Students' Attitudes and Perceptions toward the Effectiveness of Mobile Learning in University of Djibouti

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ABSTRACT

As mobile learning has become ubiquitous, many institutions of higher education have embarked on a number of mobile learning initiatives to support traditional learning modes. This study was conducted to determine the students' attitudes and perceptions toward the effectiveness of mobile learning using SMS and Facebook at University of Djibouti. The sample consisted of 105 respondents enrolled in the second year course entitled "Internet Technology," taught in the Department of Mathematics and Computer Science. The study focused on how mobile learning using SMS and Facebook can be used to enhance students' learning at the Department of Mathematics and Computer Science course at the University of Djibouti. The findings indicate that mobile learning using SMS and Facebook could be used as supplemental tools to enhance students' learning to achieve their learning outcomes.

Keywords : mobile learning, SMS, Facebook, higher education, students' attitudes and perceptions

1. INTRODUCTION

Massive changes in the 21st century, such as new developments in technology, competition, and globalization, have impacted higher education. The quality of higher education has become a primary agenda worldwide, thus there is a need for administrators and faculty within institutions of higher education to understand the emerging trends and major challenges of the 21st century. It is no doubt that one of the important features in education in 21st century will be the adoption of mobile devices in the learning sphere.

According to Ally (2005), a mobile device is a portable, electronic tool that permits users to interact with others or access information remotely using wireless networking capabilities. The immense popularity of mobile devices has been attributed to "decreasing cost and increasing social currency" (Herrington & Herrington, 2007). Furthermore, the International Telecommunications Union (IUT, 2014), indicated the number of mobile-cellular subscriptions worldwide is approaching the number of people on earth; mobile cellular subscriptions were predicted to reach almost 7 billion by the end of 2014 with a penetration rate of 96%. The IUT also reported that Africa and Asia and the Pacific, will reach penetration rates of 69% and 89%, respectively, by end 2014. These regions contain the strongest mobile-cellular growth.

Furthermore, this growing popularity of mobile devices, which include mobile phones, smartphones, tablets, and iPods has provided a considerable opportunity for educators to exploit for educational purposes. In this context, numerous research studies on the use of mobile and wireless communication technologies in education have been conducted. The researchers have denoted these technology-supported learning approaches as Mobile Learning (Chu, Hwang, Tsai & Tseng, 2010; Chu, Hwang & Tsai, 2010).

Mobile learning is defined as learning using mobile devices with wireless connectivity. These include mobile phones, smart phones, tablets or any other handheld devices that offers learner the opportunity to enhance their learning experience anywhere and anytime. According to Bonk (2009), mobile learning is the next wave of learning. With this new mode of learning, learners are able to learn anything, at any place and any time. It is also argued that mobile learning has the potential to promote collaborative learning, engage learners in the learning process, and enhance student learning. As the potential of mobile learning to enhance learning has become significant, many higher education institutions have embarked on a number of mobile learning initiatives to support their traditional learning modes.

It is within this perspective that the University of Djibouti has embarked on a mobile learning initiative to determine the students' attitudes and perceptions towards the effectiveness of mobile learning using Short Message Service (SMS) and Facebook. SMS and Facebook applications were chosen because these are what most students in higher education use. These venues are not only popular but also perceived to be useful in supporting the students' needs. According to Abas et al (2009) , of all the applications developed for mobile phones, the most useful and the most used is SMS, also known as text messaging. When combined with Facebook, which is the most used social networking in the world, the two venues may become a significant force for enhancing student learning. However, use of these tools should be appropriately designed and properly implemented.

1.1 Relevant Literature

Mobile learning has captured the imaginations of many educators in higher education because it allows them to capitalise on the features and tools embedded within powerful mobile devices (Hung & Zhang, 2011).

Research has shown that SMS is a powerful application in mobile learning particularly in the area of academic and administrative support. In academic support, Uday Bhaskar & Govindarajulu (2008), suggested that content sent via SMS is more easily absorbed and has been found to be

effective in helping students learn facts. Furthermore, a study led by Abas et al (2009), demonstrated that using SMS can engage learners and enhance the learning environment. Learners receive text messages to help them remember important course facts easily or to motivate them to participate in a discussion forum. As a result, students actively take part in the learning process rather than passively receive knowledge. Abas et al. developed five categories of SMS: forum, content, tips, motivation, and course management. These messages were designed to enhance learning by triggering learners to perform specific learning tasks related to the print module, face-to-face tutorials, or online discussions.

Additionally, a study conducted by researchers at the Sheffield Halam University of India indicated that when text messages containing important course content are received by learners, they are more readily and easily assimilated because they are chunked into small sizes (Uday Bhaskar & Govindarajulu, 2008). This chunking increased the students' retention abilities as well as comprehension.

For administrative support, the University of Pretoria, South Africa, used SMS to motivate distance learners. This includes various aspects such as reminding students of contact session dates and registration deadlines. The initiative was successful in reducing "perceptual distance between learners and the university" and in reducing the drop-out rate of at-risk learners (Ericsson Global, 2013). Similarly, the University of Ulster was able to reduce learner drop-out by sending timely text messages to learners who had not been attending classes and who had the misperception that nobody cared (Keegan, Kismihok, Mileva & Rekkedal, 2009).

The benefits of using SMS in education have been shown to be significant. Some important characteristic of using SMS for mobile learning activities can be information delivery, providing feedback, asking questions, and providing answers. It is argued that SMS has the potential to enhance student learning if properly designed. Thus, some higher education institutions have started to experiment, test, and implement mobile learning using SMS within their curriculum.

Moreover, a few studies in using mobile applications of Facebook have been conducted to investigate how it can enhance student learning in higher education. A study done at Open University Malaysia (OUM) revealed that asynchronous discussions, such as forum discussions on Facebook, is useful for enhancing student learning because it helps learners discuss important content more easily (Tina, Mansor & Norziati, 2011). The purpose of the forum discussion on Facebook is to provide a collaborative learning environment where students learn from each other, and it allows the instructor to ensure that learners are on track.

For example, in traditional face-to-face classes, when an instructor asks the class about something, not everyone has an opportunity to give a response (Benson, 2003). However, in forum discussions on Facebook, all students have the opportunities to express their opinion. Furthermore, Hrastinski (2008) reported that when students agree with their colleagues, they form social ties, and these are important for collaborative learning. Other research found that students who felt they did not have enough background knowledge in the subject matter did extra research before making a comment because they did not want to sound unintelligent in front of their colleagues (Du, Zhang, Olinzock & Adams, 2008).

Mobile learning using the forum discussion on Facebook provides opportunities to engage students in interactive and collaborative learning in order to achieve learning outcomes. Although, Facebook is one of the most popular social networking websites in the world, and most students in higher education are familiar with it, there is little research into how it can be used to support learning. As such, a range of activities within Facebook including discussion, video, chats, quizzes, chat applications, and exercises are used in this study to experience how mobile learning using Facebook can enhance student learning by motivating students to engage in the learning process and thus achieve learning outcomes.

1.2 Problem statement

Education is fundamental to the development and growth of every nation in the world. However, developing countries face greater challenges in providing opportunities to their population. For example, students enrolled in higher education institutions in Africa in general and in Djibouti in particular, one of the least developed countries in the world, typically encounter problems in getting quality academic education. The difficulties are related to challenges such as scarcity of library books, limited library seating, and low or poor bandwidth availability. Furthermore, in most situations, two or three students have to share one computer during university classes. This makes it difficult to provide students with the necessary level of support and guidance.

In this context, one possibility to overcome these problems is the application of the concept of mobile learning (called M-Learning). In other words, why not use mobile devices that are cheap, simple to use and widely available for the youth in countries such as Djibouti to improve learning environments? Why not use the power of portable computing in the hands of most students in the University of Djibouti to motivate and create an environment to support additional interactions between teachers and students? For these reasons, it is argued that mobile learning could be the solution to enhance student learning in higher education and simultaneously could be a chance to enhance education all over the world particularly in the developing countries.

1.3 Research questions

Van 't Hooft (2009) emphasized that priority should be given to the formulation of research questions in mobile learning research as part of the process of implementing mobile learning. According to Laurillard (2007), mobile learning research questions should be centered on the pedagogical aspect as a means to support the learning process and to exploit the potential of a ubiquitous environment. In this study, the researcher first designed the use of SMS and Facebook to enhance learning in a university course. Following the design and implementation of the course, the researcher proposed the following four research questions:

1. What are student's perceptions and motivation about using mobile learning tools such as SMS and Facebook?
2. Does mobile learning using SMS and Facebook enhance the participation of students in activities related to the course?
3. Does mobile learning using SMS and Facebook enhance students' appraisal of the course content and improve learning in order to achieve the learning outcomes?
4. Does the design of mobile learning for the course enhance student learning?

2 METHODOLOGY

In order to meet the objective of this study, the researcher used both quantitative and qualitative methods. Quantitative data was obtained through a questionnaire based on close-ended questions using a five-point Likert scale. The values ranged from strongly disagree (1) to strongly agree (5).Qualitative data was obtained through open-ended questions on the same survey. This article focuses on the feedback gathered from the quantitative data.

The quantitative data was analyzed using descriptive and inferential statistics. Using the Statistical Package for the Social Sciences (SPSS), results were analyzed and tables and graphs that illustrate responses on each question and each factor were produced. Tables that illustrate the comparison of responses between items were also generated.Three main steps were taken to achieve the purpose of this research:

1. Design and implement mobile learning using SMS and Facebook to enhance a University course
2. Determine students' perceptions and viewpoints on the efficiency and effectiveness of mobile learning using questionnaires and interviews
3. Analyse the data collected through questionnaires and interviews

2.1 Participant

Ruane (2007) and Bryman (2008) defined 'convenience samples' as study participants as selected due to convenience of access. The participants of this study were the entire student population of the University of Djibouti. However, the researcher had to delimit the possible respondents due to the limitations of time and resources. As such, the participants of this study werethe second year students in the Department of Mathematics and Computer Science at the University of Djibouti.These students were selected for two reasons. First, it was determined that they should at least be second year level students because the researcher wanted students who were already familiar with the university's pedagogical style and knew how to use Facebook as well as SMS. Second, the researcher, as principal investigator of the study, was teaching a course called "Internet Technology" to second year students in the Department of Mathematics and Computer Science.

2.2 Design of the Study

The design and implementation of mobile learning for this study was for a second year course entitled "Internet Technology." This course was taught to second year students in the Department of Mathematics and Computer Science at the University of Djibouti. The students met two hours each week for face-to-face lessons, which was the main delivery mechanism of the course. The compulsory first semester course met for a period of 11 weeks. It was an introductory course on Internet technology designed to promote the use of information communication technologies (ICTs) in education. Due to the nature of the course, introducing mobile learning concepts to the students was seen as advantageous, and allowed students to experience mobile learning.

Designing the course was the first step of the research. The curriculum of the course is provided in Appendix A. Two categories of SMS were considered for the study: content and reminders. SMS content was designed to help students to remember important course facts and concepts easily. SMS reminders also consisted of messages to stimulate students to take part in forum discussions on

Facebook. These two modes were modelled after those employed at the Open University Malaysia done by Abas, Lim and Woo (2009). Hence, two text messages were scheduled to be sent each at 8:30 pm after the face-to-face lesson.

Facebook use encompassed a variety of activities such as forum discussions, videos, quizzes, chat applications and exercises. Students were involved in forum discussions on Facebook in order to generate ideas within a group regarding a specific topic. Quizzes and exercises were posted on Facebook so the students could undertake self-evaluations regarding the concepts learned in class. Videos also were posted on the Facebook wall in order to provide demonstrations about the topics under study. Finally, chat applications were used to supplement forum discussions by allowing students in various groups to discuss and debate the topic posted on Facebook.

2.3 Questionnaire

The instrument used in the study was a questionnaire developed to provide answers to the research questions and based on recommendations from the relevant literature. “Ref [18]”suggested that a questionnaire is “a self-contained, self-administered instrument for asking questions” (p.123). The researcher posited that the prospective respondents were familiar with how to answer questionnaires because all respondents were university students. In this study, the researcher, as the main course lecturer, had direct contact with the respondents. The researcher could approach each respondent and ask them to finish the survey on time. The researcher estimated that completing the questionnaire would take approximatley25 minutes of the respondents’ time.

The questionnaire was divided into five parts aligned with the three major questions guiding the research. The first part was designed to obtain the demographics of the respondents. The second part measured the student’s perception and motivation about using mobile learning tools such as SMS and Facebook to support their courses. Eight statements measured the degree of satisfaction and motivation by using a 5-point Likert scale (Strongly Disagree, Disagree, Neutral, Agree and Strongly Agree). The third part measured the level of the student’s participation in activities related to the course. Ten statements were listed in this part and required the student to rate with a choice of Never, Sometimes, Often, Very Often or All the Time. These 10statements were intended to clarify the extent to which students were engaged in the course related SMS and Facebook activities. The fourth part contained15statements intended to measure the students’ evaluation of the course using mobile learning. Responses used a 5-point Likert scale (Strongly Disagree, Disagree, Neutral, Agree and Strongly Agree). These questions helped determine whether mobile learning using SMS and Facebook enhanced student learning in order to help them achieve learning outcomes. The fifth and the last part were comprised of open-ended questions which allowed students to openly express their opinions about using mobile learning in the course. This article focuses the quantitative data gathered from the first four parts of the questionnaire.

2.4 Data Collection

At the conclusion of the course, the students (N = 105) were asked to complete the questionnaire. The questionnaire was administered at the end of the last class in the semester. All of the 105 students responded. Their item-by-item responses were entered into the SPSS software, and the data were screened for missing responses. Based on the N of 105 and 32 responses per student, there were

3,360 possible responses to the questionnaire (disregarding the three general demographic items). There were four missing responses in the three general information dataset; therefore there was no impact on the study results. The respondent demographics indicated that 62 (59%) respondents were male and 43 (41%) were female. In addition, 84 (80%) of the respondents had a computer with 67 (63.8%) having Internet access at home. All respondents had a mobile phone.

3 Analysis

3.1 Analysis of Students' Perception and Motivation using M-learning

The primary objective of the study was to determine the students' perceptions and motivation using mobile learning in their learning process. Table I provides the results related to the first research question in respect to respondents' overall perceptions and motivation about the course. Their responses are shown as the percentages associated with each of the options from strongly disagree (SD) through strongly agree (SA). The items are listed from the highest to the lowest level agreement based on respondents' perceptions and motivation about using mobile learning tools such as SMS and Facebook.

The overall findings indicated that student perception and motivation about using mobile learning was generally positive. Most students agreed (A) and strongly agreed (SA) to all items. Students indicated that they perceived mobile learning will bring new opportunities (83.9%) as well as offer the ability to learn anytime and anywhere (78.1%). This means that 88.6% of the respondents agreed that mobile learning improved teacher-student and student-student communication. However, 81.9% of the respondents indicated that they perceived mobile learning to be expensive. This may constitute a major challenge for the students' acceptance of mobile learning.

TABLE I.
Student Perceptions and Motivation about Using M-Learning (N = 105)

	Item Responses (%)				
Items	***SD***	***D***	***N***	***A***	***SA***
M-Learning Perception:					
Improves communication	4.8	1.9	4.8	32.4	56.2
Encourages new learning opportunities	1.0	4.8	10.5	42.9	41.0
Is expensive	6.7	1.0	10.5	18.1	63.8
Mobility of M-Learning is useful	1.0	3.3	7.6	28.6	49.5
M-Learning Motivation:					
Enhances motivation to learn	3.8	5.7	8.6	31.4	50.5
Encourages focus to study	8.6	9.5	7.6	24.8	49.5
Should be extended to other courses	3.8	6.7	17.1	22.9	49.5
Makes learning more enjoyable	10.5	7.6	12.4	38.1	31.4

Key. SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree.

In general, it can be concluded that the respondents viewed mobile learning as beneficial and useful. These positive perceptions of students contribute considerably to future implementation of mobile learning in education in general and in higher education in particular.

3.2 Analysis of Students Participation in Activities related to the Course

The second objective of the study was to analyze the opinions of students about the different types of mobile learning activities used in the course. Table II shows the percentages associated with the second research question: participation in the course activities. The responses are listed from always (A) to never (N).

Analysis of the metrics always (A), very often (VO) and often (O), indicate that the Facebook activities were the most interesting to the respondents. Specifically, 86.7% of the respondents stated they did the learning activities on Facebook, and 84.7% declared that they read other students' Facebook postings. In addition, 81.9% confirmed that they posted the answer to the learning activities. This high level of participation indicates that students appreciated the activities posted in Facebook as a mean to support their learning.

For the SMS activities, 82.8 % of the respondents indicated that they answered the SMS questions, and 76.1% indicated that they went back to the course content to answer the text messages. This shows that students responded positively to the text messages by completing the related activities. However, only 47.6% confirmed that they sent answers using SMS, and just 34.3% sent a SMS to the teacher requesting help. A reason why students did not send text messages may be related to the expense of SMS. Another reason is that students prefer to post messages on Facebook when seeking help from their teacher.

TABLE II.
STUDENT PARTICIPATION IN ACTIVITIES RELATED TO THE COURSE (N = 105)

	Response %				
Items	***A***	***VO***	***O***	***S***	***N***
Activity:					
Reading SMS message	70.5	31.4	8.6	5.7	3.8
Taking part in Facebook discussion	61.9	15.2	14.3	6.7	1.9
Doing the learning activities on Facebook	58.1	8.1	10.5	7.5	5.7
Reading other students Facebook postings	51.4	17.1	16.2	10.5	4.8
Answering SMS question	43.8	29.5	9.5	9.5	7.6
Using learning activities for revision	41.9	26.7	10.7	5.7	15.2
Reading course before going to Facebook	41.0	19.0	10.5	19.0	10.0
Posting the answer to learning activities	40.0	25.7	16.2	10.5	7.6
Going back to course to answer SMS	39.0	21.9	15.2	11.4	12.4
Post messages to share information	33.3	19.0	10.5	17.1	20.0
Posting messages to teacher for help	29.5	14.3	15.2	13.3	27.6

Using the internet to do learning activities	28.6	9.5	14.3	6.2	31.4
Sending answers using SMS	21.0	17.1	9.5	16.2	36.2
Sending SMS to teacher for help	13.3	8.6	12.4	12.4	53.3

Key. A = Always; VO = Very Often; O = Often; S = Sometimes; N = Never

Overall, the majority of the students participated in the mobile learning activities related to the course. Both SMS and Facebook activities were useful mobile learning activities for engaging and motivating students to take part to their learning processes in order to achieve learning outcomes.

3.3 Analysis of Students evaluation of the Course using M-learning

The third objective of the study was to determine whether mobile learning using SMS and Facebook enhanced students' understanding of the course content and improved their learning in order to achieve learning outcomes. Table III provides the results from the questions asking the students' about their appraisal of M-Learning primarily associated with the use of SMS and Facebook.

Part (a) of the Table III lists the percentage of the responses from strongly disagree (SD) to strongly agree (SA). The items based on the highest percentage are listed in the strongly agree column. Students responded positively to all six items indicating that mobile learning using SMS and Facebook enhanced students learning. "M-Learning was designed to facilitate my learning" had the highest level of agreement with 75% selecting 'Strongly agree' while only 9% selected 'Strongly disagree.' This demonstrates that the design of the course contributed considerably to the acceptance of mobile learning by the students.

As for the perceived effectiveness of mobile learning activities, 70.5% of the students selected 'Strongly agree' when asked whether SMS and Facebook were good supplements for learning.Additionally,65.7% selected 'Strongly agree' to the question of whether working in a group helped them better understand the course, and 61% selected 'Strongly agree' when asked whether SMS and Facebook assisted them in learning. In terms of mobility, 60% selected 'Strongly agree' when asked whether learning anywhere and anytime improved their study habits. Finally, 56.2% selected 'Strongly agree' when asked whether SMS helped them to focus on important course content.

Part (b) of Table III lists the items based on the highest percentage of student agreement on the appraisal of the course using mobile learning. The table shows that the majority of the students found that mobile learning activities enhanced their appraisal of the course. Specifically, 94.3% of the respondents said 'yes' when asked whether SMS and Facebook activities enhanced their understanding of the course content.Additionally,92.4% agreed that being in touch with the teacher and classmates facilitated their learning. Finally, 84.8%indicated that M-learning helped them succeed on course exams, and 81% believed that SMS helped them to remember main course concepts more easily.

Overall, it can be concluded that the students' overall appraisal of M-learning was favorable in respect to facilitating learning using SMS and Facebook. The majority of students indicated that SMS and Facebook were good supplements for learning and also enhanced the understanding of the

course content. Moreover, most of the students found that working in a group helped to better understand the course. They also indicated that being able to work anywhere and at any time improved study habits. From this point of view, students became more engaged learners. As a result of these findings, mobile learning, if properly designed, has been shown to have considerable potential for enhancing students' understanding of the course and for improving learning in order to achieve learning outcomes.

TABLE III.
Overall Student Evaluation of the Course Using M-Learning
(N = 105)

	Response %				
Internet Technology Course	***SD***	***D***	***N***	***A***	***SA***
Part (a)					
M-Learning was designed to facilitate my learning	4.8	1.9	4.8	32.4	56.2
SMS and Facebook were good supplements for learning	1	4.8	10.5	42.9	41
Working in a group helped better understand the course	6.7	1	10.5	18.1	63.8
Using SMS and Facebook assisted me to learn	1	3.3	7.6	28.6	49.5
Learning anywhere anytime improved my study habits	6.7	8.6	8.6	16.2	60
SMS helped focus on the important content of the course	5.7	6.7	8.6	22.9	56.2
Part (b):				***Yes***	***No***
SMS and Facebook activities enhanced the understanding of the course content				94.3	5.7
Being in touch with the teacher and classmates facilitated learning				92.4	7.6
M-learning helped me to succeed on course exams				84.2	15.2
SMS helped to remember main course concepts more easily				81.0	19.0

Key. SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree

4 CONCLUSION AND SUGGESTIONS FOR FUTURE RESEARCH

This paper investigated student attitudes and perceptions toward the effectiveness of mobile learning using SMS and Facebook at the University of Djibouti. Findings from this study reveal that

in general mobile learning was well perceived by students. This positive perception led to high levels of student participation in the mobile learning activities. The student responses to the questionnaire indicated they changed from passive learners to engaged learners.

The results of this research demonstrate that mobile learning using SMS and Facebook is an effective means to enhance the understanding of the course, assist learners to better manage their studies and facilitate their learning. Furthermore, the results reveal that mobile learning brought considerable potential to promote collaborative learning, to engage learners in the learning process, and to enhance student learning. The majority of student respondents suggested that mobile learning should be continued in the course and be integrated into their other courses as well. Thus, the findings suggest that students are ready to embark on mobile learning as part of the learning process, and it is the appropriate time for institutions of higher education to implement mobile learning as a supplemental tool to support learning.

Finally, this research can serve a guide for the formulation of a framework for mobile learning with the goal of the enhancing learning in higher education. The framework will contribute a strong foundation for developing further mobile learning applications as a supplement to the existing learning environment in higher education in general and at the University of Djibouti in particular. In addition, future research should investigate adapting the different types of learning activities for other courses that do not focus on technology. Doing so would serve to assess the degree to which these findings are mirrored in other courses.

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