USE OF MOBILE DEVICES BY STUDENTS TO SUPPORT LEARNING

IN UNIVERSITIES: A CASE OF MUNI UNIVERSITY

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ABSTRACT

It's a requirement in admission for every student to come with a mobile device for any programme admitted. The main objective of this study was to establish how the students use mobile devices in lecture rooms /classroom this was achieved by answering the following research questions: which mobile devices are owned by students? what are benefits of using mobile devices by students?and how mobile devices are used for learning?Quantitative design was employed using questionnaires containing a five (5) Likert scale items ranging from strongly agree, agree, neutral, disagree-strongly disagree and open-ended items was utilized in this study to obtain quantitative information to answer the research questions: A total population of 331 was considered and sample size of 181 was obtained using Krejcie and Morgan table, stratified sampling was used to collect data from each stratum and data was analyzed using SPSS Version 16. The reliability of the data collected was tested using the Cronbach's reliability test coefficient where the overall value of all the options was on average 0.65 which was beyond recommended 0.6 for an instrument to be declared reliable. The findings showed that, 56.2% (91) respondents use smart phones, 40.7 %(66) use Laptops in class and only 1.2 %(2) use kindle in class room while no student indicated that he/she uses Ipad or PDA in classroom or lecture room. In terms of the benefits of using mobile devices, students the following among the top four (4) benefits; easy to access information, storage of information, mobility of the device and use of social media but cost effective and security of information were ranked last. The findings also showed students use mobile devices to access course materials, doing class work, send and receive e-mails and taking and sharing of notes but virtual classroom, discussion forums and using pre-recorded lecturers with PowerPoint were ranked among the last three (3). This study recommends that Smartphone's and mobile devices should be allowed to use by students, lecturer to start virtual classroom, discussion forums and using pre-recorded lecturers with PowerPoint so that the students can also benefit from these functionalities since they were ranked among the last three(3) services not used.

KEYWORDS: Usage, Mobile Devices, Learning and Muni University.

INTRODUCTION

The increased diffusion of mobile devices into every aspect of human lives is on the rise. Mobile devices have become a major part of people's everyday life thank to the innovation of mobile application. There are a lot of mobile application that are used for general to specific Purposes. Hence, end users use mobile applications for both personal and professional aspects [1].

A mobile device is any portable electronic device that can connect to a network (such as the Internet) [2]. Characteristics of aforementioned mobile devices are their small size (small enough to be handheld), they are lightweight (they weigh less than a kilo) and have a display screen with touch input or a small keyboard [3]. Mobile devices are now equipped with high performance hardware such as quad-core CPU (Central Processing Unit), high performance GPU (Graphic Processing Unit), high speed flash storage, and etc. Moreover, the price of this devices are now affordable for average users [1].

Mobile devices such as laptops, tablet PCs, PDAs, and smart phones all have great potential as classroom learning tools: many students for example use them to take class notes, while others use them to record lectures or parts of lectures for later reference.

The pedagogy used to teach with mobile devices such as tablet computers, smartphones and MP3/4 players is referred to as M-Learning [4], [5], [6].

Now we are witnessing the explosion of mobile learning (m-learning) in all fields of education.

According to [7], mobile learning is "any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of the learning opportunities offered by mobile technologies" (pg 6).

Mobile learning is that learners can learn at anytime and anywhere through the use of wireless internet and mobile devices, such as mobile phones, Personal Digital Assistants (PDAs), smart phones, pads and digital audio player [8]. Mobile learning allows students acquiring their learning materials anywhere and anytime using mobile technologies and the internet [3]. Despite the tremendous growth and potential of the mobile devices and networks, mobile learning is still in their infancy.

In this paper we present research results of a survey conducted among students enrolled for four courses (Bachelor of Science in Information Technology, Bachelor of Information Systems, Bachelor of Science in Nursing and Bachelor of Science in Education) in Muni university about the use of mobile devices by students to support learning in university.   The benefits of using mobile devices by students in learning is identified and finally, the way how mobile devices are used for learning is explored and presented in the paper.

MOBILE DEVICES OWNED BY STUDENTS

Muni University (MU), a public university was established in 2013 by Act of Parliament and currently the university has only one faculty, Technoscience with one department of Computer and Information Science (CIS). Since its inception, the university has witnessed a significantly high number of students as compared to other newly established universities and fewer staff members who with higher workloads. To overcome this challenge, the university introduced the policy that before students are registered they must have mobile device like laptop, kindle, tablets or smartphone which they can use for learning. The students use these mobile devices in lecture room for various purposes. Similarly, according to [3], the study on comparison between possessing a tablet towards possessing a smartphone shows that more study participants possessed a smartphone (83.7%) in comparison to a tablet (18.7%) while Research carried out in The Nelson Mandela Metropolitan University (NMMU) showed that student smartphone usage increased from approximately 40% in 2014 to approximately 85% in 2015. Furthermore, laptops which were primarily used by students in 2014 were surpassed by smartphones and tablets in 2015 [9]. The research carried out on Mobile Culture in College Lectures: Instructors' and Students' Perspectives, about 91% of the students' own laptops and all (100%) own cell phones and use them in class quite intensively for non-academic uses during lectures [10]. According to research carried out in University of Southern Queensland – Australia, the findings indicated that students access to smartphones and tablet computers is high across all groups of students, although several significant differences are apparent [11]. The viability and suitability of mobile learning is a topic of intense debate in Australia, where 65 per cent of people own a Smartphone, 37 per cent own a tablet, and around a third of the population owns both [12]. Younger people are more likely to own Smartphone's, with some 86 per cent of people in the 18 to 24-year-old age group and 91 per cent of people in the 25 to 29-year-old age group owning at least one [12].

BENEFITS OF USING MOBILE DEVICES BY STUDENTS

The benefits of using mobile devices by students include the following:

Researchers have shown that personal mobile devices in the classroom can work as catalysts to promote collaboration, interaction and students' interest in course content and tasks as well as facilitate formative and summative assessment activities [13], [14], [15]. The integration of mobile devices in teaching and learning will create opportunities for students to be in contact with outside world such as their families [16]. The potential of these devices facilitate engagement and participation in discussion when used in the classroom setting, it allows students to adapt course content to fit their learning style and pace, the visual and tactile learning opportunities presented by these devices made the learning experience more "hands-on" [17]. Study by [18], found that the use of tablet computers facilitates their ability to understand key concepts and personalize their learning experience, helped to create a cooperative learning environment among students. Students were able to share information more efficiently, formulate responses to questions, and increase their sense of accountability. [19] found that the capabilities of these devices encourage learning and engagement. This is evident in students' reports of using their mobile devices to access course content and use 'apps' to support their learning. Notably, these devices played a significant role in students' creation and utility of study materials. The touch screen capabilities of mobile devices allow students to enlarge or rotate images with ease, thereby making learning more hands on [19], [20].

[21] depicts many benefits to the students if we allow them to use their personal smartphones in classrooms and some of

them are listed below:

- *Preparing Students for the Future:* Students knowing how to use a smartphone is getting an important part in this connected world. In many rural areas even if they own a smartphone they don't know how to actually use many of its features. If student starts using the device continuously, they will get more close to the new trends and technologies.

- *Up-to-date Learning:* The lapsed trend of searching for the particulars in books and other references has gone away. If students have mobile phones in classroom he can instantly access the latest information about anything and everything, and thus increases the motivation and engagement level of students in their studies. Also, they will get instant access to information about new technologies in their interested fields and they can share this information to other students through smart phone. Even though the lecturing is one of the ways of conveying information to students, this way of teaching won't hold their attention very long. Thus this way of sharing information will greatly help students to widen their knowledge.

- *Alternative to Textbooks:* The old way of going to libraries, searching for books, contents, topics etc., everything has gone away. Students knowledge will increase only if they get updated, knowledgeable information of anything and everything instantly. Many textbooks will not contain relevant information a student needs. Library books couldn't able to provide updated information as like a smart phones do. Also, they can keep digital textbooks in .docx, .pdf etc. formats or even as e-books in their smart phone. This is how smartphone replaces pen-drives, external hard-disks and other data storage devices.

- *Learning goes outside of classroom:* Learning will happen not only from classrooms but also from home too. Research has studied that learning will be more engaging if they study with newer technologies like Smartphone [22]. If they start using smart phones in classrooms it will extend their studies to more fields. They can carry notes, videos for references and go through it whenever they are free. In classroom, if the students are engaged and excited in learning, then they are more fairly to continue learning outside of the classroom. They can do it with smart phones.

- *Collaborative Learning:* Through smartphone devices students can easily share materials of their subjects, relevant information about their courses easily. Today 'Computer Supported Collaborative Learning' (CSCL) plays a vital role in learning. We can introduce a new term called 'Smart phone Supported Collaborative Learning' (SSCL) in which the students can learn collaboratively using smart phones. The traditional way of 'combined study' can also be achieved through this.

HOW MOBILE DEVICES ARE USED FOR LEARNING

Several researches had been conducted with the aim to ascertain how mobile devices are used for learning. Among which include the following:

One of the researches is a study of using mobile devices to support learning of university students at Islamic Azad University of South Tehran [23]. Study was carried out during academic year 2011/2012 on 284 students who have been randomly selected among 2140 students of Psychology and Educational Science at aforementioned university. That particular study showed that the most frequent use of mobile devices for educational purposes by university students are activities which include using calculator, sending/receiving educational SMS and dictionary use. Activities which were rated very low were: usage of the internet for educational purposes (22.2% students used it very little and 31.7% not at all), usage of educational software (23.0% students used educational software on their mobile phone very little and 30.4% not at all), and sending/receiving educational e-mail (40.1% students didn't use that activity at all). On average, 24.4% of students didn't use mobile phone for any educational activity. Study also showed that female students, in comparison to their male colleagues, are more likely to use mobile devices in educational purposes [23].

Another study was about impact of mobile learning on students' learning behaviors and performance. The study was carried out at Network Education College, Shanghai Jiaotong University, among 178 students [24]. One hundred and forty- three students participated in activities of mobile learning, of which 89 students participated in all activities of mobile learning. That study showed that students use their mobile devices for the following learning activities: discussing course content with classmates (85% of the participants), asking classmates questions (54%), asking the instructor or teaching assistant questions (90%), answering questions from the instructor (82%), answering questions from classmates (52%), exchanging ideas with classmates about the course material (38%). Students also had some suggestions for improving the mobile learning content, for example: more discussions through emails and forums to accommodate students with special needs, the mobile learning content must have a variety of topics and formats in addition to quizzes and situational dialogues [24].

Study by [25], [26], for instance, discussed several ways how students used their mobile devices in the classroom to support learning. For example, the study noted that students "were able to communicate and collaborate about course content by using mobile computing devices to text message and email" (p. 22).

In [27], a selection of the most innovative and intriguing case studies were selected for review and meta-ethnography, which yielded the following general categories of usage of mobile devices in educational context:

- Accessing Learning - The mobile device is used as a tool that lowers the barrier of entry to education for a learner who faces constraints due to limitations such as physical ability, monetary resources, or geographical distance.

- Enhancing Learning - The Mobile device is used in a manner that provides a meaningful difference in learning achievement when compared to non-use scenarios.

- Managing Learning - The mobile device is used in a manner that does not directly impact learning but reduces logistical overhead or increases administrative efficiency.

According to the study by [28], The majority of students utilize their mobile devices as learning tools. Students

turn their mobile devices into learning tools through the use of mobile applications, or "apps". A majority of students reported the use of the Quizlet LLC "app" as a study tool. Through the use of "apps", students are able to use their mobile devices as communication tools. Applications such as Blackboard enable students to access course content to perform actions such as grade viewing, viewing and posting discussion board threads, as well as uploading assignments and downloading pdf files. Other functions include accessing school e-mail, student bills, and class schedules, among other options. Students reported using the Google Mail "app" to access their student e-mail in order to receive and send communications to professors and classmates. The ability to retrieve e-mail through mobile devices enables students to stay informed, especially with regards to changes in deadlines, course syllabi, meetings, lectures, and trainings. Further, instant access to e-mail facilitates prompt response to faculty, thereby improving communication.

Nowadays many students possess a smartphone or a tablet and use it for numerous everyday activities: communication, web browsing, tweeting, status sharing, video watching, recording or uploading, task scheduling or mobile gaming. Mobile technologies are attractive and easy way to maintain literacy skills and gain constant access to learning materials [3].

Laptops and mobile devices can be used to enhance learning and designing course activities and assignments that use mobile devices to deepen students' engagement with the learning process is one way to harness the power of these tools as academic resources, rather than viewing them only as distractions [29].

The Penn State University in USA recently adopted a web based system called **e2Campus** for creating a revolutionary new wireless campus news service to be offered to students, faculty and staff. Penn State Live now sends instant SMS text messages of news and emergency information to subscribers' mobile devices using the **e2Campus** Web-based communication system.

The new framework such as **e2Campus** should enable all participants to communicate effectively in the teaching-learning processes [30]. Similar services are now implemented in several other universities in USA.

These smart devices are being used by them for most of the working hours for communication and edutainment. Mobile devices currently being sold in the market comes with a variety of rich technical features that could be easily exploited by the universities to enhance learning strategies and add value to student's education. For example, using SMS features of the mobile devices the universities could notify students about cancellation of classes on a particular day, send a notification of change in the schedule, advertise a new class via an exciting multimedia-SMS or provide content for M-Learning [31].

The last study describes results of m-learning implementation into university course "Introduction to Marketing" carried out in 2011 at the university in Austria [32]. Mobile learning modules of the course consisted of searching and reading the documents, communication with the peers, participating in videoconferences, and preparing project presentations and documentation. Students were given tablets so they could actively participate in mobile learning modules, but they could also use smartphones to achieve learning goals. Results of the study showed that usage of mobile learning modules has led to better student performance at the course. The authors of the study conclude that m-learning could encourage students to actively participate in course activities but it requires some flexibility on the part of the teacher

and focus on benefits rather than on the restrictions and additional workload [32].

METHODOLOGY

Design: Quantitative designed was employed. Through quantitative data analysis, information regarding frequency, mobile devices used the benefits of using mobile devices to students and how mobile devices are used for learning.

A questionnaire containing a five (5) Likert scale items ranging from Strongly Agree, Agree, Neutral, Disagree-Strongly Disagree and open-ended items was utilized in this study to obtain quantitative information to answer the research questions: Which mobile devices are owned by students? What are benefits of using mobile devices by students?and how mobile devices are used for learning?

The population comprised of all students of muni university from the faculty of Technoscience totaling to 331 and a sample of 181 was obtained using a table of Krejcie and Morgan which was further verified by using sloven's formula.

Stratified sampling was used to get the respondents; sampling fraction of 0.546 was used to get respective samples from each stratum as shown below in the table.

Table 1: Sample of the Respondent

No	Programme	Population	Sample
1	BSc.ED	64	35
2	BNS	30	16
3	ISM1	29	16
4	ISM2	56	31
5	ISM3	44	24
6	ITM1	20	11
7	ITM2	52	0
8	ITM3	36	20
		331	**181**

Data Analysis

The questionnaire was administered to students in class and they were requested to take approximately ten minutes for completion. Data from the questionnaire was analyzed using SPSSv.16 software to compute descriptive statistics, frequency tables and means of the respondents.

RESULTS

Table 2

No	Item	Categories	Percentage
1	Gender	Male	125
		Female	34
2	Programme	Bachelor Information Systems	69
		BSc. Information Technology	57
		Bachelor of Midwifery and Nursing	12
		BSc. Education	24
3	Year	1st Year	71
		2nd Year	55
		3rd Year	36

From 181 questionnaires distributed, only 159 questionnaires were returned representing 89% response rate. The respondents comprised of 125 male students and 34 female students where 69 respondents were doing Bachelor of Information systems, 57 respondents were taking Bachelor of Science in Information Technology, and 12 respondents were undertaking Bachelor of Science of Midwifery & Nursing and 24 respondents were from Bachelor of Science with Education. Of 159 respondents 71 were from 1st Year, 55 from 2nd Year and 36 from 3rd Year.

Table 3: Mobile Device Mostly Frequently Used in Lecture Rooms

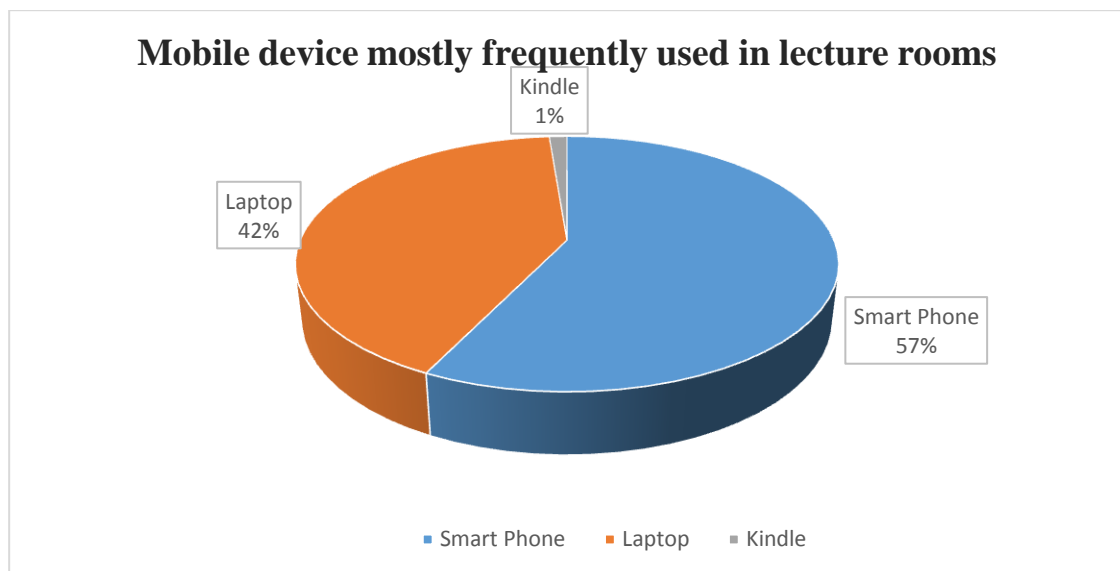|	Mobile Device	Frequency	Percent (%)
1	Smart Phone	91	56.2
2	Laptop	66	40.7
3	Kindle	2	1.2
TOTAL		**159**	

Figure 1: Mobile device mostly frequently used in lecture rooms

The study also showed that Smartphone was the most frequently used mobile device in classroom/Lecture rooms with 91(56.2 %) followed by Laptops 66 (40.7%) with only 2(1.2 %) using Kindle while the rest were missing.

Table 4: Cross Tabulation of Programme and Mobile Device Used

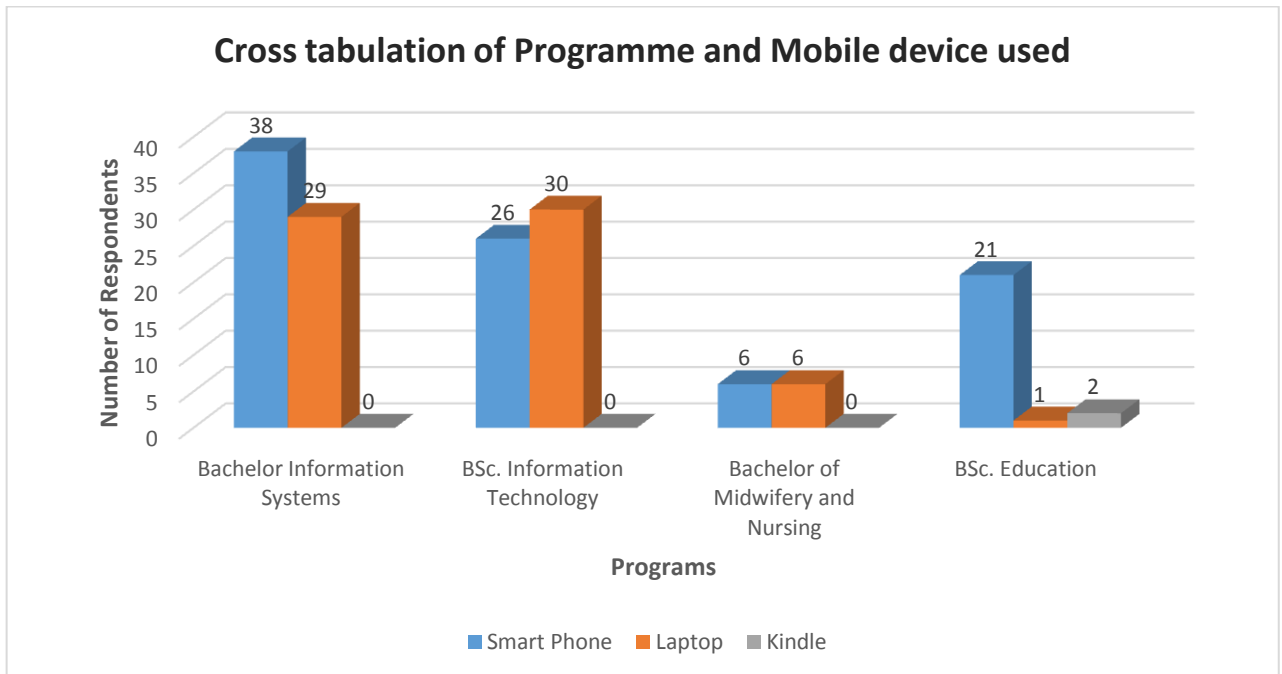| No	Programme	Smart Phone	Laptop	Kindle	Total
1	Bachelor Information Systems	38	29	0	67
2	BSc. Information Technology	26	30	0	56
3	Bachelor of Midwifery and Nursing	6	6	0	12
4	BSc. Education	21	1	2	24
Total		**91**	**66**	**2**	**159**

Figure 2: Cross tabulation of Programme and Mobile device used

The study found out that Bachelor Information Systems respondents were using smartphone (38) more than the laptops (29), BSc. Information Technology respondents were using more laptops (30) compared smart phones (26), of the 12 respondents from Bachelor of Midwifery and Nursing Smartphone users were the same number with laptop users (6) and of 24 respondents BSc. Education 21 use phones, 1 use laptops and only 2 used kindle.

Benefits of Using Mobile Devices

The table below shows the ranking of the benefits of using mobile devices to the students using the means where 1 represented strongly disagree to 5 which represented strongly disagrees.

Table 5

No	Item	N	Mean	Std. Deviation	Rank
1	Storage of Information	160	1.37	0.71	**1**
2	Easy Access of Information	157	1.41	0.69	**2**
3	Mobility of the device	154	1.50	0.83	**3**
4	Use of Social Media	157	1.94	1.10	**4**
5	Security of Information	151	2.04	1.06	**5**
6	Cost Effective	154	2.38	1.42	**6**

Using the mean ranking, students ranked storage of information as the top most importance of using mobile devices (mean=1.37) followed by access to information (mean=1.41), mobility of the device was ranked third (mean=1.50), use of social media was ranked fourth (mean=1.94) while security of information (mean=2.04) and cost effectiveness (mean=2.38) were ranked the last benefits. This shows that students used mobile devices mostly for storage of information to enable easy access to information given that they are portable and can easily access social media from anywhere.

How Mobile Devices are Used by Students for Learning.

The table below shows the ranking using the mean, how mobile devices are used for learning by students ranging from 1 strongly disagree to 5 which represented strongly disagrees.

Table 6:

No	Item	N	Mean	Std. Deviation	Rank
1	Access to course materials	159	1.60	0.90	1
2	Send and Receive E-mail	159	1.85	1.07	2
3	Doing class work	155	1.88	1.02	3
4	Take and Share Pictures of Notes	158	1.95	1.07	4
5	Pre-recorded lectures with PowerPoint slides	154	2.23	1.26	5
6	Chatting on Social Networks	154	2.27	1.32	6
7	Discussion forums	157	2.31	1.22	7
8	Live lecture capture	150	2.59	1.46	8
9	Self-marking quizzes	154	2.86	1.55	9
10	Virtual classrooms	155	2.96	1.46	10

The findings showed students use mobile devices to access course materials (mean=1.60, Rank 1), doing class work (mean=1.85, Rank 2), send and receive e-mails (mean=1.88, Rank 3) and taking and sharing of notes (Mean=1.95, Rank 4) while virtualclassroom(mean=2.96) was ranked as the last followed by, self-marking quizzes (mean 2.86) was ranked second last and live lecture capture were least used services on mobile devices.

CONCLUSIONS

Although Muni University has been implementing the usage of Mobile devices for learning by students, this study found that there are still some challenges that need to be addressed in order to realize the expected benefits. This study recommends that mobile devices should be allowed to be used by students, lecturer to start virtual classroom, discussion forums and using pre-recorded lecturers with PowerPoint so that the students can also benefit from these functionalities since they were ranked among the last three (3) services not used.

Notwithstanding these recommendations, it is becoming increasing difficult to ignore the benefits of mobile devices which include, storage of information, access to information, mobility of the device, use of social media. It is also important to know how students have been using the mobile devices for learning among which are: To access course materials, doing class work, send and receive e-mails, taking and sharing of notes, virtual classroom.

ACKNOWLEDGEMENTS

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