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PREDICTING THE ADOPTION OF AN ANDROID-BASED CLASS RECORD USING THE UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY MODEL

Abstract. Technology adoption is a process that is affected by many variables. To achieve innovative teaching and learning, mClassRecord, an Android-based class record application, was developed and tested. This paper is aimed at predicting the level of adoption of mClassRecord as experienced by the respondents using the Unified Theory of Acceptance and Use of Technology Model. Specifically, this article presents the qualitative analysis of mClassRecord adoption among the respondents in terms of performance expectancy, effort expectancy, attitudes toward using mClassRecord, social influence, facilitating conditions, self-efficacy, anxiety, and behavioral intention to use mClassRecord. The respondents of the study are the 17 teacher educators in higher education institutions in Central Visayas, Philippines. A semi-structured questionnaire was used, which was adapted from the model. Results show that mClassRecord is useful in the classroom. The interaction of teachers with mClassRecord is found to be clear and understandable. The positive comments from the respondents imply that the app is a good idea for teachers. Findings reveal that there is no clear indication that there is a direct influence or support from the school administration. It shows also that the teachers acquire dissimilar skills and even different levels of the same skills. The results indicate that majority of the teachers do not have fear and apprehension in using mClassRecord. Likewise, it implies that there is positive attitude and high degree of intention to use mClassRecord. The study concludes that adoption of mClassRecord is predicted at different stages. There is strong evidence that mClassRecord offers effective and efficient class recording and management. There is promising indication that the teaching tool offers an innovative contribution to teaching.

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

1. INTRODUCTION

Webster defines innovation as “the act or process of introducing new ideas, devices, or methods.” The proposed instructional technologies for teachers are not new in this digital world; however, these tools, especially the process of their integration, are a new method for the faculty in the teacher education program. Because of this innovation, it is noteworthy that this study will consider the Diffusion of Innovation theory. Diffusion of innovation theory “seeks to explain how innovations are taken up in a population” [1]. Surry and Farquhar [2] state that Innovation Theory is potentially valuable to the field of instructional technology for three reasons: 1) most instructional technologists do not understand why their products are, or are not, adopted; 2) instructional technology is inherently an innovation-based discipline; and 3) 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 innovation; to forming an attitude toward an innovation; to a decision to adopt or reject; to implementation of the new idea; and confirmation of this decision” [3]. Knowledge, persuasion, and decision processes were done during Year 1 of the study.

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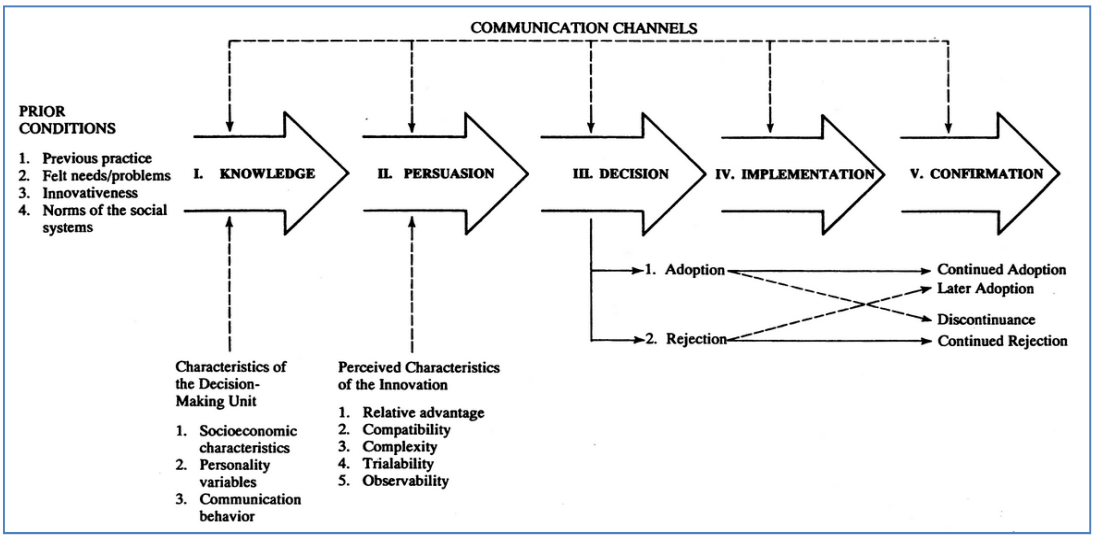

Figure 1. A Model of Five Stages in the Innovation-Decision Process (adopted from Rogers, 1983)

The problem statement. To provide innovative teaching in the higher education institutions in the Philippines, a mobile class record application, called mClassRecord, was developed. mClassRecord is a stand-alone mobile application that automates the manual process of class information recording and management. It only runs on Android, a Linux-based operating system for mobile devices such as Smartphones and tablet computers. The best practices in higher education institutions in the Philippines are the critical inputs to functional analysis. The development employs the feature-driven approach, specifically during the design and coding phases. The mobile app went to a rigid system testing by a pool of testers before the launching and training. The app was subjected to usability testing, and it was found to be highly usable. The development of mClassRecord is a part of a two-year project funded by the Philippine Commission on Higher Education through the Philippine Higher Education Research Network.

Analysis of recent studies and publications. "Technology adoption is a process – starting with the user becoming aware of the technology, and ending with the user embracing the technology and making full use of it" [4]. As a process, technology adoption "begins with awareness of the technology and progresses through a series of steps that end in appropriate and effective usage" [5]. Technology adopters are classified according to the Rogers' bell curve, as shown in Figure 2. These adopters are the innovators, early adopters, early majority, late majority, and laggards. Table 1 is an excerpt explaining each of these groups, as cited in [6].

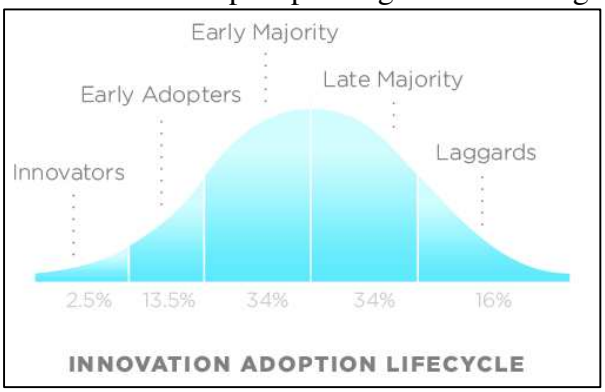

Figure 2. Innovation Adoption Lifecycle
(https://en.wikipedia.org/wiki/Technology_adoption_life_cycle#/media/File:DiffusionOfInnovation.png)

Table 1

Roger's Five Technology Adopter Groups [1]

Adopter Groups	Description
Innovators (2.5%)	Innovators are the first individuals to adopt an innovation. Innovators are willing to take risks, youngest in age, have the highest social class, have great financial lucidity, are very social and have closest contact to scientific sources and interaction with other innovators. Risk tolerance has them adopting technologies which may ultimately fail. Financial resources help absorb these failures. (in Rogers 1962 5th ed, p. 282)
Early Adopters (13.5%)	This is the second fastest category of individuals who adopt an innovation. These individuals have the highest degree of opinion leadership among the other adopter categories. Early adopters are typically younger in age, have a higher social status, have more financial lucidity, advanced education, and are more socially forward than late adopters. More discrete in adoption choices than innovators. They use judicious choice of adoption to help them maintain central communication position (in Rogers 1962 5th ed, p. 283).
Early Majority (34%)	Individuals in this category adopt an innovation after a varying degree of time that is significantly longer than the innovators and early adopters. Early Majority tend to be slower in the adoption process, have above average social status, contact with early adopters, and seldom hold positions of opinion leadership in a system (in Rogers 1962 5th ed, p. 283)
Late Majority (34%)	Individuals in this category will adopt an innovation after the average member of the society. These individuals approach an innovation with a high degree of skepticism and after the majority of society has adopted the innovation. Late Majority are typically skeptical about an innovation, have below average social status, very little financial lucidity, in contact with others in late majority and early majority, very little opinion leadership.
Laggards (16%)	Individuals in this category are the last to adopt an innovation. Unlike some of the previous categories, individuals in this category show little to no opinion leadership. These individuals typically have an aversion to change-agents and tend to be advanced in age. Laggards typically tend to be focused on "traditions", likely to have lowest social status, lowest financial fluidity, be oldest of all other adopters, in contact with only family and close friends, very little to no opinion leadership.

For Bridges to Technology Corp. [5], technology adoption comes in five stages. These are awareness, assessment, acceptance, learning, and usage. Users in the awareness stage acquire enough knowledge about the technology and its benefits to decide whether they want to explore further. The assessment stage is where the potential users appraise the efficacy, effectiveness, usability, and the ease-of-use of adopting the technology. Users in the acceptance stage are those who decide to acquire and use the technology or decide not to adopt. In the learning stage, potential users progress the skills and knowledge required to use the technology effectively and efficiently. Finally, users in the usage stage apply and use the technology correctly and effectively. Accordingly, users come at different degrees of adoption at these stages.

The article's goal. Given this, the purpose of the article is to predict the degree of adoption of mClassRecord. Specifically, this paper presents the qualitative analysis of the acceptance of mClassrecord in terms of the seven factors in the Unified Theory of Acceptance and Use of Technology [2]. These factors include performance expectancy, effort expectancy, attitude toward using technology, social influence, facilitating conditions, self-efficacy, anxiety, and behavioral intention to use the system.

2. THE THEORETICAL BACKGROUNDS

There are several approaches to predicting technology adoption. The study [8] attempted to provide a theoretical framework for the study of innovation adoption at the individual level. The proposed choice-based model of adoption combines both behavioral and

product attribute factors in a consumer expected utility maximization framework. The model presented attempts to spark into the decision 'black box', which most behavioral innovations adoption research does not address. Likewise, the study [9] proposed a new Technology Continuance Theory (TCT) that combines two ultimate constructs: attitude and satisfaction. The model can be applied to users at different stages of the adoption life cycle.

One of the most popular models in predicting technology adoption is the Technology Acceptance Model (TAM; Figure 3). TAM is known to be the most influential extension of the theory of reasoned action. It is an information systems theory that models how users come to accept and use technology. The model suggests that when users are presented with new technology, several factors influence their decision about how and when they will use it. Notably: a) 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"; b) Perceived ease-of-use (PEOU), which is defined as "the degree to which a person believes that using a particular system would be free from effort" [10]. The TAM has been continuously studied and expanded into two significant upgrades being the TAM 2 [11][12] and the Unified Theory of Acceptance and Use of Technology [7]. TAM 3 has also been proposed [13]. Moreover, TAM has been the primary consideration in many studies that predict technology adoption.

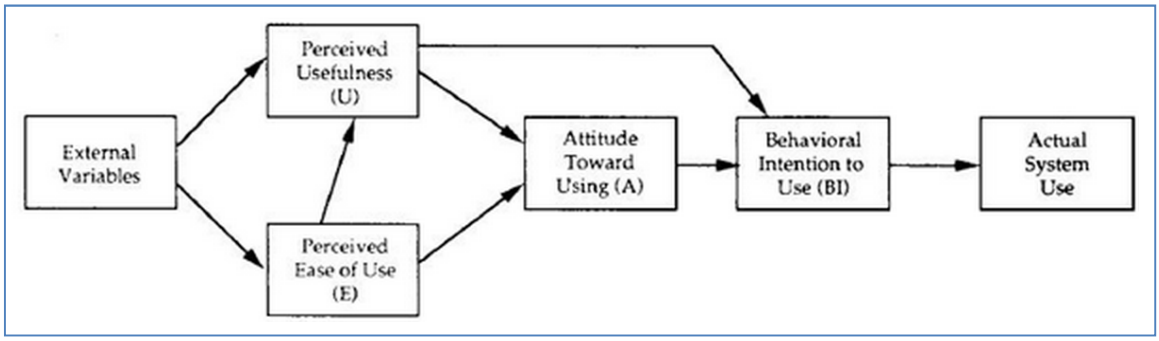

Figure 3. Technology Acceptance Model (adopted from Davis, Bagozzi, & Warshaw, 1989)

In a related study, although conducted among the elderly [4], TAM was used. However, they proposed the “Senior Technology Acceptance and Adoption Model (STAM) for modeling the acceptance process as driven by the factors that influence mobile phone adoption in the context of the elderly mobile phone user.” The model includes seven components. These are User Context, Intention to Use, Experimentation and Exploration, Ease of Learning & Use, Confirmed Usefulness, and Actual Use. Likewise, TAM was also used in a qualitative software adoption study [14]. In this paper, a unified model, called the Unified Theory of Acceptance and Use of Technology (UTAUT) [7], was used that includes eight factors. These are performance expectancy, effort expectancy, attitude toward using technology, social influence, facilitating conditions, self-efficacy, anxiety, and behavioral intention to use the system.

Technology adoption is affected by many factors. The most prominent elements of technology adoption are the “benefits received by the user and the costs of adoption” [15]. Likewise, socioeconomic characters, personality variables, and communication behavior greatly influence technology adoption (Rogers, 2003, cited in [16]. The study [15] pointed out also that availability of complementary skills and inputs, the strength of the relation to the firm’s customers, and the importance of network effects are also factors in technology adoption. Internal factors and user’s characteristics have a significant influence on technology adoption in the case of SMEs [17]. Perceived usefulness and perceived ease of use, economic

factors, and trust influence intention to adopt and use mobile services in the case of banking industries [18]. Environmental, organizational, and innovation-related drivers and inhibitors influence technology adoption in the case of financial information systems [19]. The study [20] found that "contrary to its intention, commissioning practice is more of a barrier than an enabler of innovation" in the case of health services systems. They added that organizational power and politics were a significant barrier for adoption of technology. The study [21] showed that "optimism and innovativeness significantly influence perceived usefulness and perceived ease of use." They also found that "perceived usefulness has a significant positive influence on actual usage." Moreover, Chan and Ngai [22] concluded that perceived benefits/costs, organizational readiness, and external pressures significantly affect adoption in the case of web-based training.

3. RESEARCH METHODS

This study is a qualitative analysis using a semi-structured questionnaire. The study was conducted in 15 higher education institutions (HEIs) offering programs in teacher education in the four provinces in Region 7, Philippines. Teacher education program refers to degree programs such as Bachelor of Science in Secondary Education and Bachelor of Science in Elementary Education offered in public and private HEIs.

The participants of the study are 17 teachers in HEIs offering teacher education programs in Central Visayas, Philippines. These respondents are selected because of their experience in using mClassRecord in the classroom. Notably, these teachers were identified as pilot users who agreed to use mClassRecord in their classroom during the second semester of the school year 2015-2016. As pilot users, they were provided with a tablet – similar hardware specifications – with installed mClassRecord. Table 2 shows the demographic profile of the participants.

Table 2

Demographic Profile of the Respondents

Profile	Provinces						Total	
	Negros Oriental & Siquijor		Cebu		Bohol			
	f	%	f	%	f	%	f	%
Sex								
Male	2	25.00	2	50.00	2	40.00	6	35.29
Female	6	75.00	2	50.00	3	60.00	11	64.71
Total	8	100.00	4	100.00	5	100.00	17	100.00
Age								
18- 40	6	75.00	3	75.00	2	40.00	11	64.71
41 – 65	2	25.00	1	25.00	3	60.00	6	35.29
Total	8	100.00	4	100.00	5	100.00	17	100.00
Number of years in teaching								
< 4	0	0.00	1	25.00	1	20.00	2	11.76
4 – 6	5	62.5	1	33.33	0	0.00	6	35.29
7– 9	0	0.00	1	33.33	0	0.00	1	5.88
10 – 15	2	25.00	0	0.00	1	20.00	3	17.65
16 – 20	1	12.50	1	0.00	1	20.00	3	17.65
> 21	0	0.00	0	0.00	2	40.00	2	11.76
Total	8	100.00	4	100.00	5	100.00	17	100.00
Status								
Single	3	37.50	2	50.00	2	40.00	7	41.18
Married	5	62.50	2	50.00	2	40.00	9	52.94
Widow	0	0.00	0	0.00	1	20.00	1	5.88

Total	8	100.00	4	100.00	5	100.00	17	100.00
Highest Educational Attainment								
Bachelor's Degree	3	37.50	1	25.00	1	20.00	5	29.41
Master's Degree	3	37.50	3	75.00	2	40.00	8	47.10
Doctoral/PhD	2	25.00	0	0.00	2	40.00	4	23.53
Total	8	100.00	4	100.00	5	100.00	17	100.00
Type of HEI								
Private	4	50.00	4	100.00	4	80.00	12	70.60
Public	4	50.00	0	0.00	1	20.00	5	29.40
Total	8	100.00	4	100.00	5	100.00	17	100.00
Area of Expertise								
IT	4	50.00	0	0.00	1	20.00	5	29.40
Non-IT	4	50.00	4	100.00	4	80.00	12	70.60
Total	8	100.00	3	100.00	5	100.00	17	100.00

These respondents had undergone several capability training activities on the classroom use and integration of two newly developed digital teaching tools. First, the respondents participated in a 3-day train-the-trainers (TTT) training on October 19-21, 2015 at Silliman University, Dumaguete City, Philippines. The TTT training was face-to-face, and it aimed to demonstrate, practice, and do hands-on activities with the use and classroom integration of the two developed digital teaching tools. One of the training's outputs is the participants' list of steps to achieve their training goals; they were supposed to provide their action plan. Terms of Engagement were signed, by which the participants agreed to use and integrate the tools in any of their classes during the second semester of the school year 2015-2016. At the end of the training, these ambassadors received a Samsung Galaxy tablet with mClassRecord installed and a USB 3.0 flash drive with the PLMS.

Secondly, the respondents participated in the two-day region-wide user training on the classroom use and integration of mClassRecord and PLMS. As ambassadors, they served as assistant trainers on their respective provinces. Three user training activities were done for the two digital tools. These were conducted in Silliman University for Negros Oriental and Siquijor Batch on October 26-27, 2015, University of Cebu – Main Campus for Cebu batch on October 28-29, 2016, and Holy Name University for the Cebu teacher educators on October 30-31, 2015.

A preliminary evaluation workshop was also organized for seventeen respondents. The workshop was a one-day affair to gather initial feedback on the teacher's use of mClassRecord and PLMS. Likewise, it was aimed to compare notes on the teacher's use of these two digital applications. The preliminary review workshop was held on December 19, 2015, at Silliman University Dumaguete City, Negros Oriental, Philippines.

The respondents attended a final evaluation and learning workshop. The workshop was conducted on April 4, 2016, in a convention center in Bohol, Philippines. It was a one-day learning workshop that was aimed at documenting the experiences and lessons learned from the pilot users of the two digital teaching applications - mClassRecord and PLMS. Likewise, it also aimed at evaluating the facilitating and hindering factors using force-field analysis. Moreover, the learning workshop solicited from the participants' suggestions and recommendations for future actions to help achieve innovative teaching and learning.

The instrument used in data gathering to accomplish the specific objectives of the study was a semi-structured questionnaire. The questions are based on the Unified Theory of Acceptance and Use of Technology model (TAM) [7]. There is at least one question in every variable found in TAM (Table 3).

Table 3

Variable Questions found in TAM

Question №	Questions
1	Do you believe that using mClassRecord will help you to attain gains in your teaching job performance? Why? Why not? Explain your answer.
2	Tell us about the effort you exerted in using mClassRecord. Is it easy to operate? Describe any circumstance encountered.
3	Tell us your over-all feeling (positive or negative) in using mClassRecord.
4	Are you supported (in any form) by your school administration in using mClassRecord? Were you able to get technical assistance from any source? Explain your answer.
5	Describe your ability to complete class recording tasks using mClassRecord.
6	Do you have apprehension or fear in using mClassRecord? If yes, what is it? Why?
7	Do you intend to use mClassRecord in the future? If yes, tell us when?
8	Do you recommend that all teachers must integrate mClassRecord in at least one of their classes? Why and why not?

4. THE RESULTS AND DISCUSSION

RESULTS

4.1 Do you believe that using mClassRecord will help you attain gains in your teaching job performance? Why? Why not? Please explain

All respondents believed that using mClassRecord will help them attain gains in their teaching job performance. All of them believed that mClassRecord is efficient and effective. Three respondents explicitly stated that the tool makes them efficient. For example, Teacher 1 said:

"Yes. Based on my experience I have efficiently come up with my grades during the midterm without spending so much time on the manual process of creating a manual class record and updating it from time to time and then encoding it in the EXCEL format to program the grading computation."

Eight respondents openly stated also that the tool makes recording management faster and easier. Teacher 2 said that it was easy for her to recall events and check students' attendance. Teacher 3 also mentioned that "When the mClassRecord was introduced, I can easily record the scores of the students right after their presentation." Likewise, six respondents mentioned that the tool makes class recording faster and quicker.

mClassRecord is a support tool for teachers (Teacher 11), and it offers an innovative mechanism of a recording wherein teachers will have a readily available digital format of the class record (Teachers 12 & 14).

Further, the respondents also believed that the tool is convenient and user-friendly among teachers. The tool has the ability to have a readily available digital format of the classroom. Teacher 6 stipulated that "The mClassRecord benefits me in the sense that it is very handy, very mobile, very user-friendly, speedier than writing down on the traditional class record, and is paperless." Likewise, Teacher 5 explained that mClassRecord helps attain gains in her teaching job. She enumerated the following reasons:

- ✓ *Since data from the tablet are emailed, scores are copied and pasted into the Excel worksheets for computations of sums when applicable, transmuted scores, and the like leading to the computations of score.*
- ✓ *Students in classes can be pregrouped*
- ✓ *Events and tasks for the whole semester can be encoded before and during the semester*
- ✓ *Students are only encoded once*
- ✓ *Attendance can be checked and notations can be made for those who are absent*
- ✓ *Attendance can be viewed by day and as a summary from the start of classes*
- ✓ *Minimizes use of paper*
- ✓ *Headings are provided in scores for each assessment type that includes date, coverage, highest possible score*

Other responses include the following:

Teacher 4: *"Yes, the mClassrecord helped me efficiently attain gains in my teaching job performance. Through this digital teaching tool I was able to maximize my time and efforts in record keeping. It helped me eliminate a great deal of manual processing like the students' list and attendance."*

Teacher 7: *"Yes, I do believe that using mClassRecord will help me attain my gains in my teaching job performance. The application has given me ease and convenience in recording my students' grades and outputs. Compared to the traditional method of recording on paper class record, the mClassrecord can be carried anywhere inside my bag for ready use during my free time and in any location. Students who would like to access their grades can also look into my mClassRecord due to its availability and portability."*

Teacher 8: *"Yes, because of the mClassRecord I can easily see/view the summary of the students' attendance. We are now in the 21st century, we need to utilize the technology we have for the better teaching learning experience."*

4.2 Please tell us about the effort you exerted in using mClassRecord. Is it easy to operate? Please describe any circumstance encountered

All respondents agreed that mClassrecord was easy to operate. Teacher 3 said that it "does not require any effort at all primarily because the application opens immediately without lagging time." "I only exerted effort at the start. But later on, it was effortless. Mastery has been attained", Teacher 13 said. Likewise, there are five respondents who clearly mentioned that the tool is user-friendly. Teacher 10 said:

"I never had a problem using the mClassRecord, for me any mobile app can be easily used by any user. The application is simple and user friendly. I didn't even bother to look at the manual. Maybe I sometimes forgot where to look for a certain score of the activity or quiz but eventually you will find it, maybe it's just me."

The highlighted features include the list of classes, student names, attendance, teacher and student tasks, recording scores (Teacher 4), Groups feature (Teacher 6), and the data can be easily transferred to excel files via email (Teacher 17). On the contrary, three respondents mentioned that at first, the tool is complicated. Once used, it was easy for them to operate. Teacher 7 explained

"Of course, the mClassRecord is so easy to operate. However, at first when you will be encoding all the names of the students in the class record, it would take time, especially if you have more than 200 students."

4.3 Please tell us your overall feeling (positive or negative) in using mClassRecord

All the 17 respondents gave positive feelings about using mClassRecord. Using mClassRecord makes the teachers proud, and they are very positive about the integration of mClassRecord in the classroom. Some respondents were thankful and honored to be part of the project. The respondents were happy, and they enjoyed using the mClassRecord, especially the attendance, dictionary, recording of activities, downloading the grades, viewing groups, reminders and scores, automating the computation of percentage, and paperless way of recording. Teacher 6 said that using the application is a joy. She wrote

"... Though I have been alternating between the mCR and my good old Microsoft Excel, I enjoy using mCR because it looks more alive and much better than the spreadsheet. It also looks less technical than Excel. Moreover, I find it very hassle-free to just tap, long-tap, back, and just swipe my finger or type the exact letter or figure. It is very liberating, and I do not need white inks, pens, or the conventional class record."

However, among the 17 participants who gave positive comments, six respondents also expressed their negative sentiments about the tool. Teacher 8 said that some teachers do not have an Android tablet. The slow response time of the tablet was noticed also by Teacher 9. Inputting of student names is the only problem that Teacher 10 sees. Teacher 11 encountered a slight degree of frustration. Teacher 16 discontinued using the application because she found the application cannot answer to the needs of the subject matter. Teacher 13 said

"I feel elated having advanced to the use of technology. But there was a time that my mClassRecord was deleted because my daughter rebooted my tab, and I did not know that the app will be deleted. I also did not send it to the email. So, that's a lesson learned on my part. Imagine I had to retrieve the scores of my students.

4.4 Are you supported (in any form) by your school administration in using mClassRecord? Were you able to get technical assistance from any source? Explain your answer

Regarding support from school administration, five of the respondents clearly stated that they did not get support from their school administration. Below are the responses of these respondents:

Teacher 6: *"Not that I know of. So far, only the young instructors were willing to use the mCR. The school had been busy with transitions and putting people in the right place, including accreditation. The use or promoting or supporting the use of mCR is furthest from the admin's minds."*

Teacher 7: *"I am not yet supported by our administration regarding the mClassRecord due to unavailability of funds. I was not also able to get technical assistance from other source. However, the programmer and the project staff of the mClass Record are very accommodating and helpful in any problem that will arise and are willing to assist me anytime."*

Teacher 8: *"The administration didn't support us in using mClassRecord. And also, we are not able to get technical assistance."*

Teacher 12: *"Honestly, the administration did not really prioritize the program due to lots of priorities specially in the area K-12 preparations. So, I work on my own, introduce it to some of my colleagues who have Android tablets."*

Teacher 15 also mentioned that their school administration did not know that she was using mClassRecord. Other respondents said that they got support from their management. The support that they got was in the form of allowing them to attend training, enabling them to use school facilities during training and echo seminar. Teacher 17 proudly revealed

"Our school president is happy that these two technologies are introduced to the faculty, but we don't have the technical [aspect]. Yet she suggested the "Ripa-ripa" system so that the teachers can purchase the tablet."

Further, Teacher 2 described her experience and said

"I remember I went to HRMO office because I was marked absent and deducted for an hour absent. I showed to them my checked attendance in the mobile class record and when the head of HRMO saw the mobile class record she wanted to ask a copy of the program because she said it was very useful for them."

Moreover, only four respondents clearly claimed that they got technical support from the project team. Two respondents said that there was no need of technical assistance because they fully understood the functions of the application. Other respondents did not reveal if they got any technical assistance.

4.5 Please describe your ability to complete class recording tasks using mClassRecord

Teacher 1, an IT teacher, said that she is already "well-versed" with the application because it is interesting and educational. Teacher 8 evaluated her ability to use mClassrecord as 8 out of 10, 10 being the highest. Teacher 7 said that she is "quite moderately good," while Teacher 9 said "average." On the other hand, Teacher 12 stated that he is still confused with the process, especially in the encoding of scores. Teacher 4 also said that she is "still in the process of mastering the tool's potential on how it can increase my productivity and performance in my profession." Two respondents (Teachers 8 & 16) said that they are not yet experts in using mClassRecord. Although he/she did not rate him/herself, Teacher 15 mentioned that inputting of student names is time-consuming. Other respondents described the different actions and processes they can do with mClassRecord. Below are their responses:

Teacher 3: *"During group presentations, students are given group scores. Instead of bringing with me the scoring paper to be recorded later on, I just call their names and they give me their scores which I efficiently input in the mClassRecord. However, I cannot use this application when I record essays, portfolios, reflection paper, etc. I record the scores directly to my main class record."*

Teacher 6: *"It is generally easier to complete tasks using the mCR as well as it is very easy for me to operate it and integrate it with the excel spreadsheet that I already had at the beginning of the class. Since it already categorized the scores, it is definitely not a problem in computing grades via excel with the help of the mCR. My computations of grades are definitely faster, more effective, and more efficient."*

Teacher 10: *"Attendance is accurate and detailed, specially for lates and absents where you can place the reason the student was absent. I was not able to use all the features of the mobile application."*

Teacher 11: *"I can create, edit and delete student record. I can create a class record, send and view class information, and delete a class. I can check attendance, view daily attendance and summary of attendance. I can add and delete group activity and student groups. I can add, edit and delete tasks and activities. I can add, edit, and delete information of assessments per term basis. I can add obtained scores and view percentage."*

Teacher 13: *"I can do it fast with confidence."*

Teacher 14: *"I can complete class recording tasks using any feature of the mClassRecord".*

Teacher 17: *"I can easily record the attendances of students and record students' performances and quizzes."*

4.6 Do you have apprehension or fear in using mClassRecord? If yes, what is it? Why?

Seven respondents indicated they had apprehension or fear in using mClassRecord. The major fear of these respondents is the loss of data due to accidental deletion, tablet crash, and system malfunction. This fear is articulated by a respondent who enumerated the following possibilities:

- ✓ *She is unable to email one of her classes, the message "temporarily stopped" appears*
- ✓ *A computer virus might destroy the files especially on the scores that she will be unable to physically retrieve from her students*
- ✓ *The tablet might be stolen/get lost or broken/destroyed*
- ✓ *Data might not be send via email since sometimes the university is unable to pay bills, wi-fi would be down for various reasons*
- ✓ *When the program can't run anymore and you need to access from the net and by that time it will not be provided to you for free*
- ✓ *When somebody borrows the tablet with the data and is tempted to change any of the data inputted, especially if they know how to operate the said program*
- ✓ *When there is a long blackout and the university's power source does not work*

Likewise, a respondent also said, "It might not answer the needs such as the uniqueness of some policies of the institution regarding the recording of latecomers". Moreover, two respondents stated that they were afraid at first. "But eventually, I was able to manipulate the tool and became comfortable with it," Teacher 4 explained. On the other hand, 11 participants explicitly answered that they had no apprehensions or fear. A respondent explained that mClassRecord is a mobile app, so it is fun to use. Another respondent described the app as user-friendly and wrote that he had no fear in operation.

4.7 Do you intend to use mClassRecord in the future? If yes, please tell us when the time is.

All respondents said that they intended to use mClassRecord in the future. Some stated that they would use the tool starting summer of the school year 2015-2016 or first semester of the academic year 2016-2017. Some did not specify the time of integration. Teacher 12 expressed, "I am really much interested to use this through my entire teaching career. I know I have not really maximized the utilization of this project; that is why I still want to use this one."

However, two of the respondents expect to use the new version of the tool, particularly the features that would fit the teacher's needs based on the institution's uniqueness in their practices. Another respondent explained that his intention to use was contingent upon ownership of a tablet. Further, Teacher 7 said

"…Besides, it would also inspire other teachers to follow what I am doing and motivate everyone to be technologically oriented and updated. Meaning, technology can be applied as an effective aid to teaching and learning."

4.8 Do you recommend that all teachers integrate mClassRecord in at least one of their classes? Why and why not?

All the respondents said that they would recommend that all teachers must integrate mClassRecord in at least one of their classes. The reason for recommending the tool according to the respondents is to make the 21st-century teacher innovative. Quality, usefulness, efficiency, ease-of-use, and learnability are convincing statements for other teachers. Three respondents enthusiastically wrote that they would convince other teachers, especially the young ones. However, persuading other teachers to use mCLassRecord is a challenge, and there will be many hindrances. Teacher 5 enunciated these hindrances as follows:

- ✓ *Some instructors are interested to use the mClassRecord but cannot afford yet to purchase the appropriate tablet since priority is to purchase a laptop.*
- ✓ *There is one instructor who lets his child play with the same tablet, so cannot bring the tablet with him all the time and is also aware that data/scores can be changed by anyone who knows how to operate the program.*
- ✓ *One instructor is waiting for an upgraded version that would allow him to copy names when enrolling from a list provided by EDP so he need not encode a name at a time.*

DISCUSSION

On Performance Expectancy

"Performance expectancy is the degree to which an individual believes that using the system will help him or her to attain gains in job performance" [23]. The result suggests that mCLassRecord is useful in class. It also signifies that using mClassRecord enables teachers to accomplish classroom tasks more quickly. Likewise, it indicates that the app increases classroom productivity.

On Effort Expectancy

"Effort expectancy is defined as the degree of ease associated with the use of the system" [2]. Based on the model, the result shows that the interaction of teachers with mClassRecord is clear and understandable. It also implies that becoming skillful with the app is easy for the teachers. It also signifies that mClassRecord is easy to use.

On Attitude toward using technology

"Attitudes are developed and revised according to assessments about beliefs and values" (Fishbein & Ajzen, 1975, cited in [24]). Venkatesh et al. [7] articulated that attitude toward using technology is "defined as an individual's overall affective reaction to using a system." The positive comments from the respondents imply that the app is a good idea for teachers. It shows that teachers are having fun using the app. Likewise, it indicates that teaching with the use of mClassRecord is exciting. On the other hand, the negative comments may mean that there is still a need to improve teacher's skills in using mClassRecord.

On Social Influence

"Social influence is defined as the degree to which an individual perceives that important others believe he or she should use the new system" [7]. The responses show that there is no clear indication that there is a direct influence or support from the administration. The responses indicate that most of the support from administrations is related to training and use of facilities. On the other hand, actual use and utilization of the digital tool are not supported. The study [25] points out that technical and administrative support should be emphasized to ensure high adoption of digital tools like laptops. On the other hand, the responses show that there is reasonable technical assistance, especially coming from the project team.

On Self-efficacy

Self-efficacy refers to the "judgment of one's ability to use a technology to accomplish a particular job or task" [7]. The result shows that teachers acquire different skills and even different levels of the same skills. The result implies that some of the teachers can accomplish most of the features offered in mClassRecord. Likewise, the result demonstrates that some teachers can complete the tasks in class recording successfully even if no one is around to assist them. In a similar qualitative study, although with the use of iPad, the study [26] asserts that "issues of self-efficacy with technological knowledge and pedagogical implementation of the technology were at the forefront with all of our teachers." They added that teachers had acknowledged the importance and value of technology in the teaching job, but "teachers did not always make the connection to classroom practice."

On Anxiety Level

Anxiety is defined by [7] as "invoking anxious or emotional reactions when it comes to performing a behavior." The result shows that the majority of the teachers do not have fear and apprehension in using mClassRecord. The result implies that the majority of the teachers are comfortable and confident in using the app. Likewise, the result suggests that the app is not intimidating to the teachers. Thus, they are always interested in using the app in their everyday class recording activities. The result also indicates that some teachers experienced worries and nervousness in using the app. Privacy of data and information, loss of data and information, and unauthorized access to data are among the teachers' fears.

On Behavioral intention to use

The result implies that there is a positive attitude and high degree of intention to use mClassRecord. The result means that teachers will also have a high usage of mClassRecord [7]. The result also demonstrates that ownership and possession of the required hardware specification is a concern among teachers. Further, the result shows that teachers are getting more excited and interested in a more refined version of the tool.

4. CONCLUSIONS AND PROSPECTS FOR FURTHER RESEARCH

Adoption of mClassRecord is predicted at different levels. The adoption of mClassRecord among teacher educators is grounded on technology features which can make their daily activities easier [27]. There is strong evidence that mClassRecord offers effective and efficient class recording and management. There is a promising indication that the teaching tool offers an innovative contribution to teaching. There is little anxiety among

teachers on the use of mClassRecord. Control and security of data and information are the most pressing apprehensions of the teachers. Ownership of the prescribed gadget is a requirement in any technology integration.

There must be more training activities to be conducted to ensure high adoption of mClassRecord. The app must be improved to cater for some specific needs of the teachers. Teachers must be convinced that mClassRecord is safe and secure.

It is also recommended to conduct further investigation to validate the claims, in particular, evaluate the adoption of mClassRecord using the variables mentioned by [28] as well as the diffusion estimation technique [29]. It is further recommended to conduct a study that will carefully measure the personality dimensions and system specific dimensions as described by [21]. Likewise, it is recommended to conduct future research to utilize qualitative methods and examine the behavioral outcomes of mobile adoption instead of simple adoption in consumer markets [30]. Moreover, there is a recommendation to conduct a further study to test if the hardware cost and pedagogical approaches are predictors to mClassRecord adoption.

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ПРОГНОЗ З ВПРОВАДЖЕННЯ ЗАСТОСУНКУ CLASS RECORD НА ОСНОВІ ANDROID З ВИКОРИСТАННЯМ МОДЕЛІ ЄДИНОЇ ТЕОРІЇ ПРИЙНЯТТЯ І ВИКОРИСТАННЯ ТЕХНОЛОГІЇ

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Анотація. Упровадження технології - це процес, на який впливають багато чинників. Для впровадження інноваційних методів викладання і навчання було розроблено та протестовано додаток mClassRecord на базі Android. Мета даної статті - прогнозування рівня впровадження mClassRecord, на основі досвіду респондентів, використовуючи модель єдиної теорії прийняття і використання технологій. Зокрема в цій статті представлений якісний аналіз упровадження mClassRecord з точки зору очікуваної продуктивності, очікуваних зусиль, ставлення до використання mClassRecord, соціального впливу, сприятливих умов, самоефективності, занепокоєння і поведінкового наміру використовувати mClassRecord. Респондентами дослідження стали 17 викладачів вищих навчальних закладів Центральних Вісайських островів, Філіппіни. Використовувалася полуструктурована анкета, адаптована на основі моделі. Результати показують, що mClassRecord корисний при викладанні в класі. Використання mClassRecord виявилось простим і зрозумілим для вчителів. Позитивні відгуки респондентів говорять про те, що додаток - хороша ідея для вчителів. Результати показують, що немає чітких даних про прямий вплив або підтримку з боку шкільної адміністрації. У результаті дослідження встановлено, що вчителі набувають різні рівні одних і тих самих навичок. Крім цього, зазначено, що більшість учителів не відчувають страху і побоювань при використанні mClassRecord. Більш того, проглядається позитивне ставлення і високий ступінь готовності вчителів використовувати mClassRecord. Зроблено висновок, що впровадження mClassRecord можливо прогнозувати на різних етапах навчання. Доведено, що використання mClassRecord надає ефективний запис занять і управління ними. Представлений інструмент робить освітній процес інноваційним.

Ключові слова: мобільне навчання; модель прийняття технологій; ІКТ в освіті; мобільний запис уроку.

ПРОГНОЗ ПО ВНЕДРЕНИЮ ПРИЛОЖЕНИЯ CLASSRECORD НА ОСНОВЕ ANDROID С ИСПОЛЬЗОВАНИЕМ МОДЕЛИ ЕДИНОЙ ТЕОРИИ ПРИНЯТИЯ И ИСПОЛЬЗОВАНИЯ ТЕХНОЛОГИИ

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Аннотация. Внедрение технологии - это процесс, на который влияют многие факторы. Для внедрения инновационных методов преподавания и обучения было разработано и протестировано приложение mClassRecord на базе Android. Цель данной статьи - прогнозирование уровня внедрения mClassRecord, опираясь на опыт респондентов, используя модель единой теории принятия и использования технологий. В частности, в этой статье представлен качественный анализ внедрения mClassRecord среди респондентов с точки зрения ожидаемой производительности, ожидаемых усилий, отношения к использованию mClassRecord, социального влияния, благоприятных условий, самоэффективности, беспокойства и поведенческого намерения использовать mClassRecord. Респондентами исследования стали 17 преподавателей высших учебных заведений Центральных Висайских островов, Филиппины. Использовалась полуструктурированная анкета, адаптированная на основе модели. Результаты показывают, что mClassRecord полезен при преподавании в

классе. Использование mClassRecord оказалось простым и понятным для учителей. Положительные отзывы респондентов говорят о том, что приложение - хорошая идея для учителей. Результаты показывают, что нет четких данных о прямом влиянии или поддержке со стороны школьной администрации. В результате исследования установлено, что учителя приобретают разные уровни одних и тех же навыков. Кроме этого отмечено, что большинство учителей не испытывают страха и опасений при использовании mClassRecord. Более того, просматривается положительное отношение и высокая степень готовности учителей использовать mClassRecord. Сделан вывод, что внедрение mClassRecord возможно прогнозировать на разных этапах обучения. Доказано, что использование mClassRecord предоставляет эффективную запись занятий и управление ими. Представленный инструмент делает образовательный процесс инновационным.

Ключевые слова: мобильное обучение; модель принятия технологий; ИКТ в образовании; мобильная запись урока.

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