS Facebook by college students at Michigan State University (Ellison et al., 2007), most students, nearly 70%, had used Facebook to discuss with their classmates about class-related work, whereas, only one-third of them used Facebook as a means to communicate with their lecturers even though the use of Facebook as an OCC to supplement mass lectures was proven to improve student, learning and exam scores (Bowman and Akcaoglu, 2014). Another SNS, namely Twitter, is also not an exception. Despite showing the potential to improve interaction amongst learners and lecturers (Junco et al., 2011), the most beneficial use of Twitter remains at sending push notifications regarding deadline reminder, course information, and peer-to-peer communication. It is of no doubt SNS is for the social use. However, what would be the combined benefits of using
SNS for both social and education interaction? There are studies that show challenges in the educational use of SNS for learning and teaching (Tang and Hew, 2017). So the challenge is to identify and utilize the most appropriate communication technology perceived by the researchers to interact with the students effectively and meet the objectives of this research.

Amongst all the specified CMC technologies, IM is proven to be highly effective in developing student-lecturer communication. Several studies point out the changing approach of IM from being top-down to more bottom-up organized according to the competence based education and social constructivist theories (Zhang et al., 2017, Hou and Wu, 2011). The advantage of IM is that it can be transferred from the classroom environment to the workplace settings when the graduates are employed (Lenhart et al., 2005). Additionally, students perceive a greater sense of belonging to their community, and have additional space for their social and informal communication regarding common program questions, class-related materials and the school (Nicholson, 2002). According to Nicholson (2002), the use of IM is virtually mimicked in the informal interactions in building halls in traditional educational institutions, where students have a virtual meeting room with their lecturers. Moreover, its use opens more opportunity for students to interact directly with lecturers via online apps and constitutes the foundation for personal rapport, which leads to an increase in class-room dialogue (Cifuentes and Lents, 2011). The use of IM also reduces the distance between students and teachers, make them more comfortable to share their ideas and knowledge which in turn, facilitates the learning (Andujar, 2016)

In this study, Remind – an instant message application that offers lecturers and students an easy and inexpensive means of communication, is used as an example of asynchronous interaction to facilitate OCC between lecturers and students.

Application of Technology in Education
Prensky (2001) calls the younger generation of students ‘digital natives’. They are surrounded by an environment that inspires them to learn through technology such as mobile phones, online videogames and computers since childhood (Prensky, 2001). Younger generation is more comfortable communicating via computer rather than face-to-face (Boyle and O'Sullivan, 2016). Hence, the technology in education has become the preferred mode of communication. Growing up as “digital natives”, students are used to the exposure and process of excessive information (McCarthy, 2010; Chao et al., 2011). Consequently, students' learning skills and preferences are influenced by the digital culture in the education environment (McCarthy, 2010). Naturally as students are familiar with the technology and the understanding of its necessity, they evidently prefer active to passive learning (McCarthy, 2010; Chao et al., 2011).

Abu and Abdul (2012) investigated the usage of Short Message Service (SMS) to facilitate learning and discovered that a mobile assessment method
can be utilized by lecturers to introduce flexibility into the teaching and learning environment. In addition, text and instant messaging offer both students and lecturers the convenience, ease of use and the opportunity to save time in resolving administrative issues as well as make students feel more bonded with their lecturers and classroom activities (Lauricella and Kay, 2013). Instant messaging environment facilitates the establishment of social presence (Tang and Hew, 2017); thus the adoption of communication technologies in education, particularly those that are familiar to students leads to the establishment of a sense of community (Klein, 2008) and the development of social capital, which are useful for student with low satisfaction and low self-esteem as they help them develop better college experiences (Ellison et al., 2007). The study by Moh (2015) who surveyed a group of students reported a lot of positive feedback on the usage of smartphone. Most students in their survey reported that the adaption of mobile application in their study created more chances for them to interact with their classmates. Moreover, it was also agreed by the students that they found it easy, convenient and quick to use mobile messages in learning and their performances had improved throughout the studies. Similarly, Kuznekoff et al. (2015) studied the impact of message content, message creation and frequency on student learning and found that sending and responding to lecture content-related messages improves student’s test scores as it allows students to comprehend and encode the contents of the lectures. However, the effect would be reversed if messages are used extensively at a distracting level, particularly if the messages are unrelated to lecture content.

Other researches, however, have looked at the weak or negative correlation between the adaption of technology as course pedagogy and the learning outcomes of students. Muhammad et al. (2017) studied the use of smartphone in teaching and learning. While smartphone aids the learning process, it brings distraction and reduces the hands-on skills. Similarly, Kraushaar and Novak (2010) did a study about student use of laptops using both student self-reporting and monitored components. Their results suggest that students engage substantially in multi-tasking behaviours and are distracted by non-course related applications, which lower their level of performances in terms of quiz, exam, and grade scores. In addition, there is also a discrepancy between student self-reported and monitored frequency of distractive application use in class, which raised concerns of the past studies using student surveys (Kraushaar and Novak, 2010). Wood et al. (2012) studied two groups of students – one which engaged in technologically-based activities using cell phones, Facebook and MSN during lectures and the other group which did not. The findings showed that off-task multi-tasking with technology were irresistible when technologies were permitted in classrooms and that those who used technologies performed more poorly than those who did not. Wei et al. (2012) also showed similar findings in investigating student usage of text message during class, as
students need more time to comprehend the lecture due to their limited information-processing ability when switching between listening to lectures and texting, thereby reducing their cognitive learning. Peterson and Johnston (2015) investigated the impact of Facebook and Twitter on the development of students’ cognitive social capital, which is said to be an influential factor in forecasting academic performance and intellectual development. This study essentially investigates the Remind application for students’ clarification reasons, perceived content quality and thereby, their perceived performance proficiency.

Clarification reason and students’ perceived content quality
In this study, clarification reason is perceived as course-related questions from learners to their lecturers such as seeking help if they did not understand the topic, requesting lecture materials, tutorials as well as further guidance in doing assignments on the IM app, namely Remind. The Chat feature on the app allows learners to request a clarification or responses for their inquiries and build interpersonal rapport with lecturers. The extant research on the use of CMC has found that students use popular technologies such as emails for educational assistance and interpersonal communication (Dutton, 2012, Weiser, 2000, Waldeck et al., 2001). According to Young et al. (2011), using such form of computer-mediated OCC to communicate with the lecturers can foster student-lecturer professional relational development. Similar to emails, IM is also a favoured form of communication for personal and social relationships (Vrocharidou and Efthymiou, 2012). However, unlike emails, which are asynchronous and time-delayed communication, IM can become synchronous to interact in real time, which improves the relatedness, that is feeling connected to others (Butz and Stupnisky, 2017), thus, enhance student-lecturer relationship. Lo and Leung (2009) stated that most students would choose IM over emails, if they were able to select one medium for social communication. The IM application like Remind is used as it allows 140-character limit for each post (Remind, 2016), forcing the message to be short, meaningful, less formal, and more attractive than long messages.

The content quality of an informative platform is determined based on the level of users’ perceived quality of information provided by that platform (Lu and Lin, 2002). A research conducted on the experience of blogging site users (Lu and Lee, 2010) shows that the content quality is one of the users’ concerns when visiting the site, and from there, they develop their own perception about the quality of blog content. It can be seen that students use IM mostly for social attention and entertainment, task accomplishment and to meet new people (Vrocharidou and Efthymiou, 2012). IM allows users to perform mass communication as well as target communication at an individual level. Moreover, IM offers an interactive place for feedback and discussions amongst users.
Relationship between students' perceived content quality and their performance

Socially related communication can improve students' task-delivering and problem-solving abilities, and consequently have both direct and indirect impacts on their performance (Yu et al., 2010). Proposing an assessment model for Learning Management Systems (LMS), Ozkan and Koseler (2009) found that a strong positive relationship exists between content quality; which is defined as the ease of understanding, concurrence and richness of materials content; and students' perceived satisfaction. Additionally, the use of online informative platforms for clarification reason has been found to consolidate learner-lecturer interpersonal connections, which ultimately leads to academic success on the part of the students (Young et al., 2011). Students' perceptions about the quality of the contents received from IM as well as their interactions with lecturers and peers are believed to have an impactful weight on their performance in the course.

Based on existing literature on CMC, this study aims to investigate further the effectiveness of instant-communications sent out of the classroom environment using the online application ‘Remind’ to facilitate learning as part of the education process. Following this, two hypotheses were developed as follows:

Hypothesis 1: Clarification reason for lecturer-student online communication is positively related to students’ perceived content quality of online communication for learning purpose.

Hypothesis 2: Students’ perceived content quality of online communication for learning purpose influences their perceived performance proficiency positively.

Based on the literature review, a conceptual model shown in Figure 1 was developed.

[Figure 1 insert here]
Methodology

The study design

This study employed a quantitative approach. A survey instrument was designed using three constructs adapted from Young et al. (2011), Lu and Lee (2010), and Yu et al. (2010). The constructs are shown in Figure 1. The questionnaire was distributed to first year students from an international University in Vietnam. The data collected were then tabulated to test the measurement model and the structural model.

Convenient sampling approach was used in this study in order to obtain an expected sample size. The ‘Remind’ messaging system was used for students enrolled in the Accounting in Organisations and Society (AOS) and Management Accounting and Business (MAB) courses. Both courses are core business modules required for students in the Business program.

There were 236 students enrolled in the AOS course. Out of this number 216 students accepted the invitation to use the ‘Remind’ messaging system in which they can download in any of their devices. However, only 11 students from the AOS course used the chat services during the semester. As for the MAB course, all the 129 students enrolled in the course used the ‘Remind’ messaging system. Again from the MAB course, only 11 students used the messaging chat service.

At the end of the semester a broadcast email was sent to all the students enrolled in both courses to participate in this study. The email had a link to an external site known as Qualtrics in which the survey instrument was designed. A consent form and participant information were also provided with the instrument. All the students from AOS and MAB were informed that their participation was voluntary and the results will be anonymised. The SPSS Amos 20 software was used to test the models. The Structural Equation Model (SEM) was used to evaluate the reliability and validity and then to test the following hypotheses.

Hypothesis 1: Clarification reason for lecturer-student online communication is positively related to students’ perceived content quality of online communication for learning purpose.

Hypothesis 2: Students’ perceived content quality of online communication for learning purpose influences their perceived performance proficiency positively.

Student Engagement

On the first day of the semester, students were informed that they would be able to communicate with their lecturers using the ‘Remind’ application system. The key features of the tool were explained to the students: students
could either chat with their lecturer or the lecturer could send out short announcements to the whole group.

Students were made aware that using Remind was voluntary and other forms of communication such as email and Blackboard (Learning Management System) would still be available if they decided not to use Remind. The benefits of using instant messaging for both the lecturer and students were also explained.

During the semester, most of the communication was from the lecturer to the students: sending reminders and notifying students when new information was available on Blackboard.

As the course progressed regular messages were sent to students on a weekly or sometimes twice weekly basis to remind students about general activities that were necessary to help them manage their time and their studies better. The type of messages ranged from reminders about checking solutions on Blackboard to reminders about approaching deadlines.

Over a period of twelve weeks, 27 messages were sent to MAB students and 18 messages were sent out to AOS students. When required, attachments were included with the messages. Table 1 shows examples of messages sent to students for MAB and AOS courses.

[Insert Table 1 about here]

Before the ‘Remind’ messaging system was implemented students normally commented information was unclear, they were unaware of the assignment deadlines, unaware they were required to bring exercise sheets to class, unaware information was available on Blackboard and were unprepared for tests. However, these reactions reduced over time when the ‘Remind’ messaging system was implemented.

Over the duration of the semester, the lecturers noticed it became easier to teach and manage the courses. For example, some exercises required the students to bring a laptop and work on spreadsheets in class. Previously this was an arduous task to do because not all students remembered to bring their laptops which evidently made teaching and conducting practical lessons in class difficult. However, when Remind was implemented, communication with students became easier and all the groups remembered to bring their laptops to class. It was also noted, when students became more confident in using the application system, they initiated most of the chat conversation. The communication using the chat feature reduced as students received regular updates and expectations were clearer.

When students were reminded to take the first online test for MAB, students who were unable to participate in the test sent apology messages to the lecturer. From this experience, it was noted the two-way communication showed two outcomes. Firstly, students had an opportunity to inform the lecturer on time before the commencement of the test and secondly from the
replies they received the students were rest assured and acknowledged the fact that their lecturer was concerned for them if they missed the test. This created a good communication practice between teaching staff and students. In another situation, students who missed assignment deadlines even though several reminders were sent to them prior to the deadline were able to reflect on their shortcomings. It was also noted that using the ‘Remind’ application system reduced the time lecturers spent reminding and repeating messages in the classroom. Instead the time was utilized more effectively in engaging students in other learning activities.

Measurement Scales
The survey instrument consisted of Clarification reason for online communication, Perceived content quality for learning purpose, and Perceived performance proficiency. The three constructs were measured by a number of items using 5-point Likert scale to express how much they agree or disagree with a particular statement, where 1 is ‘Strongly Disagree’ and 5 is ‘Strongly Agree’.

[Insert Table 2 about here]

Results
Convergent and discriminant validity
Before accessing the results of the hypothesis testing, it is crucial to first examine the convergent and discriminant validity of the measurement scale. The SEM technique of measurement model is one of statistical techniques for testing hypotheses about convergent and discriminant validity. The convergent validity was tested by examining the composite reliability (CR) and the average variance extracted (AVE) from the measures (Hair et al., 1998). The CR scores of the reflective constructs shown in Table 1 exceed the threshold of 0.70 (Nunnally, 1978). The AVE values (Table 1) exceed the recommended cut-off value of 0.50 (Fornell and Bookstein, 1982). Proven in Table 1, all the indicators using in this study are satisfactory.

[Insert Table 3 about here]

The discriminant validity was supported when the square roots of the AVE for each factor is greater than the correlations between that construct with others. The discriminant validity analysis in Table 2 indicates that all square roots of the AVE scores are greater than the corresponding correlation coefficients.

[Insert Table 4 about here]
The overall fitness of the structural equation model

The structural equation model is proved to relatively fit to the population data because of the following satisfactory indicators: all the indicators GFI, TLI, and CFI are approximately equal 0.9 (Steiger, 1990; Bentler and Bonett, 1980); CMIN/df ≤ 3 (Carmines and McIver, 1981).

[Insert Table 5 about here]

Hypothesis testing results

The P-value and the sign of the Estimate of the Regression weights in Table 1 show that Clarification reason for online communication has a significantly positive effect on Perceived content quality for learning purpose (P-value < 0.001), confirming H1, and Perceived content quality for learning purpose has a significantly positive impact on Perceived performance proficiency (P-value < 0.001), confirming H2.

[Insert Table 6 about here]

[Insert Table 7 about here]
Discussion
Learning interaction process comprises of direct face-to-face communication in the classroom and indirect communication outside the classroom (Kansanen, 1999). Clarification reason for online communication using the Chat feature on ‘Remind’ outside the classroom, according to Kansanen (1999), is indirect interaction (Figure 2) whereby students ask their lecturers about course content and assignments is stated to build up the bond between lecturers and students and thereby, support the students' confidence and success in higher education (Young et al., 2011; Jones et al., 2009). Within indirect interaction, there are structured interaction and unstructured interaction. Structured interaction is an institution's formal and instructional processes; whereas unstructured interaction is not compulsory and deals with informal conversations (Terenzini et al., 1999). In this study, the Chat feature via ‘Remind’ is also informal and optional; in other words, it is unstructured interaction (Figure 2). The informal interaction method has been proven to bring a number of positive learning outcomes (Rau et al., 2008; Dobransky and Frymier, 2004; Nadler and Nadler, 2000), and to promote social bonding and social learning (Terenzini et al., 1999; Nardi et al., 2000). In addition, ‘Remind’ is facilitated with either smartphones for messaging or any device with internet-based notification (e.g. emails and websites), so it is CMC (Figure 2). This makes the clarification more convenient, and more participative; and enhances bonding, learning efficiency and effectiveness. (Kansanen, 1999; Ericson, 2011; Olaniran, 2006; Abu and Abdul, 2012; Lauricella and Kay, 2013).

[Figure 2 insert here]

Furthermore, the findings fill the gap between communication and perception of learning outcomes with perceived content quality as a mediating variable. The conceptual model (Figure 3) is developed from the relationship between actual quality and perceived quality of website content of Lu and Lin (2002). Simultaneously, the current study has not adequately covered about the quality of the content and its correlation with the method of teaching and learning communication.

[Figure 3 insert here]
Conclusion

The findings conclude using the IM system is favourable to students. The results of the students’ perceived content quality is supported and online communication for learning purpose has a positive influence on their perceived performance proficiency. Before using the ‘Remind’ messaging system the students were unclear and unsure of the information and the classroom materials and would require constant reminding and re-assurance from the lecturer. This took up class time and sometimes led to unclear communication and class performance. In addition, not all first-year students were assertive and had confidence to seek clarification (Maheshwari and Thomas, 2017). However, after using the ‘Remind’ messaging system, allowed a better form of communication to occur which integrates structured and unstructured communication in the teaching and learning process with positive outcomes. This research shows perceived content quality as a mediating variable in the causal relationship between teaching and learning online communication and outcomes. The use of instant messaging tool, ‘Remind’ in this case, should be weighed up carefully. The research has a practical importance in the sense that there is pressure to integrate technology into all educational settings and ‘Remind’ emerges as one of preeminent means for teaching and learning computer-mediated communication. The role of communication in enhancing student experience be it in the use of new technology in blended learning or simply keeping up with class materials should not be underplayed in any form of education setting be it in higher education or primary and secondary education system, and hence the increasing need for communication tools like ‘Remind’. This research would be of interest to educators who are exploring different forms of blended learning and communication approach or staff who are developing curriculum for non-English speaking students and distance learning. The ‘Remind’ application can also be used in other forms of educating the society such as by health care practitioners to remind and educate patients to come for appointments and take appropriate medications.

The value and benefits of the different forms of blended learning with the right form of communication application systems will improve the education process and the learning experience of the end user. The health care and education policy makers and University directorate should take this into consideration when implementing new forms of blended learning approaches.

However, there are limitations to the study. First, the results did not exhibit how any actual changes in learning content and learning outcomes can be affected by the students’ perceptions of content quality and of their performance. Second, the results do not give any significant guidance on how ‘Remind’ should be employed to improve teaching and learning outcomes.
Third, the study would wrap up a different result if other means of social media were the objectives. Fourth, the sample size for later researches should be bigger so that that the SEM model can be perfectly fit to the market data.

Future research should investigate establishing a comprehensive teaching structure using social media to approach applicable methods which improve actual learning outcomes. In addition, future research should inspect the role of the content quality and its impact on learning outcomes. Although Waldeck et al., (2001) postulated a supportive influence of frequent email communication on face-to-face teacher-student exchanges, the study recommended that clarification of subtle matters would be clearer and easier via face-to-face interaction. Thus, further research is needed to find an optimal method to employ in order to combine teaching and learning CMC and direct interaction to achieve the highest effectiveness.
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### TABLE 1
Examples of messages sent to Accounting students using the 'Remind' Application

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<thead>
<tr>
<th>Management Accounting and Business</th>
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<tbody>
<tr>
<td><em>Remember to print all the materials for this week and bring the textbook to class. Please form groups of 5 for the assignment. Thank you.</em></td>
<td><em>Remember to check the solutions for Tutorial 1 and 2 exercises for Week 1. Have you completed the discussion questions for Topic 2 - Week 2?</em></td>
</tr>
<tr>
<td><em>Profit Planning is a 'hands-on' topic. Please bring a laptop to both sessions this week in order to practice profit planning efficiently.</em></td>
<td><em>The ... Orientation module is now available on Blackboard. Please go to Blackboard for more details. Thank you.</em></td>
</tr>
<tr>
<td><em>The case study for the assignment... is now available on Blackboard under Topic 3 materials. Please read it over the weekend</em></td>
<td><em>Have you signed up to attend ..? Sessions will run on Tuesdays and Wednesdays. Please visit BlackBoard for more information.</em></td>
</tr>
<tr>
<td><em>The early feedback test is now available on Blackboard. It will cover topics 1, 2 and 3 and will be available until Thursday this week.</em></td>
<td><em>Remember to complete the discussion questions for Week 4. Early Feedback tests will take place in Week 4, covering topics 1, 2 &amp; 3- Goodluck!</em></td>
</tr>
<tr>
<td><em>Remember to bring a laptop to class for our second session this week. Have you taken the online quiz? Today is the last day! Good luck!</em></td>
<td><em>Remember to form groups of four for the assignment. Let your lecturers know if you have problems finding group members. Good luck!</em></td>
</tr>
<tr>
<td><em>Remember to bring a laptop to class. I have also attached a letter from ... about midterm revision on Saturday.</em></td>
<td><em>Check BB for details about what you need to do in week 7. Refer to the attachment for more details. See you in</em></td>
</tr>
<tr>
<td><strong>Attachment: ... Revision Session..docx</strong></td>
<td><strong>Week 8 Attachment: Week 7 Tasks.docx</strong></td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>You will have the midterm test on Wednesday next week. It is a closed book test. Venue and time will be posted later. Happy Revision!</td>
<td>The assignment (30% of the final grade) is now available on Blackboard under assessment tasks. It is due on 25th April, 5.00 pm. Good luck!</td>
</tr>
<tr>
<td>Take note that the midterm test is on 30th March, Week 6. Goodluck! Remember to bring the textbook to class this week to practice budgeting</td>
<td>Remember to use the Online Feedback Service, ... when working on your assignment....Attachment: ..._Online Writing Feedback Service Announcement.pptx</td>
</tr>
<tr>
<td>Make sure all the details of your group members are correct. We are using the information to create your discussion board for Week 7 in BB.</td>
<td>Make sure your Week 7 Task is done before going to class. Be ready for a 2-3 minute presentation. this is part of preparation for Week8.</td>
</tr>
<tr>
<td>You will be provided with rough paper to use for calculations and make notes during the test tomorrow, bring a pen and a calculator.</td>
<td>Remember to check your first Discussion Grade on Blackboard. Please see your lecturer if you need to find out more about your Grade!!</td>
</tr>
<tr>
<td>The discussion board will be available until Sunday. Complete all your posts before then. You do not need to post a report for Week 7 on BB!</td>
<td>...will be available till week 11 - this will help you improve your grades. See the attachment for details! Attachment: ...Promotion.pdf</td>
</tr>
<tr>
<td>You can get online feedback on your writing. Click ... to watch the instructions. Very easy to use Attachment: ..._Online Writing Feedback Service Announcement.pptx</td>
<td>Remember to submit the assignment by 5.00 pm today. please refer to Blackboard for more details.</td>
</tr>
<tr>
<td>Remember to print all the revision materials and bring them to class. Thank you.</td>
<td>...sessions are still available this week. Make some time to attend a session today or tomorrow to review Topic 6A.</td>
</tr>
<tr>
<td>The assignment grade is now available on Blackboard. Please email me if you have any questions.</td>
<td>... remember there is a revision class this afternoon from 2pm to 5pm, and no other classes this week.</td>
</tr>
</tbody>
</table>
### TABLE 2
The survey instrument

<table>
<thead>
<tr>
<th>Clarification reason for online communication on Remind (Young et al., 2011)</th>
<th>Original Items</th>
<th>Modified Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>I send emails to my instructors to clarify material from lecture.</td>
<td>I used Remind with my lecturer to clarify materials from the class.</td>
<td></td>
</tr>
<tr>
<td>I send emails to my instructors to ask for guidance on assignments</td>
<td>I used Remind with my lecturer to ask for guidance on assignments.</td>
<td></td>
</tr>
<tr>
<td>I send emails to my instructors to ask the instructors questions about the course content</td>
<td>I used Remind with my lecturer to ask questions about the course content.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Perceived content quality of Remind for learning purpose (Lu &amp; Lee, 2010)</th>
<th>Original Items</th>
<th>Modified Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>The title of this blog catches my attention.</td>
<td>The content of up-to-date post from Remind catches my attention.</td>
<td></td>
</tr>
<tr>
<td>The content of this blog is attractive to me.</td>
<td>The content of up-to-date post from Remind is attractive to me.</td>
<td></td>
</tr>
<tr>
<td>The content of this blog is interesting for me.</td>
<td>The content of up-to-date post from Remind is interesting to me.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Perceived performance proficiency after interacting with instructor on Remind (Yu et al, 2010)</th>
<th>Original Items</th>
<th>Modified Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am confident about the adequacy of my academic skills and abilities.</td>
<td>With the use of Remind, I am more confident about the adequacy of my academic skills and abilities.</td>
<td></td>
</tr>
<tr>
<td>I feel competent conducting my course assignments.</td>
<td>With the use of Remind, I feel competent conducting my course assignments.</td>
<td></td>
</tr>
<tr>
<td>I have learned how to successfully perform my coursework in an efficient manner.</td>
<td>With the use of Remind, I have learned how to successfully perform my coursework in an efficient manner.</td>
<td></td>
</tr>
<tr>
<td>I have performed academically as well as I anticipated I would.</td>
<td>With the use of Remind, I have performed academically as well as I anticipated I would.</td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 3
Assessment of convergent validity

<table>
<thead>
<tr>
<th>Variable</th>
<th>Construct reliability (CR)</th>
<th>Average variance extracted (AVE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clarification reason for online communication</td>
<td>0.84</td>
<td>0.84</td>
</tr>
<tr>
<td>Perceived content quality for learning purpose</td>
<td>0.81</td>
<td>0.83</td>
</tr>
<tr>
<td>Perceived performance proficiency</td>
<td>0.91</td>
<td>0.88</td>
</tr>
</tbody>
</table>
### TABLE 4
Assessment of discriminant validity

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Clarification reason for online communication</td>
<td>0.919</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Perceived content quality for learning purpose</td>
<td>0.512</td>
<td>0.909</td>
<td></td>
</tr>
<tr>
<td>3. Perceived performance proficiency</td>
<td>0.845</td>
<td>0.640</td>
<td>0.937</td>
</tr>
</tbody>
</table>

*Bold values on the diagonal are square roots of AVE value of constructs.*
### TABLE 5
Overall fitness of structural equation model

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Standard Value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>GFI</td>
<td>GFI = 0.9</td>
<td>GFI = 0.866 Supported</td>
</tr>
<tr>
<td>TLI</td>
<td>TLI = 0.9</td>
<td>TLI = 0.907 Supported</td>
</tr>
<tr>
<td>CFI</td>
<td>CFI = 0.9</td>
<td>CFI = 0.934 Supported</td>
</tr>
<tr>
<td>CMIN/df</td>
<td>CMIN/df ≤ 3</td>
<td>CMIN/df = 2.576 Supported</td>
</tr>
</tbody>
</table>
TABLE 6
Regression Weights

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Est</th>
<th>S.E.</th>
<th>C.R.</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived content quality for learning purpose</td>
<td>0.362</td>
<td>0.093</td>
<td>3.881</td>
<td>***</td>
</tr>
<tr>
<td>Clarification reason for online communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived performance proficiency</td>
<td>2.318</td>
<td>0.542</td>
<td>4.275</td>
<td>***</td>
</tr>
<tr>
<td>Perceived content quality for learning purpose</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(*** means the value is smaller than 0.001)
### TABLE 7
**Hypothesis testing results**

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>P-value</th>
<th>Testing result</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1. Clarification reason for online communication between the lecturer and student is positively related to students’ perceived content quality of online communication for learning purpose.</td>
<td>Below 0.001</td>
<td>Supported</td>
</tr>
<tr>
<td>H2. Students’ perceived content quality of online communication for learning purpose has a positive influence on their perceived performance proficiency.</td>
<td>Below 0.001</td>
<td>Supported</td>
</tr>
</tbody>
</table>
FIGURE 1
Conceptual Model

Clarification reason for online communication (1) → Perceived content quality for learning purpose (2) → Perceived Performance Proficiency (3)

Key:
(1) Young et al. (2011)
(2) Lu & Lee (2010)
(3) Yu et al. (2010)
FIGURE 2

Description of clarification reason for online communication using Chat feature on Remind.com
Figure 3
Results of the structural model