Teacher Education Perceptions of a Proposed Mobile Classroom Manager

Dave E. Marcial

Abstract

In a knowledge-driven enterprise, mobile learning introduces new ways for students to learn and educators to teach. This paper investigates the acceptability of a mobile classroom manager among teacher educators in Central Visayas, Philippines. Specifically, this paper presents findings from an empirical investigation on the level of perceived usefulness and ease of use of the mobile classroom manager. A total of 383 responses from 76 private and public higher education institutions were included in the analysis. The instrument used in data gathering was a survey questionnaire adopted from the first Technology Acceptance Model by Davis (1989).

The study reveals that a mobile class record application is highly useful as perceived by the respondents ($\bar{x}$ = 5.48). A mobile class record application is also perceived to be good in terms of its ease of use ($\bar{x}$ = 5.32). The result implies that the respondents will assuredly accept and use the mobile tool in their classroom. It can be concluded that teacher educators will strongly adopt the proposed instructional tool and integrate it into their teaching and learning activities. It is highly recommended that the mobile classroom manager application will be developed in accordance with the teaching practices of the teacher educators.

Keywords: ICT in education; mobile learning; mobile technology; technology acceptance model.

Introduction

Mobile learning revolutionized the traditional way of classroom learning (Vinu, Sherimon & Krishnan, 2011), for both formal and informal contexts (Martí and Ferrer, 2012). El-Hussein and Cronje (2010) defined mobile learning as "any type of learning that takes place in learning environments and spaces that take account of the mobility of technology, mobility of learners and mobility of learning". Students have a high level of acceptance of mobile learning that can be explained by their position as digital natives . Digital natives are generation of people who were born during or after the rise of digital technologies (Prensky, 2001). Mobile learning is viewed positively by students in terms of accessing information quickly, communicating and collaborating, introducing a variety of ways to learn, and situated learning like game-based learning (Gikas & Grant, 2013). Students in higher education have a high level of personal innovation and mobile readiness (Jazihan Mahat, Ahmad Fauzi Mohd Ayub, & Su Luan, 2012). In fact, many mobile applications are targeted primarily at students. Mobile technologies involve applications that students use semi-independently in a classroom or after-school setting to supplement or enhance teacher-led instruction.

Mobile learning requires a technology that can build and deploy applications. Mobile technology devices range from basic mobile phones to tablet PCs, and include PDAs, MP3 players, memory sticks, e-readers, and smartphones (UNESCO, 2011). Mobile technologies refer to a combination of hardware, operating systems, networking and software, including content, learning platforms, and applications. Further, a mobile application, referred to as an app, is a software application designed to run on Smartphones, tablet computers and other mobile devices. They are available through application distribution platforms, which are typically operated by the owner of the mobile operating system, such as the Apple App Store, Google Play, Windows Phone Marketplace and BlackBerry App World. Some apps are free, while others are not. Usually, they are downloaded from the platform to a target device, such as an iPhone, BlackBerry, Android phone or Windows Phone 7, but sometimes they can be downloaded to less mobile computers, such as laptops or desktops (Siegler, 2008).

Although there are many mobile apps available in the market, there is no app that is specifically designed for teacher educators who are Filipinos. It is in this context that a research project on the development of a mobile classroom manager is submitted and approved by the Philippine's Commission on Higher Education through Philippine Higher Education Research Network (Marcial, 2014).The proposed mobile app is called m-APP, and it will contain several features that will integrate some of the related features found from the existing mobile apps in the market like classroom management, attendance checking and scores recording. On top of these features, the proposed mobile app will be unique because it will include a vocabulary of terms for teacher education and training as handy and quick guide for teachers in the education program. This innovation is aimed to support the teaching instructions of Filipino teacher educators.

This paper examines the acceptability of the proposed mobile learning tool among teacher educators in the four provinces in Central Visayas, Philippines. Specifically, it investigates the perceived usefulness and perceived ease of use of the proposed mobile classroom manager among the teacher educators in Central Visayas, Philippines. It also explains the relationships between the respondent's demographic profile such as sex, age, status, institution, number of years in teaching, highest educational attainment and the acceptability of mobile classroom manager. Likewise, it also shows the relationship between the respondent's technology ownership of a desktop, Smartphone, tablet, and a laptop and a mobile classroom manager. Moreover, the paper also presents the relationship between Internet accessibility and perceptions towards a mobile classroom manager.

Literature Review

Mobile technology is applied and accepted in many areas such as in government operations (Aloudat, Michael, Chen, & Al-Debei, 2014), commerce (Chen, Li, Chen, & Xu, 2011; Gerpott, 2011), advertising (Liu, Sinkovics, Pezderka, & Haghirian, 2012), health (Selma Limam Mansar, Shashank Jariwala, & Maahd Shah, 2012), security (Mekonnen, Lerasle, & Herbulot, 2013) and robotics (Quintía, Iglesias, & Regueiro, 2010). Most importantly, many mobile development projects support instruction, both in and outside of classrooms (Dykes and Knight, 2012). Issues such as classroom management, information sharing, collaboration, grade control and among others, are issues and topics that appeal most to teachers. Young (2011) listed some features of a mobile app that teachers would want to have, these are: taking attendance, collecting data, reading scholarly articles, recording notes, and using textbook tools. Moreover, table 1 lists some of the mobile apps for teachers in the market today. As shown in the table, most of the applications are very specific to a single purpose and do not offer a complete, comprehensive service for teachers.

Table 1. Common Mobile Apps for teachers

Name	*Subscription*	*Features*	*Platform*
Attendance	Paid	Allows attendance recording, can be used for meetings and group gatherings, unlimited courses, move students from one class to another, photo recognition, customizable attendance statuses.	iOS
ClassDroid	Free	Alows teachers control many areas of the classroom information, supports images stored on a Wordpress site, which are available using a web browser on any web-enabled device, students and parents can then view their work and grades online	Android
Educate	Free	Attendance monitoring, student photos for each student, address book or student information importing	iPad
Evernote	Free	Captures the information in any environment using any device, and makes everything accessible and searchable, from anywhere, captures teacher's ideas, snapshots, voice memos, and just about anything else that a user want to remember.	Microsoft Windows, Mac OSX, Chrome OS, Android, IOS, WebOS
Flipboard	Free	Alows to set twitter feeds, and then re-presents it in a magazine format, makes online textbooks for specific classes or even further reading lists	iPad
Grade Rubric	Free	Records grade	Android
GradePad	Paid	Manages groups, do assessments, track performance, and share data.	iPhone
iGrade	Paid	Manages all student information including notes, tardiness and absences, provides teachers with detailed statistics in real time, lesson plans can be designed using the notes section	Android
PowerTeacher	Free	Records student scores and make observations about student progress from individual student desks, the gym, playground, at a sporting event or while on a field trip	iPad
PrimaryPad	Free	Helps teachers collaborate in real time with other teachers and pupils, anyone can edit and create new information, and it is on the screen so that everyone can benefit from the shared information	Android

RtM	Free	Offers task management, can sync it between devices	Android
Schmoop	Free	Calculates test scores, supports English, Spanish, and French languages, helps teachers with their lesson plans since it makes grading easier.	Android
Teacher Pal	Free	Enables teacher to organize classes, and students, tracks the attendance, grades and behavior of their students, simple tapping of attendance, grade books, enter grade with an intuitive touchpad, import, export data files from and to CSV files.	iPhone and iPad
Teacher Tool	Free	Saves grades and makes suggestions for grades, saves remarks about students and presents them to you in the upcoming lesson, remembers the date of any grade and lets the teacher store comments along with it, keeps track students‘ absences	Mac

The literature iterates that there are many issues to consider in mobile learning apps. Usability, technical and functional aspects are significant issues in mobile learning (Bidin & Ziden, 2013; Economides & Nikolaou, 2008). Likewise, Abachi & Muhammad (2014) reveal that accessibility is a top concern in a mobile learning service. They assert that this matter includes, but not limited to bandwidth, speed, network coverage, security and reliability of the service provider. In the same manner, Gikas & Grant (2013) also found that mobile learning may generate frustrations among learners. These frustrations include anti-technology instructors in other classes, device challenges, and devices as a distraction.

Moreover, the acceptance of mobile technology challenges the digital immigrants such inadequate skills, lack of infrastructure, and other behavioral and institutional related concerns. Because of the challenges, there is a need to have a clear understanding of technology adoption theory. According to Oliveira & Martins (2011), the most used technology adoption theories include: Technology Acceptance Model, Theory of Planned Behavior, Unified Theory of Acceptance and Use of Technology, Diffusion on Innovation Theory, and the Technology, Organization, and Environment Framework. Likewise, Kim & Crowston (2011) listed the same theories including the Social Cognitive Theory.

Merriam-Webster dictionary online defines innovation as “the act or process of introducing new ideas, devices, or methods”. The proposed instructional technology for teachers is not new in the knowledge enterprise, however, the tool, especially the process of integration is a new method for the faculty in the teacher education program. Because of this innovation, it is noteworthy to have an explicit understanding of Diffusion of Innovation theory. Diffusion and innovation theory “seeks to explain how innovations are taken up in a population” (Robinson, 2009). Surry & Farquhar (1997) assert that Innovation Theory is potentially valuable to the field of instructional technology for three reasons.

First, most instructional technologists do not understand why their products are, or are not, adopted. Second, instructional technology is inherently an innovation-based discipline. Lastly, the study of diffusion theory could lead to the development of a systematic, prescriptive model of adoption and diffusion. Shown in Figure 1 is the innovation-decision process. Innovation-decision process “is the process through which an individual passes from first knowledge of an innovation; to forming an attitude toward an innovation; to a decision to adopt or reject; to implementation of the new idea; and to confirmation of this decision” (Rogers, 2003).

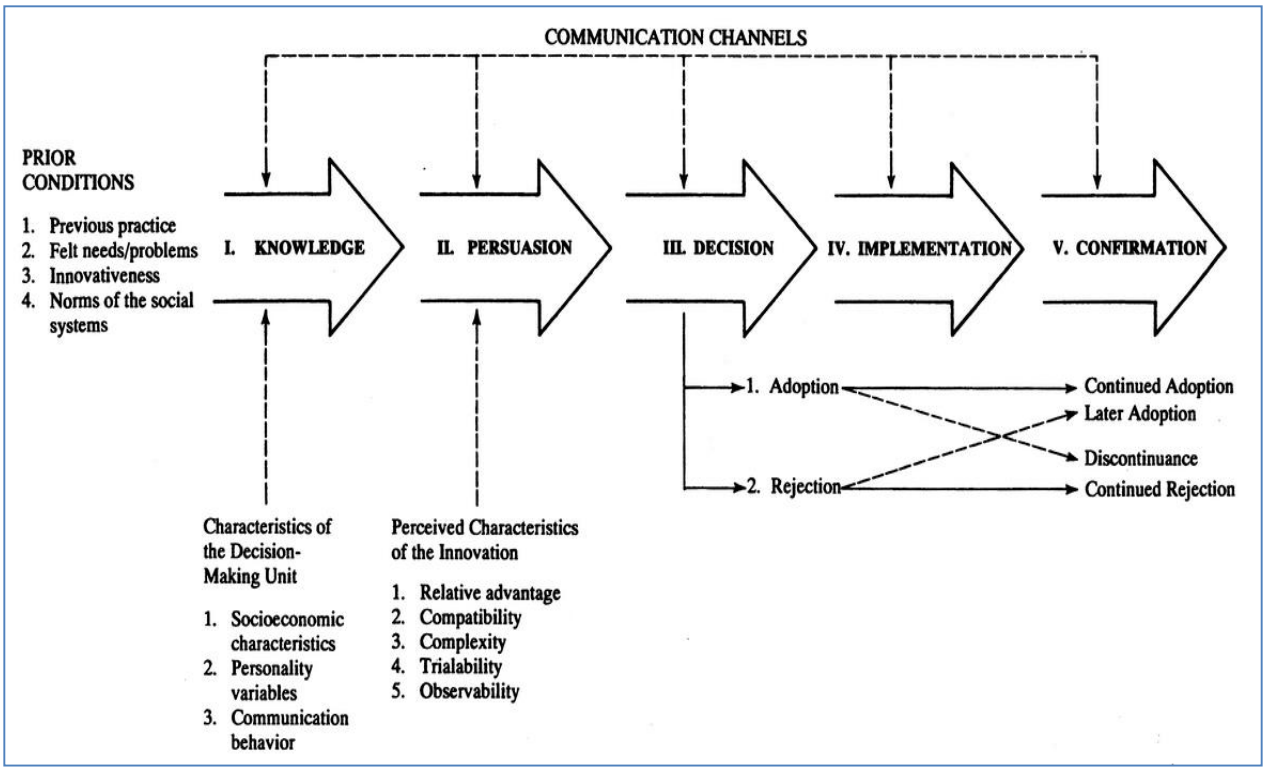

Figure 1. A Model of Five Stages in the Innovation-Decision Process (captured from Rogers, 2003)

On the other hand, the Technology Acceptance Model (TAM) is also considered carefully being one of the most influential extensions of the theory of reasoned action, shown in figure 2. TAM is an information systems theory that models how users come to accept and use a technology. The model suggests that when users are presented with a new technology, a number of factors influence their decision about how and when they will use it. First, perceived usefulness (PU) which is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance". Secondly, perceived ease-of-use (PEOU) that is defined as "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989). The TAM has been continuously studied and expanded the two major upgrades being the TAM 2 (Venkatesh & Davis, 2000; Venkatesh, 2000) and the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003). TAM 3 has also been proposed (Venkatesh & Bala, 2008).

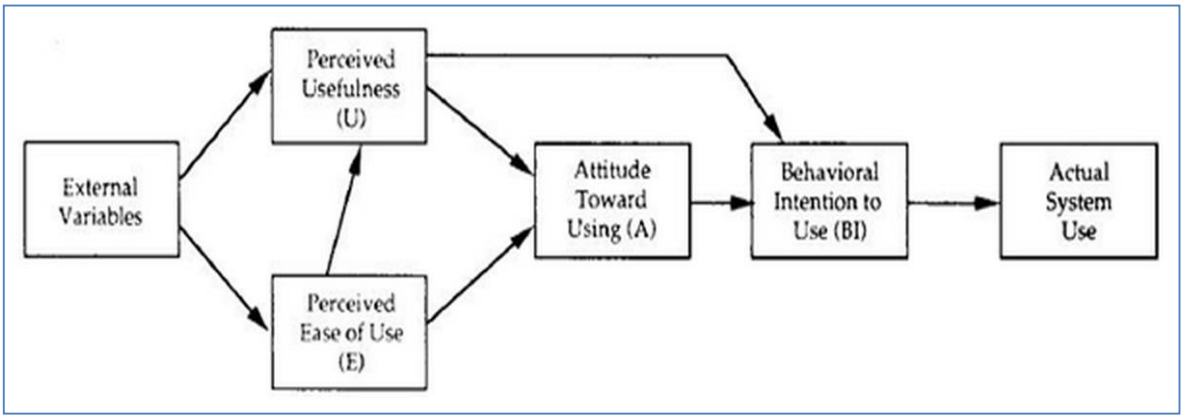

Figure 2. Technology Acceptance Model (captured from Davis, Bagozzi, & Warshaw, 1989)

It is highly noted that the perceived usefulness and ease-of-use are significant variables linked to the behavioral intention to adopt any technology (Davis, 1989; Venkatesh and Davis, 2000; Chuttur,

2009). Indrayani (2013) asserts that perceptions of ICT users will determine a person's attitudes and behavior towards the use and integration of ICT. The Technology Acceptance Model explains that "users are driven to adopt an application primarily because of the functions it performs for them, and secondarily for how easy or hard it is to get the system to perform those functions". Further, the model suggests that adoption and actual system use is correlated with high behavioral intention to use. Attitudes and perceived usefulness are useful indicators of behavioral intention in using mobile technology (Aloudat, Michael, Chen, & Al-Debei, 2014). Brown and Town (2002) reveal that perceived usefulness is not a major factor in technology usage particularly in web-based learning technology. Moreover, user training is a crucial factor in any technology use and implementation. Petter, William, & Ephraim (2008) assert "user training and education were significantly related to use in the earlier stages of the information system". Orientation about the technology has a significant direct effect to increase perception to new innovation (Alkhaldi, Khraim, & Ta'amneh, 2014).

Methodology

Design and Environment

The study implemented a descriptive-correlational design that begins with description, based on observation, of an event or events, from which theories may later be developed to explain the observations as well as a survey method. All of the study was conducted in recognized higher education institutions (HEIs) offering any teacher education programs in the four provinces in region 7, the Central Visayas in the Philippines. The teacher education program refers to degree programs such as Bachelor of Science in Secondary Education and Bachelor of Science in Elementary Education offered in both public and private HEIs. All private and public HEIs including community colleges were included. The respondents of the study are all full-time faculty teaching any professional or specialization courses of the teacher education program in the provinces of Bohol, Cebu, Negros Oriental and Siquijor.

Respondents

All HEIs offering teacher education programs in Central Visayas were considered. A complete enumeration of respondents was administered during the identification of respondents . The identification of HEIs was based from the list given by the Philippine's Commission on Higher Education CHED Region 7 office, dated January 31, 2013. Table 2 shows the summary of the number of HEIs offering teacher education programs in the region.

Table 2. Summary of HEIs offering teacher education program in region 7

Type of HEIs	*Bohol*		*Cebu*		*Negros Oriental*		*Siquijor*		*Total*	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Public	7	35.00	17	27.42	9	42.86	1	25	34	31.78
Private	13	65.00	45	72.58	12	57.14	3	75	73	68.22
Total	20	100.00	62	100.00	21	100.00	4	100	107	100.00

A total of 76 out of 107 HEIs participated during the administration of the survey as shown in table 3. All schools in Bohol and Siquijor participated in the study. In Negros Oriental, 12 out of 21 schools from Negros Oriental involved and included in the analysis of the study. Five HEIs in Negros Oriental are not anymore offering teacher education program as listed in CHED's database. Some HEIs in Negros Oriental did not return the questionnaires. In Cebu, 40 out of 62 HEIs were included in the analysis of the study. There were filled-up questionnaires from two schools rejected due to the qualifications of the person who answered the survey questionnaire. Some Cebu schools

opted not to participate in the study, and some did not return the questionnaires after several days of extension. In total, responses from 23 (30.26%) public and 53 (69.74%) private HEIs were included in the analysis of the study. In total, 383 responses were accepted and included in the analysis coming from 76 private and public HEIs in the four provinces.

Table 3. Summary of HEIs participated in the study

Type of HEIs	*Bohol*		*Cebu*		*Negros Oriental*		*Siquijor*		*Total*	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Public	7	35.00	12	19.35	3	25.00	1	25	23	30.26
Private	13	65.00	28	45.16	9	75.00	3	75	53	69.74
Total	20	100.00	40	100.00	12	100.00	4	100	76	100.00

Instrument

The instrument used in data gathering to accomplish the specific objectives of the study was a survey questionnaire. Questions related to perceived usefulness and ease of use are adopted from the first Technology Acceptance Model (Davis, 1989). Respondents were asked to evaluate the level of their competency according to the seven possible choices: 1 – extremely unlikely, 2 – quite unlikely, 3 – slightly unlikely, 4 – neither, 5 – slightly likely, 6 – quite likely, and 7 – extremely likely.

Data Gathering and Statistical Treatment

The survey administration process was done into two distribution periods due to unexpected delays in the project funding. The first administration was done on April 1 – 30, 2013 by the assigned area coordinators. Field enumerators are also identified to assist during the distribution and collection of the self-administered questionnaire for each province. A briefing was done before the survey administration with an emphasis on the ethical standards and protocol. A post - enumeration meeting was also conducted to gather relevant issues during the data gathering. An endorsement letter from the CHED regional director was attached in all survey questionnaires. As part of the protocol, the program or school head was met first, and they are the source of information in terms of the total number of eligible respondents. Only those who were present at the time of the visit were given a questionnaire to fill and they were collected before leaving the school. Copies of the questionnaire were also left for the school staff to be distributed to all qualified respondents who were not present at the time of the delivery. Retrieval of these questionnaires was done during the last week of April, 2013.

There are some schools in Cebu and one school in Negros Oriental that were not visited because of the geographical concern and distance considerations. Instead, printed copies of questionnaires with a return postage stamp were sent via a courier addressed to the school head in reference to the CHED regional's database. Follow-up processes were limited to a telephone call, as well as sending text messages to the respondents who did not respond by the indicated deadline. A weekly follow-up through email was also done to encourage greater participation from HEIs. The first distribution was done only from April 1-30, 2013 in order to get a result necessary to the skills enhancement training on May as scheduled. In order to improve the number of responses from the respondents and participation from other HEIs, the second distribution was done from July to August 2013. Printed copies of the questionnaire were sent to all respondents who were on vacation leave during the April visit. The questionnaires were mailed through a speed mailing service with the inclusion of a prepaid post stamp. All questionnaires were sent directly to the dean or head of the teacher education program. Filled-up questionnaires from unqualified respondents were rejected, including

those questionnaires that are mostly unanswered. In this case, 40 survey questionnaires were rejected. The statistical tools employed in the data processing are the weighted mean for measuring the competency level and chi-square for testing the relationships.

Results and Discussion

Perceived Usefulness of m-APP

The study shows that a mobile classroom manager, m-APP is quite likely useful as perceived by the respondents ($\bar{x} = 5.48$), shown in table 4. The results imply that a mobile classroom manager is acceptable and very important to the teaching job of the respondents. It is highly noted that all indicators of the perceived usefulness are rated with a description 'quite likely'. Like with many literatures on the technology acceptance model, perceived usefulness had significant positive impact on participants' attitude toward the system (Zhou, Mohammed, & Zhang, 2012). Further, the result of study contradicts to the study of Brown and Town (2002).

Table 4. Perceived Usefulness towards m-APP

Perceived Usefulness	*Bohol*	*Cebu*	*Negros Oriental*	*Siquijor*	*Total*
	$(\bar{x})$ *Description*	$(\bar{x})$ *Description*	$(\bar{x})$ *Description*	$(\bar{x})$ *Description*	$(\bar{x})$ *Description*
a. Using them-APP in my job would enable me to accomplish tasks more quickly.	(5.30) Quite Likely	(5.42) Quite Likely	(5.46) Quite Likely	(5.42) Quite Likely	(5.40) Quite Likely
b. Using m-APP would improve my job performance.	(5.32) Quite Likely	(5.46) Quite Likely	(5.53) Quite Likely	(5.69) Quite Likely	(5.50) Quite Likely
c. Using m-APP in my job would increase my productivity.	(5.34) Quite Likely	(5.46) Quite Likely	(5.56) Quite Likely	(5.62) Quite Likely	(5.50) Quite Likely
d. Using m-APP would enhance my effectiveness on the job.	(5.35) Quite Likely	(5.42) Quite Likely	(5.51) Quite Likely	(5.69) Quite Likely	(5.49) Quite Likely
e. Using m-APP would make it easier to do my job.	(5.32) Quite Likely	(5.38) Quite Likely	(5.60) Quite Likely	(5.69) Quite Likely	(5.50) Quite Likely
f. I would find m-APP useful in my job.	(5.33) Quite Likely	(5.42) Quite Likely	(5.57) Quite Likely	(5.69) Quite Likely	(5.50) Quite Likely
Aggregate Mean	(5.33) Quite Likely	(5.43) Quite Likely	(5.54) Quite Likely	(5.63) Quite Likely	(5.48) Quite Likely

Perceived Ease-of-use of m-APP

In the same manner, the study shows that the perceived ease of use of a mobile classroom manager is evaluated with a mean of 5.32 described as 'quite likely' (table 5). The result suggests that a mobile classroom manager is appropriate and very user-friendly that would provide flexibility to the teachers. Specifically, learning to operate a mobile classroom manager and to instruct it what to do is rated with a description 'slightly likely'. The result shows that the respondents somewhat agree that a mobile classroom manager is appropriate and user-friendly. Interestingly, respondents in Bohol and Cebu rated all indicators 'slightly likely' while respondents from Negros Oriental and Siquijor rated all indicators 'quite likely'. The result is analogous to Zhou et al. (2012) study that

found out that ease-of-use positively affected attitude toward the system and ease-of-use had a positive influence on perceived efficiency. Venkatesh (2000) articulated that perceived ease-of-use is "a key driver of technology acceptance, adoption, and usage behavior". He added that the strongest determinants of perceived ease-of-use is the individual's general beliefs about computers.

Table 5. Perceived ease-of-use towards m-APP

Perceived ease-of-use	*Bohol*	*Cebu*	*Negros Oriental*	*Siquijor*	*Total*
	$(\bar{x})$ *Description*	$(\bar{x})$ *Description*	$(\bar{x})$ *Description*	$(\bar{x})$ *Description*	$(\bar{x})$ *Description*
a. Learning to operate m-APP would be easy for me.	(4.94) Slightly likely	(5.08) Slightly likely	(5.51) Quite Likely	(5.54) Quite Likely	(5.27) Slightly likely
b. I would find it easy to get m-APP to do what I want it to do.	(4.99) Slightly likely	(5.09) Slightly likely	(5.53) Quite Likely	(5.54) Quite Likely	(5.29) Slightly likely
c. My interaction with m-APP would be clear and understandable.	(4.89) Slightly likely	(5.11) Slightly likely	(5.57) Quite Likely	(5.69) Quite Likely	(5.32) Quite Likely
d. I would find m-APP to be flexible to interact with.	(5.04) Slightly likely	(5.16) Slightly likely	(5.56) Quite Likely	(5.54) Quite Likely	(5.33) Quite Likely
e. It would be easy for me to become skillful at using m-APP.	(5.05) Slightly likely	(5.12) Slightly likely	(5.54) Quite Likely	(5.54) Quite Likely	(5.31) Quite Likely
f. I would find m-APP easy to use.	(4.97) Slightly likely	(5.07) Slightly likely	(5.90) Quite Likely	(5.54) Quite Likely	(5.37) Quite Likely
Aggregate Mean	(4.98) Slightly likely	(5.11) Slightly likely	(5.60) Quite Likely	(5.57) Quite Likely	(5.32) Quite Likely

Table 6.Summary of Acceptability Level towards m-APP

Acceptability	*Bohol*	*Cebu*	*Negros Oriental*	*Siquijor*	*Total*
	$(\bar{x})$ *Description*	$(\bar{x})$ *Description*	$(\bar{x})$ *Description*	$(\bar{x})$ *Description*	$(\bar{x})$ *Description*
Perceived Usefulness	(5.33) Quite Likely	(5.43) Quite Likely	(5.54) Quite Likely	(5.63) Quite Likely	(5.48) Quite Likely
Perceived ease-of-use	(4.98) Slightly likely	(5.11) Slightly likely	(5.60) Quite Likely	(5.57) Quite Likely	(5.32) Quite Likely
Overall Mean	(5.16) Slightly likely	(5.27) Slightly likely	(5.57) Quite Likely	(5.60) Quite Likely	(5.40) Quite Likely

Essential features of m-APP

When asked about important features that a mobile classroom manager should have, 376 (97.66%) respondents believe that a module for management of classroom information, attendance monitoring and test score calculation must be included (table 7).The result implies that teachers give more importance to the formative assessment activity, and they want this feature to be the first

to develop in any mobile learning application. It may support to the claim of Hwang & Chang (2011) who asserts "formative assessment-based approach is helpful to the students in improving their learning achievements in the mobile learning environment". About 97% of the respondents also agreed that a dictionary of general educational terms must be integrated with a mobile classroom manager. It is followed by features that teachers can store grades and comments along with it as well as a task management module where almost 97% respondents agreed. 361 (93.77%) respondents believe that a mobile classroom manager must contain address book and grouping management modules. A feature that can suggest grades is also rated important by 356 (92.47%) respondents. Surprisingly, only 339 (88.05%) respondents agreed that it is necessary for? teachers can upload photos for each student in a mobile classroom manager.

Table 7. Ranking of the Features of the proposed m-APP

Features	*Yes (%)*	*Ranking*
Teachers can manage classroom information	376(97.66)	2
Teachers can monitor attendance	376(97.66)	2
Calculates test scores	376(97.66)	2
Dictionary of general education terms	374(97.14)	4
Offers task management	372(96.62)	5.5
Stores grade and let the teacher store comments along with it	372(96.62)	5.5
Address book	361(93.77)	7.5
Manages groups	361(93.77)	7.5
Make a suggestion for a grade	356(92.47)	9
Teachers can upload photos for each student	339(88.05)	10

Relationship between Perceptions towards m-APP and the Respondent's Demographic and Technology Ownership Profile

Table 8 shows the results of chi-square computation for determining if significant relationships exist between the acceptability of a mobile classroom manager and demographic profile among the respondents. It is interesting to note that the study shows no significant relationship between the mobile application and the respondent's sex, age, status, institution, number of years in teaching and highest educational attainment. Age category is based on Erikson's stages of development, such as young adulthood (19-40), middle adulthood (41-65), and maturity (66-death). The results may be compared to the study of Lishan Xuea, et al., (2012). They found out that age and educational attainment are predictors of a mobile phone-based intervention.

Similarly, this study is opposite to the result of Ronggang Zhou, Pei-Luen Patrick Rau, Wei Zhang, & Damin Zhuang (2012) who found out that age is an important factor in using mobile devices. Further, the result may compare to the results of Fezile Ozdamli, Emrah Soykana, & Ezgi Pelin Yıld (2013) who found that the level of use of mobile devices for male students was higher than female students. Perhaps, the result of this study is due to being based in HEIs.

Table 8. Relationship between acceptability of a mobile application manager and the respondent's demographic profile

Acceptability and	x^2 *Value*	*P value*	*df*	*Remarks*
Sex	9.31	0.157	6	Not Significant
Age	9.31	0.503	10	Not Significant
Status	2.32	0.804	5	Not Significant
Type of Institution	1.33	0.970	6	Not Significant
No. of years in teaching	17.80	0.603	20	Not Significant

Highest educational attainment	7.09	0.717	10	Not Significant

On the other hand, table 9 shows the results of chi-square computation for determining if significant relationships exist between the acceptability of a mobile classroom manager and respondent's technology ownership. The study shows that there is evidence of a significant relationship between the acceptability of a mobile classroom manager and the respondent's ownership of desktop (x2 (6, N = 383) = 19.40, p<.01). Acceptability level is affected also by smartphone ownership (x2 (6, N = 383) = 13.00, p<.05).Laptop ownership is correlated with the acceptability of a mobile classroom manager (x2 (6, N = 383) = 12.60, p<.01).Further, internet accessibility in school is may affect also the acceptability of a mobile classroom manager (x2 (6, N = 383) = 18.20, p<.01). Surprisingly, there is no enough evidence that tablet ownership has a significant correlation with the acceptability of a mobile classroom manager. The result can be interrupted as the respondents having scant ideas on how tablet computers support mobile learning as a new pedagogy in teaching and learning.

Table 9. Relationship between acceptability of a mobile application manager and the respondent's technology ownership profile

Acceptability and	x^2 *Value*	*P value*	*df*	*Remarks*
Desktop Ownership	19.40	0.004	6	Significant
Smartphone Ownership	13.00	0.043	6	Significant
Tablet Ownership	12.30	0.055	6	Not Significant
Laptop Ownership	20.60	0.002	6	Significant
Internet accessibility in the school	18.20	0.006	6	Significant

Summary and Conclusion

The acceptability of the teacher educators towards to the development of a mobile classroom manager is very high, positive and encouraging. The perceived usefulness and perceived ease-of-use are significant variables linked to the behavioral intention to adopt any technology (Davis, 1989; Venkatesh and Davis, 1996; Chuttur, 2009). It may be concluded that teacher educators in Central Visayas, Philippines will vigorously adopt the proposed instructional tools and integrate mobile learning into their teaching and learning activities. In reference to the Technology Acceptance Model, it is highly likely that the proposed m-APP is likely to be adopted. In the same manner, adoption of the proposed m-APP is likely to be more successful if the preferred features are taken into consideration. It is further recommended that a similar study should be conducted among academic administrators in the teacher education program and measure if there is a significant difference between the two groups of respondents. Further, a user training on the use of the proposed mobile classroom manager must be conducted.

Acknowledgements

The funding support provided by the Commission on Higher Education through the Philippine Higher Education Research Network (PHERNet), facilitated by Silliman University through Research and Development Center is gratefully acknowledged. The research expertise of Dr. Enrique Oracion and the involvement of Dr. Pablito de la Rama are very much appreciated. The assistance of Jeambe Rendal and Kristel Puno, as well as the coordination of Ms. Mitzi Fortich, Ms. Dawn Iris Calibo and Dr. Jonathan Etcuban, is deeply appreciated. The same appreciation is also given to all the field assistants and enumerators namely: Rose Ann Digal, Ma. Hazel Pantoja, Melissa Tamayo, Rosie Namoc, Mary Ann Caliao, Aahron M. Dinauanao, Cynthia S. Abellanosa, Venancio B. Fernandez, Rafael Calvo, Fritzie D. Skinner, Marites C. Melendres, Glenn A. Arnado, Robbie Austen Vailoces, Lyviendo Dales, Ramcer Dy Teves, Sheila Garcia, and Edit Albit. We

are very grateful also to all school heads for accommodating us during the survey. Further, I would like also to recognize The Asian Conference on Technology, Information and Society 2014, held on November 20-23, 2014 at the Rihga Royal Hotel Osaka, for the comments and suggestions in improving this article.

References

Abachi, H. R., & Ghulam, M. (2014). The impact of m-learning technology on students and educators. *Computers in Human Behavior, 30,* 491 – 496. Retrieved July 20, 2015, from http://dx.doi.org/10.1016/j.chb.2013.06.018.

Alkhaldi, A. N., Khraim, H. S., & Ta'amneh, I, Y. (2014). Effect of User Training on Perception of Ease of Video-conferencing Use: The Moderating and Direct Effect of Time Orientation Cultural Values in Jordan. *Research Journal of Science and IT Management, 3*(6). Retrieved July 20, 2015, from http://www.theinternationaljournal.org/ojs/index.php?journal=rjitsm&page=article&op=view&path%5B%5D=2534.

Aloudat, A., Michael, K., Chen, X., & Al-Debei, M. M. (2014). Social acceptance oflocation-based mobile government services for emergency management. *Telematics and Informatics, 31,* 153 – 171. Retrieved July 20, 2015, from http://dx.doi.org/10.1016/j.tele.2013.02.002.

Bidin, S., & Ziden, A. A. (2013). Adoption and Application of Mobile Learning in the Education Industry. *Procedia-Social and Behavioral Sciences, 90,* 720 – 729. doi:10.1016/j.sbspro.2013.07.145.

Brown, I. T. (2002). Individual and Technological Factors Affecting Ease of Use of Web-based Learning Technologies in a Developing Country. *The Electronic Journal on Information Systems in Developing Countries, 9*(5), 1-15. Retrieved July 20, 2015, from http://www.ejisdc.org/ojs2./index.php/ejisdc/article/viewFile/50/50.

Chen, Z.-S., Li, R., Chen, X., & Xu, H. (2011). A Survey Study on Consumer Perception of Mobile-Commerce Applications. *Procedia Environmental Sciences, 11,* 118-124. doi:10.1016/j.proenv.2011.12.019.

Chuttur, M. (2009). Overview of the Technology Acceptance Model: Origins, Developments and Future Directions. *Sprouts: Working Papers on Information Systems, 9*(37). Retrieved July 20, 2015, from http://sprouts.aisnet.org/9-37.

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly, 13*(3), 319-340. Retrieved July 20, 2015, from http://links.jstor.org/sici?sici=0276-7783%28198909%2913%3A3%3C319%3APUPEOU%3E2.0.CO%3B2-E.

Davis, F. D., Bagozzi, R. P., and Warshaw, P. R. "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models," *Management Science, 35,* 1989, 982-1003. Retrieved July 20, 2015, from http://www.vvenkatesh.com/it/organizations/theoretical_models.asp.

Dykes, G., & Knight, H. R. (2012). Mobile Learning for Teachers in Europe. Paris, France: UNESCO. Retrieved July 20, 2015, from http://unesdoc.unesco.org/images/0021/002161/216167e.pdf.

Economides, A. A., & Nikolaou, N. (2008). Evaluation of handheld devices for mobile learning. *International Journal of Engineering Education, 24*(1), 3-13. Retrieved July 20, 2015, from http://www.conta.uom.gr/conta/publications/PDF/Evaluation%20of%20Handheld%20Devices%20for%20Mobile%20Learning.pdf.

El-Hussein, M. M., & Cronje, J. C. (2010). Defining Mobile Learning in the Higher Education Landscape. *Educational Technology and Society, 13*(3), 12-21. Retrieved July 20, 2015, from http://www.ifets.info/journals/13_3/3.pdf.

Ozdamli, F., Soykana, E., & Yıld, E. P. (2013). Are Computer Education teacher candidates ready for M-Learning? *Procedia-Social and Behavioral Sciences, 83*, 1010-1015. doi:10.1016/j.sbspro.2013.06.188.

Gerpott, T. J. (2011). Attribute perceptions as factors explaining Mobile Internet acceptance of cellular customers in Germany – An empirical study comparing actual and potential adopters with distinct categories of access appliances. *Expert Systems with Applications, 38*, 2148-2162.

Gikas, J., & Grant, M. M. (2013). Mobile computing devices in higher education: Student perspectives on learning with cellphones, smartphones & social media. *Internet and Higher Education, 19*, 18 – 26.

Hwang, G.-J., & Chang, H.-F. (2011). A formative assessment-based mobile learning approach to improving the learning attitudes and achievements of students. *Computers and Education, 56*, 1023 – 1031. doi:10.1016/j.compedu.2010.12.002.

Indrayani, E. (2013). ICT Culture of the Implementation of Academic Information System (AIS) at Higher Education (Case Study: Higher Education in the City of Bandung). *International Proceedings of Economics Development and Research*, 7-11.

Innovation - Definition and More from the Free Merriam-Webster Dictionary. (n.d.). Retrieved July 20, 2015, from http://www.merriam-webster.com/dictionary/innovation.

Jazihan Mahat, Ahmad Fauzi Mohd Ayub, & Su Luan, W. (2012). An Assessment of Students' Mobile Self-Efficacy, Readiness and Personal Innovativeness towards Mobile Learning in Higher Education in Malaysia. *Procedia - Social and Behavioral Sciences, 64*, 284-290.

Kim, Y., & Crowston , K. (2011). Technology Adoption and Use Theory Review for Studying Scientists' Continued Use of Cyber-infrastructure. ASIST. New Orleans, LA, USA. Retrieved July 20, 2015, from http://crowston.syr.edu/system/files/ASIST2011-Cyber-infrastructureTheoryReview-FinalVersion-1.pdf.

Lishan Xuea, Ching Chiuan Yena, Leanne Chang, Hock Chuan Chan, Bee Choo Tai, Say Beng Tan, . . . Mahesh Choolani (2012). An exploratory study of ageing women's perception on access to health informatics via a mobile phone-based intervention. *Inernational Journal of Medical Informatics, 81*, 637-648. Retrieved July 20, 2015, from http://dx.doi.org/10.1016/j.ijmedinf.2012.04.008.

Liu, C.-L. E., Sinkovics, R. R., Pezderka, N., & Haghirian, P. (2012). Determinants of Consumer Perceptions toward Mobile Advertising — A Comparison between Japan and Austria. *Journal of Interactive Marketing, 26*, 21 – 32.

Marcial, D. E. (2014). ICT in Teacher Education in Region 7. Technical Report to the Commission on Higher Education-Philippine Higher Education Research Network, Silliman University, College of Computer Studies, Dumaguete City.

Martí, M. C., and Ferrer, G. T. (2012). Exploring learners' practices and perceptions on the use of mobile portfolios as methodological tool to assess learning in both formal and informal contexts. *Procedia-Social and Behavioral Sciences, 46*, 3182-3186.

Mekonnen, A., Lerasle, F., & Herbulot, A. (2013). Cooperative passers-by tracking with a mobile robot and external cameras. *Computer Vision and Image Understanding, 117*, 1229 – 1244. Retrieved July 20, 2015, from http://dx.doi.org/10.1016/j.cviu.2012.12.004.

Oliveira, T., & Martins, M. (2011). Literature Review of Information Technology Adoption Models at Firm Level. *The Electronic Journal Information Systems Evaluation, 14*(1), 110-121. Retrieved July 20, 2015, from http://www.ejise.com.

Petter, S., William, D., & Ephraim, M. (2008). Measuring information systems success: models, dimensions, measures, and interrelationships. *European Journal of Information Systems, 17*, 236 – 263. doi:10.1057/ejis.2008.15.

Prensky, M. (2001). Digital Natives, Digital Immigrants. *On the Horizon, 9*(5). Retrieved July 20, 2015, from http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf.

Quintía, P., Iglesias, R., & Regueiro, C. V. (2010). Simultaneous learning of perception and action in mobile robots. *Robotics and Autonomous Systems, 58*, 1306-1315. doi:10.1016/j.robot.2010.08.009.

Robinson , L. (2009, January). A summary of Diffusion of Innovations. Retrieved July 20, 2015, from http://www.enablingchange.com.au/Summary_Diffusion_Theory.pdf.

Rogers, E. M. (2003). Diffusion of Innovations. (Fifth). New York: The Free Press. Retrieved July 20, 2015, from https://teddykw2.files.wordpress.com/2012/07/everett-m-rogers-diffusion-of-innovations.pdf

Ronggang Zhou, Pei-Luen Patrick Rau, Wei Zhang, & Damin Zhuang. (2012). Mobile phone use while driving: Predicting drivers' answering intentions and compensatory decisions. *Safety Science, 50*, 138 – 149. doi:10.1016/j.ssci.2011.07.013.

Selma Limam Mansar, Shashank Jariwala, & Maahd Shah. (2012). A Usability Testing Experiment For A Localized Weight Loss Mobile Application. *Procedia Technology*, 839 – 848. doi:10.1016/j.protcy.2012.09.093.

Siegler, M. (2008, June 11). Analyst: There's a great future in iPhone apps. Retrieved July 20, 2015, from http://venturebeat.com/2008/06/11/analyst-theres-a-great-future-in-iphone-apps/.

Surry, D. W., & Farquhar, J. D. (1997, May). Diffusion Theory and Instructional Technology. *Journal of Instructional Science and Technology, 2*(1). Retrieved July 20, 2015, from http://www.southalabama.edu/coe/bset/surry/papers/dtit/dtit.htm.

UNESCO (2011). UNESCO Mobile Learning Week Report. Paris. Retrieved July 20, 2015, from http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/ED/ICT/pdf/UNESCO%20MLW%20report%20final%2019jan.pdf.

Venkatesh, V. (2000). Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and Emotion into the Technology Acceptance Model. *Information Systems Research, 11*(4), 342 – 365.

Venkatesh, V., & Bala, H. (2008). Technology Acceptance Model 3 and a Research Agenda on Interventions. *Decision Sciences, 39*(2), 273-315. Retrieved July 20, 2015, from http://www.vvenkatesh.com/downloads/papers/fulltext/pdf/venkatesh_bala_ds_2008.pdf.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science, 46*, 186 – 204.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly, 27*, 425-478. Retrieved July 20, 2015, from http://www.vvenkatesh.com/IT/Abstract/6.asp.

Vinu, P., Sherimon, P., & Krishnan, R. (2011). Towards pervasive mobile learning – the vision of 21st century. *Procedia Social and Behavioral Sciences, 15*, 3067 – 3073. doi:10.1016/j.sbspro.2011.04.247.

Young, J. R. (2011, January 2). 6 Top Smartphone Apps to Improve Teaching, Research, and Your Life. Retrieved July 20, 2015, from http://chronicle.com/article/6-Top-Smartphone-Apps-to/125764.

Zhou, L., Mohammed, A. S., & Zhang, D. (2012). Mobile personal information management agent: Supporting natural language interface and application integration. *Information Processing and Management, 48*, 23 – 31. doi:10.1016/j.ipm.2011.08.008.