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Higher Education Students' Behaviour to Adopt Mobile Learning

J R Batmetan[1*] and V R Palilingan[2]

[1]Information Engineering Department, Universitas Sari Putra Indonesia Tomohon, Tomohon, 95416
[2]Information Technology and Communication Education Department, Universitas Negeri Manado, Tondano,95618

*john.reimon@gmail.com

Abstract. Mobile phone is an electronic device most often used by Y generation in Indonesia. This ages have become an important part in the growth of higher education in this country. The problem raised in this study is that very few students in higher education are adopting and accessing digital learning content using mobile phones. The objective of this study is to investigate the higher education students' behaviour in using mobile learning. The research method used is Structural equation models (SEM) method to analyse the factors that influence higher education students' behaviour in using mobile learning. The results of this study indicate tends of this student 85% to keep internet access in privacy. The majority of respondent is 78% having behaviour to keep adopting mobile learning and still use it in the future. Why? because this study shows that on the level of usability, easy to use, easy to learn, in various devices have a significant effect on the level of adoption of mobile learning. Implication of this study is higher education students' behaviour of especially Y generation tends to prioritize the usability towards mobile learning and will continue to adopt mobile learning in the future.

1. Introduction

Indonesia is a large country with an increasing rate of technological development. Nielsen survey in 11 major cities in Indonesia in 2017 with a total population of 54.8 million inhabitants showed that the internet penetration rate of Indonesia reached 44% with the number of internet users as much as 24.2 million users in 11 major cities of Indonesia [1]. The survey also showed that 77% of Internet users are Y and Z generations and they still in higher education student. Other data revealed is where 91% of internet accesses from home and only 33% access from schools, libraries, and other educational establishments [1]. This shows that Y generation less access the internet while in school. Other comparable data can be seen from survey published by Jakpat Indonesia, in 2016 the population of Indonesia as much as 253 million people and 50% among the Y generation and Z [2]. Jakpat also reported that internet users in Indonesia of 83.6 also users with 69.3% are Y and Z generation. While active users of mobile devices are actually 282 million users or 13% more than the population of Indonesia [2]. This means 13% mobile phone users have more than one device. Jakpat also reported that in 2016, Indonesia users 89% using mobile phones to access the internet. As many as 84% use the internet to access social media, 81% access Facebook, 48% Instagram, the rest access to other social media [2]. This data indicates that internet users Indonesia is still not productive and just looking for

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entertainment only [3]. Mobile learning is still very little accessed by mobile phone users in Indonesia although 60% of Y generation is in high education [4][5][6]. Mobile learning (m-learning) becomes an important learning media in higher education student. M-learning applications had an effect on improving higher education student learning outcomes in college [7][8]. M-learning has not been optimally adopted by higher education students because it is not all compatible with the smartphone used by higher education students [9]. Content m-learning also still not in accordance with the needs of higher education students [10].

Limitations of learning resources and access to learning resources using mobile devices have always been a major problem in teaching and learning. This limitation has a direct impact on higher education students to gain good learning achievement and gain knowledge [11] [12]. Indeed, the learning process will become suboptimal when the smartphone device is very useful, easy to use, and easy to learn. For this reason, in some universities in developing countries, the process of teaching and learning has been done by directly taking learning materials from the internet. However, the use of learning materials from the internet using m-learning is even more difficult to manifest in developing countries because smartphone devices are less compatible, limited internet access, and m-learning application that is still difficult to use [13]. Indeed, one of the strategies developed in most developing countries is accessing learning resources from the internet using a computer or laptop device. However, some problems appear as difficult to use because of their large size and weight making it difficult to use mobile. these devices can only be accessed in certain places that have limited internet access. The adoption of m-learning cannot explain in detail about its application to describe students about realistic conditions. Furthermore, m-learning is complex and incompatible with some smartphones, creating conflicts with limited adoption of m-learning. While this strategy is quite effective, problems with more mobile usage and faster Internet access, easy to use, easy to learn applications are directly correlated with the adoption of m-learning.

To solve the problem, some researchers have suggested the following strategy: the adoption of m-learning should look at aspects of the compatibility that can be accessed by all mobile devices, internet speed on mobile networks and simpler, user-friendly and lightweight content so that mobile devices can display content well and perfectly [14]. The suggested strategy is effective and can be implemented and easy to adopt by higher education students [15] [16]. However, some problems still persist. m-learning cannot explain in detail about how to use the application so that higher education students have difficulty [17] [18]. Furthermore, m-learning becomes complicated and sophisticated [19], thus creating conflicts with limited use to adoption by higher education students.

Here, the purpose of this study was to investigate the higher education student's behavior to adoption mobile learning. These novelty makes the higher education students behavior for developing countries that have many limitations using m-learning. The higher education student's behavior to adoption m-learning, including usability, easy to use and easy to learning m-learning.

2. Methods

This research was conducted in North Sulawesi with participants 18-35 years old and was studying in higher education. The distribution of respondent is in several universities, polytechnics, institutes and college located in North Sulawesi Indonesia. This study was conducted in the even semester of academic year 2016/2017. Participants involved in this research were 150 Participants. Participant distribution data based on age and sex can be shown in table 1, out of 150 participants, 89 were male and 61 were female. Participants' ages ranged from 18 years to 35 years. Some students were simultaneously enrolled in more than one class in which they used the mobile devices.

Table 1. Range of participants' ages.

Age	**18 – 20**	**21 – 23**	**24 – 26**	**27 – 29**	**30 – 32**	**33 – 35**	**Total**
Male	35	30	15	6	2	1	89
Female	26	25	8	2	-	-	61
Total	61	55	23	8	2	1	150

Participants varied in their levels of experience as a teacher and came from North Sulawesi Indonesia. Response at level 2 to level 8 actively follow the lecture, as shown in table 2.

Table 2. Range of participants' level.

Level	2	4	6	8	Total
Male	26	24	23	16	89
Female	20	21	16	4	61
Total	46	45	39	20	150

Participants actively use m-learning in each lecture activity either in face-to-face or in project projects. Participants use smartphones to access m-learning and use various learning content. All respondents access m-learning through cellular network ie 3G and 4G. Participants were given an opportunity to assess m-learning for 3 months, then measured. Data were collected using questionnaires with questionnaire techniques. The item related to Intent to use mobile learning and factors Likert scale. 1 represented Strongly Disagree, 2 as Disagree, 3 as Not Sure, 4 as Agree, and 5 as Strongly Agree. Sampling is done by purpose sampling with age and level criteria.

This research using a quantitate method. This study using above theoretical model and hypotheses by using the questionnaire and Structural Equation Model (SEM). The variable in the model are adopted from existing research literature home and abroad, the participant was requested to grade item on five-point scale. Intention to use mobile learning is the dependent variable in this study and other independent variables used in this study are perceived usefulness, perceived ease of use, perceived easy to learning, and adoption m-learning.

Based on SEM and the researches from learning literature, the present study develops a research model that examines factors that determines undergraduate students' intention to adopt m-learning. Figure 1 depicts the research model.

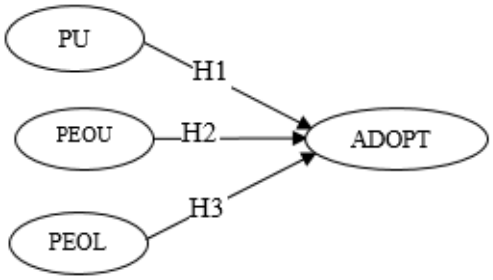


Figure 1. Model Research

The independent variables of this study are perceived usefulness (PU), perceived ease of use (PEOU), and perceived easy of learning (PEOL). These independent variables may be the determinants that influence dependent variable, i.e. intention to adopt (ADOP) M-learning among Higher Education Students in North Sulawesi. A self-administered questionnaire was used in this research, which consists of two sections.

2.1. Perceived usefulnes

The results of previous research indicate that usability has a strong relationship in the adoption of m-learning [5]. Batmetan findings show that adoption will occur against mobile applications also have strong usability [3]. Other research also shows that usability has a strong influence on the adoption of mobile applications [4] [20]. Perceived is usefulness as the degree to which a person believes that using a particular system would enhance his or her job performance [3] [13]. The importance of perceived usefulness has been widely recognized in the field of mobile learning. Perceived Usefulness of a system may be defined as the extent to which individuals believe that using the new technology will enhance their performance. Batmetan explain that perceived usefulness can influence the intention to accept and adopt mobile learning directly or indirectly. Perceived usefulness is a prominent factor which is widely

used in explaining consumer behavior towards a new technology. Perceived Usefulness of a system may be defined as the extent to which individuals believe that using the new technology will enhance their performance [3]. Therefore, perceived usefulness can influence the intention to accept and adopt mobile learning directly or indirectly.

According to value theory, hypotheses H1 in this study:

H1: usability has a relationship of Higher Education Students' behavior and determines in adopting M-learning.

2.2. Perceived easy to use

The results of previous research indicate that easy of use has a relationship in the adoption of m-learning [5]. Batmetan also findings show that adoption will occur against mobile applications have easy to use [3]. Similarly, other research also founded that PEOU has a positive effect on behavioral intention to use the m-learning [21] [22] [23]24]. The other study founded that PEOU had a significant positive effect on behavioral intention to use m-learning in East Africa[25]. Perceived Ease of Use (PEOU) refers to the degree to which a person believes that using a particular system would be free of effort. Chung[5] found that PEOU has a determinant of customer acceptance on adoption mobile application. perceived Ease of Use (PEOU) defined as the degree to which the prospective user expects a new technology to be free of effort. It is further described as the internal belief of mental effort involved in using a system. This study defines it as the degree to which the user expects the system to be user friendly.

According to value theory, hypotheses H2 in this study:

H2: Ease of use has a relationship of Higher Education Students' behavior and determines in adopting M-learning.

2.3. Perceived easy of learning

Previous research has shown that the adoption of m-learning is also influenced by easy of learning [3]. The same thing is pointed out by Chung that the adoption rate of mobile apps should be easy to learn so that they are easy to use [5]. It is also evident in previous studies that show that m-learning used by higher education students should be easy to learn and takes a short time to understand it [25] [26]. Easy of learning can be defined as the ability to understand and use an application with a relatively short time [3]. Easy of learning shows that a mobile learning application can be learned quickly and the higher education students does not require a long time to be able to use it at the time of first use. M-learning is easy to learn and quick to be used can provide a higher level for a return visit and used continuously by the higher education students. From the research that has been done previously showed that the level of learning that is both easy can increase the rate of adoption of m-learning.

Thus, the current study added price value as a predictor of intention to use mobile learning. Then, we hypothesis that:

H3: easy of learning has a relationship of Higher Education Students' behavior and determines in adopting M-learning.

2.4. Higher education students behavior

Higher education students' behavior is the concept is all about how people make their decisions on personal or household products, with the use of their available resources such as time, satisfaction and effort[27][28]. Higher education students were high in adoption and diffusion due to better quality mobile devices, user-friendly m-learning interfaces, more useful applications and services, lower prices, better security, better coverage and higher speed[29].

3. Results and Discussion

Analysis of measurement model, was used to build conceptual model of the measurement model in this study, the fit indexed between in data and proposed measurement model was generated by SPSS 20. So only fully completed 155 questionnaires were processed using SPSS version 20. Response rate was 99.98 percent linear regression was used for statistical testing of data. Variables were tested for

reliability using SPSS and all values were above 0.7 and more. This is each variable Cronbach's alpha values are given below at Table 3.

Table 3. Result of reliability test.

Variable name	Table Column Head	
	No. items	Cronbach's Alpha
Perceived usefulness	9	0.793
Perceived easy to use	12	0.872
Perceived easy to learning	5	0.787
Adoptions	8	0.789

Structural Equation Modeling (SEM) using SPSS AMOS 20 revealed sufficient evidence of goodness-of-fit between the measuring models and the sample data (factor validity test). Structural model created by latent variables to check the hypotheses of research was tested by utilizing the maximum-likelihood calculation technique Subsequent structural test produced good fit statistics $\chi 2/df$ =2868.769, CMIN/df = 1.768 RMSEA=0.042, CFI=0.874 GFI=0.852 NFI= 0.865.

This present study focused on how the Higher education students' behavior in North Sulawesi to the adoption of M-learning. The main motivation for this research was that there was no study conducted that involved Higher education students' behavior intention to adopt M-learning in North Sulawesi.

Result of hypotheses show this study, the H1: usability has a relationship of Higher education students' behavior and determines in adopting M-learning generated the highest regression weight of 0.776 a significant regression, generated the highest regression and amongst the various determinants. This result is compatibility affects behavioral intention to adopt M-learning. The H2: Ease of use has a relationship of Higher education students' behavior and determines in adopting M-learning generated a significant regression weight of 0.759. Respondents indicated that it would be easy for them to learn (mean=7.543). These findings reflected the techno savvy characteristics of the Higher education students'. The H3: easy of learning has a relationship of Higher education students' behavior and determines in adopting M-learning (regression weight=0.157), possibly because M-learning is currently in its infancy in North Sulawesi. This study showed a variable usability has a highest significant support to Higher education students' behavior to adopt m-learning in North Sulawesi. The second to support is variable ease of use to adopt m-learning in North Sulawesi and the third variable is easy of learning. This study showed Higher education students' behavior to adopt m-learning in North Sulawesi.

Based on analysis and previous research from learning literature, the current study examined factors that determine Higher education students' behavior intention to adopt m-learning. The results of structural equation modeling analysis highlight several interesting findings.

First, the perceived of usability on intention to use m-learning is greater than that of performance expectancy. This is an interesting finding. In fact, among the all significant paths, perceived usefulness is the most significant factor, as indicated by its path loadings and significance levels. The findings highlight the importance of perceived usefulness in determining Higher education students' behavior intention to use m-learning which is often not considered by adoption studies in the university or higher education [3] [5]. The results indicated that the perceived usefulness is the most significant factor in the Higher education students' behavior to adopt mobile learning.

Second, we also found that perceived ease of use has a relationship on Higher education students' behavior intention to adopt m-learning [3] [17]. This finding suggests that influences from mobile application and important interface and content connections are a critical determinant and has a positive effect for Higher education students' behavior intention to adopt m-learning. The implication is straight, m-learning educators should pay attention to the importance of content of m-learning. We also found the newly added simple content, simple interface and short text a positive impact on Higher education students' behavior intention to adopt m-learning. The current study highlights the importance of perceived of easy to use in Higher education students' decision making regarding m-learning adoption

[16] [18]. This finding indicates that the simple application and short structure of use m-learning have a significant influence on Higher education students' behavior intention to accept m-learning.

Finally, we found that perceived of easy to learning has positive effects on Higher education students' behavior intention to adopt m-learning. This is consistent to results of some prior studies [3] [29]. One possible reason is that the inherent features of mobile devices, such as small screen and complex keypad, will complicate user input. We also found that the influence of habit of using mobile phone on students' intention to use m-learning was not significant. This indicates that students with a stronger automaticity level of using mobile phone did not mean that they will more likely to use m-learning. The reason may be that higher education students' use their mobile phone primary for connecting with people, and the fitness between mobile devices and learning activities is relative low than between mobile devices and communications. Indeed, there are at least three reasons for students with a higher education students' will not likely to use mobile devices for learning. First, many studies argue that some inherent technical limitations of mobile devices, such as the user interface are difficult to use, slow network speeds, small screens and keyboard, and inadequate memory, will hinder higher education students' to use m-learning; Second, the pedagogical limitations of m-learning also impede students' to use m-learning, content is not simple, hard to understand, for instance, using mobile phone in class may obstruct student concentration and interrupt normal learning process; Third, students usually use mobile devices for hedonic purpose such as gaming or texting with friends and communication with other people.

4. Conclusion

This study showed that perceived higher education students' behavior with perceived usefulness, easy to use, easy to learning, are positive relationship of behavioral intent to adopt M-learning. This study showed to us a perceived usefulness, easy to use, easy to learning, has important determinants of behavioral intent to adopt M-learning. The implications for teacher, lecturer, higher educational organization, marketers and mobile service providers are discussed. The limitations of this study are that it has not yet explore other potential factors (technology enabler, network aggregator, content provider and wireless operators) that may determine behavioral intention towards the adoption of M-learning.

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