MOBILE APPLICATION: DIGITIZED INSTRUCTIONAL MATERIAL IN EDF-204 STATISTICS IN EDUCATION

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Abstract - Mobile technologies facilitates communication with other people any time in any place. Also, it enables easy access of information and data sharing worldwide. Consequently, mobile applications are embedded in the teaching and learning process of teachers and students. Subsequently, the evolution of newer versions of mobile phone technology and development of such academic related software applications are evidences of innovations in the teaching and learning process. So, a project study "Mobile Application: Digitized Instructional Materials in EDF 204-Statistics in Education" was conducted. Specifically the following objectives gave better perspective of the study: to assess the level of readiness and acceptability of the graduate students on the use of digitized instructional materials using mobile phones; to develop a mobile application on Statistics in Education; to determine the level of usability of the developed mobile application of Statistics in Education; and to test the significance of the developed mobile application on Statistics in Education based on the hypothetical value. Descriptive and developmental research designs were utilized. Survey questionnaires were used to gather data on the level of readiness and acceptability of the graduate students on the use of digitized instructional materials using mobile phones. In the development of the mobile application in EDF 204: Statistics in Education, the researcher used the Rapid Application Development (RAD) model. The results showed readiness on the use of mobile application. The development of mobile application software was realized through the RAD model. Furthermore, developed mobile application was very satisfactorily usable. Also revealed significant difference with respect to the hypothetical value.

Index Terms: Mobile Application, Digitized Instructional Material, EDF 204 – Statistics in Education, MLearning

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1 INTRODUCTION

The revolution of the mobile phone is staked out in the whole world. Portability of such gadgets like phones and multimedia devices manifest evidence and variety of information sources are available at any locale. In the Philippines, education is an incomparable treasure to any type of material thing a person can acquire. Educators zest on exploring different methodologies to impart lessons the simplest, accessible, portable and convenient learning for students.

Mobile technologies are part and parcel to the lives of most teachers and students. It facilitates communication with other people any time at any place. It enables easy access of information and data sharing worldwide. Newer versions of the mobile phone technology are evident potential to aid teaching and learning the process.

M-learning (mobile-learning) is considered as the next generation of e-learning using mobile technologies. It has been a viable alternative for online learning. Teachers and students' awareness of such technology should be given priority to convey with the current trends in education (http://goo.gl/KDIKDf).

Mobile computing/communication devices offer a unique opportunity for teachers and students in different kinds of instructional settings to capitalize on the flexibility and freedom afforded by these devices. However, these benefits demand new pedagogies and new approaches to delivering and facilitating instruction (http://goo.gl/ttQ4C1).

Currently, various technologies are used such as Web-based outreach, distance education, digital presentations, and online resources. By further incorporating paperless processes into our everyday work, we can increase efficiency and expand communication with our communities.

Additionally, a paperless system generates time and cost savings. In current budgetary shortfalls, improved faculty/staff efficiency is crucial as we are faced with accomplishing more with less. Implementing a paperless system allows employees to be more productive, complete more work, and thus increase the services provided to the community (Ashby, 2011).

Innovating such technology with an eco-compliant standard is really a challenge. Inside the classroom would be one of the best references to start with. But, are they ready? If so, is it beneficial? In this regard, the researcher is interested in conducting a study on the readiness of graduate students on the use of the mobile application and development of digitized instructional material in EDF 204: Statistics in Education.

In particular, technologies such 'mobile' generally means portable and personal gadget, like a cell phone. A lot of examples of learning with mobile technologies are apt to this description. Personal digital assistants and mobile phones are the most commonly used technologies for mobile learning, but they exist within the larger space of possible mobile technologies that can be broadly categorized in different dimensions of mobile learning.

From the behaviorist model, learning is thought to be best facilitated through the reinforcement of an association between a particular stimulus and a response. Applying this to educational technology, computer-aided learning is the presentation of a problem (stimulus) followed by the contribution on the part of the learner of the solution (response). Feedback from the system then provides the reinforcement. In a mobile learning context, classroom response systems like 'Class talk' (Dufresne et al 1996) and 'Qwizdom' (Qwizdom: Assessment for Learning in the Classroom 2003) fall in this category, as well as examples of content delivery by text messages to mobile phones (BBC Bitesize 2003,2004; Thornton and Houser 2004).

As postulated in situated learning, it can be enhanced by ensuring that it takes place in an authentic context. Mobile devic-

es are especially well suited to context-aware applications simply because they are available in different contexts, and so can draw on those contexts to enhance the learning activity. The museum and gallery sector has been on the forefront of context-aware mobile computing by providing additional information about exhibits and displays based on the visitor's location within them. Examples of mobile systems that situate learning in authentic contexts include the Ambient Wood (Rogers et al 2002), MOBIlearn (Lonsdale et al 2003, 2004), and the multimedia tours offered at the Tate Modern (Proctor and Burton 2003).

Collaborative learning has sprung out from research on computer-supported collaborative work and learning (CSCW/L) and is based on the role of social interactions in the process of learning. Many new approaches to thinking about learning developed in the 1990s, most of which are rooted in Vygotsky's sociocultural psychology (Vygotsky 1978), including activity theory (see for example Engeström 1987). Though not traditionally linked with collaborative learning, another theory that is particularly relevant to our consideration of collaboration using mobile devices is conversation theory (Pask 1976), which describes learning in terms of conversations between different systems of knowledge. Mobile devices can support mobile computer supported collaborative learning (MCSCL) by providing another means of coordination without attempting to replace any human-human interactions, as compared to say, online discussion boards which substitute for face-to-face discussions (Zurita et al 2003; Cortez et al 2004; Zurita and Nussbaum 2004).

Research on informal and lifelong learning recognizes that learning happens all of the time and is influenced both by our environment and the particular situations we are faced with. Informal learning may be intentional, for example, through intensive, significant and deliberate learning 'projects' (Tough 1971), or it may be accidental, by acquiring information through conversations, TV and newspapers, observing the world or even experiencing an accident or embarrassing situation. Such a broad view of learning takes it outside the classroom and, by default, embeds learning in everyday life, thus emphasizing the value of mobile technologies in supporting it. An example in this category is the system described by Wood et al (2003) where breast cancer patients are enabled to access trustworthy information about their condition, to communicate with other patients, and to keep track of the issues that concern them.

Education as a process relies on a great deal of coordination of learners and resources. Mobile devices can be used by teachers for attendance reporting, reviewing student marks, general access of central school data, and managing their schedules more effectively. In higher education, mobile devices can provide course material to students, including due dates for assignments and information about timetable and room changes. Examples of using mobile technologies in this context include a mobile learning organizer which has been developed and tested at the University of Birmingham (Holme and Sharples 2002; Sharples et al 2003; Corlett et al 2004), and the use of mobile phone technologies to support computing students (Riordan and Traxler 2003; Traxler and Riordan 2003)

Mobile technologies are becoming more entrenched and global with enhanced features for rich and friendly social interactions, context awareness and internet connectivity. Any technologies can have a great contribution on teaching and learning process. Learning would probably go beyond outside the four corners of the classroom and into the learner's milieu, both real and virtual settings, thus becoming more situated, personal, collaborative and lifelong. The challenge now here is to discover how to use mobile technologies to adapt learning as a chore to the point where considered as habit of every individual.
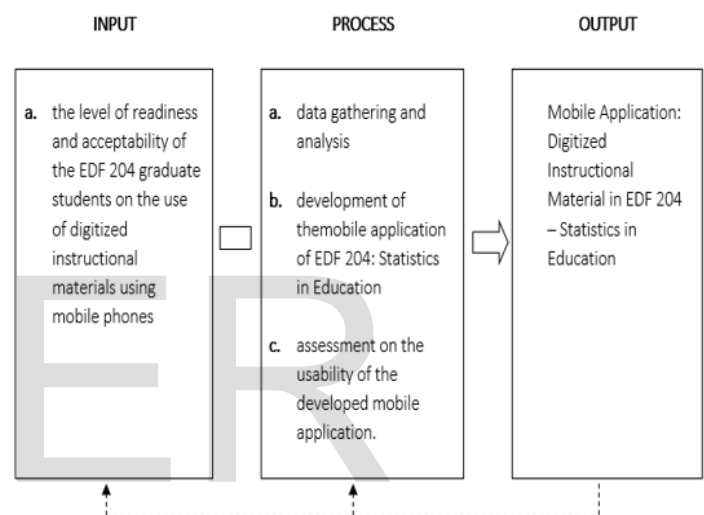
1.1 Paradigm

Figure 1. The Research Paradigm of the Study

1.2 Statement of Objectives

This study aimed to develop a mobile application in EDF 204 and to determine its usability, specifically:

1. To assess the level of readiness and acceptability of the graduate students on the use of digitized instructional materials using mobile phones;
2. To develop a mobile application on Statistics in Education;
3. To determine the level of usability of the developed mobile application of Statistics in Education; and
4. To test the significance of the developed mobile application on Statistics in Education.

2 METHOD

Descriptive and developmental research designs were utilized in this study. On the assessment of the readiness and acceptability of the graduate students on the use of digitized instructional materials using mobile phones and likewise on the usability of the mobile application are descriptively treated.

Students who were enrolled in EDF 204-Statistics in Education of the College of Graduate Studies, DMMMSU-SLUC

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were the respondents of the study. They accomplished two sets of survey questionnaires; one was in assessing the readiness and acceptability and second was in testing the usability of the developed mobile application.

Survey questionnaires were used to gather data on the level of readiness and acceptability of the graduate students on the use of digitized instructional materials using mobile phones. Likewise, on the level of usability of the developed mobile application in EDF 204: Statistics in Education.

In the development of the mobile application in EDF 204: Statistics in Education, the researcher used the Rapid Application Development (RAD) model which consists of four phases: requirements planning, user design, and construction and cutover. Below are the diagram of the said model and a brief description of each phase:
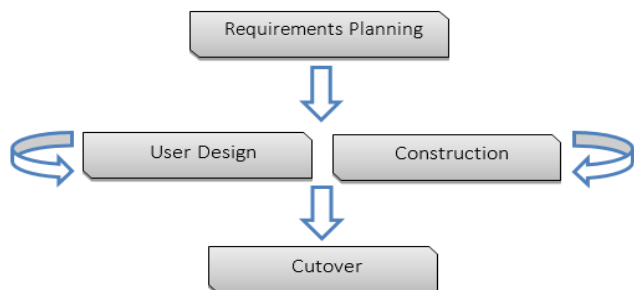

Figure 1. RAD Model

Requirements Planning phase. The researcher will make use of the course syllabus in determining the contents and methodology be assimilated in the mobile application to be developed.

User Design phase. After the first phase, the researcher will create a detailed user interface, enhanced entity-relationship and use case diagram. A major aspect of the design is the structuring, organizing, and formatting of the information that are contained in the proposed system's database. Moreover, the researchers will design the database which will specify the content of records and files that are included and procedures for storing and accessing of files.

Construction phase. Programming will take place in this phase. The researcher will build the proposed system through mobile application development tools such Content Management System that use PHP, HTML, MySQL, and CSS. The output will be a working mobile application using the android platform.

Cutover phase. At this phase, the researcher will assess whether the system developed satisfied the software's requirements. By doing so, the researcher will test its functionality to ensure the performance of different features caters to the requirements of the mobile application.

Analysis of Data

Weighted mean was applied on the level of readiness and acceptability of the graduate students on the use of digitized instructional materials using mobile phones and on the level of usability of the developed mobile application of Statistics in Education.

The level of significance on the usability of the developed mobile application on Statistics in Education was tested using T-test.

3 RESULT AND DISCUSSION

Table 1. Assessment on the level of readiness and acceptability of the graduate students on the use of digitized instructional materials using mobile phones.

Cellphone Specification	n (20)	%
1. CP with Android OS	18	90
2. CP with 8 GB memory	15	75

It shows in the table that the respondents are ready to accept the challenge of digitizing instructional materials using mobile phones. Hence, they meet the minimum requirements of mobile application software installed in their respective cellular phones.

Development of mobile application software on EDF 204: Advanced Statistics

The software was developed based on the course outline of EDF 204: Statistics in Education. Besides, the software is installable in a cellular phone with android operating system or platform with a minimum of 8 GB memory.

The developed software is user-friendly for which it indulged the basic operations of cell phones for a beginner. Moreover, the developed software is staunched for browsing capability. Though, anarchy is eschewed and paperless praxis is perceived.

Table 2. Level of usability of the developed mobile application of Statistics in Education

	Items	Mean	odd indicators – 1
1	I think that I would like to use this system	4.65	3.65
2	I found the system unnecessarily complex	4.64	
3	I thought the system was easy to use	5.65	4.65
4	I think that I would need the support of a technical person to be able to use this system	3.87	
5	I found the various functions in the system were will integrate	4.52	3.52
6	I thought there was too much inconsistency in this system	4.45	
7	I would imagine that most people would learn to use this system very quickly	4.35	3.35
8	I found the system very cumbersome to use	4.65	
9	I felt very confident using the system	4.79	3.79
10	I need to learn a lot of things before I could get going with this system	4.68	
	even total – 5		17.29
	odd total		18.96
	Total		36.25
	X		2.5
	RATING		90.625

Legend: *To score the SUS, subtract the scale position from 1 on all oddly numbered items, and subtract 5 from the scale position on all evenly numbered items, then multiply the sum of all items by 2.5 to get an overall SUS score that ranges from 0-100.*

It is absolutely revealed in table 2, that the system usability is 90.625 which described very satisfactorily usable.

Table 3. The level of significance of the developed mobile application on Statistics in Education based on its usability.

	T	p
Usability	4.457	0.002**

** *significant at 0.01*

It is bestowed in table 3 that usability of the developed mobile application is significant at α = 0.01. Also, shows that the developed mobile application is much usable than the typical one. Hence, it motivated students and get rid of hindrances in learning statistics which eventually improve their performance in the said course.

Relatively, mobile phones facilitates increase access and promote new learning (Valk, 2010). Also, disclosed that mobiles can support the great amount of learning that occurs during the many activities of everyday life, learning that occurs spontaneously in impromptu settings outside of the classroom and outside of the usual environment of home and office. And it enable learning across time and place as learners apply what they learn in one environment to developments in another (Sharples, 2007).

4 CONCLUSION

Students showed acceptability of utilizing the developed mobile application software in Advanced Statistics

The developed mobile application software found very satisfactorily usable and significant.

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