

Investigation of Students' Mobile Phone Usage and Influences towards Their Mobile Learning Adoption: A Case Study in Myanmar

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Abstract—Due to today's interconnected and technology-driven world, a physical learning environment is transforming into a virtual or online location where learners can make active learning with portable devices. There is no doubt that an increasing number of students, who have mobile devices which handle digital information and facilitate their mobility. As an integral part of students' daily lives, the universities and schools in higher education are also trying to equip with technology's changes and to solve the demand of their learners, and to adopt m-learning. This study learns the mobile phone usage of Myanmar student. In addition, it constructs a key part which investigates the students' m-learning readiness and evaluates the influences on their attitudes to use m-learning. And a hypothesized model was introduced to investigate learners' readiness to adopt m-learning. The empirical study is conducted by analyzing data collected as paper-based documents from 1024 participants. The findings advocate the eleven hypotheses which have positive impact to students' m-learning readiness and their intension to use m-learning.

Keywords—students, mobile phone usage, m-learning readiness, m-learning adoption

1 Introduction

Nowadays, mobile phones, tablets, and other connected devices become more prevalent among youths can conduct an easy connection with one another. Moreover, due to internet connection, different types of educational materials such as books, presentations, video tutorials and education games from online are available via mobile devices. And mobile phones, online communication has increased, enabling learners from the world to collaborate on educational topics. Beyond the place limitation of learning, mobile learning (m-learning) is not tied learners as they can learn anywhere in a bus or tea shop or canteen. Beyond the time limitation, learners can access educational materials when they desire. Due to benefits of mobile education, more and more universities have begun to adopt m-learning and implement online-based contents which can be effortlessly accessed by the portable devices of the learners or students.

If compared to e-learning, mobile learning can solve some impediments found in the application of the e-learning systems. For example, not every student has access to a computer and the Internet but most of them have phones. This is a real opportunity to transform their learning [1]. Moreover, due to their small size, familiarity and usability, mobile phones in the classroom can be unobtrusive [2], require no technology training, and are not intimidating to most users. So, m-learning intersects mobile computing with e-learning; it combines individualized (or personal) learning with anytime and anywhere learning [3]. In higher learning context, successful implementation of m-learning cannot be achieved without active participation of the students. Different students have different learning styles, as well as their preference for the method of learning - some students are more comfortable in the online environment than others [4][5]. So, although the students are in favor of mobile devices, the universities have to concern the acceptance of m-learning which greatly depends upon the personal attitude of students towards this medium[6].

Nevertheless, most developing nations need to implement m-learning. Because, it is a helpful tool to solve the disparity between academic facilities and physical infrastructure, and is also a good solution to provide up-to-date educational materials for increasing number of students[7]. In addition, it is able to extend the learning and training boundaries such as time and place for students and workers. At the same time, Myanmar's changing social and technological circumstances present an interesting opportunity to explore behaviors in smartphone application (app) adoption[8]. Although Myanmar is one of least developing countries but it is also an interesting country for mobile scholars in terms of unique domestication patterns and mobile culture development, devoid of Internet and mobile legacy. In 2016, computer use was low in Myanmar and only three percent of the population ranged from 15 to 65-year-olds had ever used a computer. Among these, a small group of computer users, only 16% had accessed the Internet within the day. Therefore, smartphones and mobile devices were the primary mode of accessing the internet[9]. This is a good opportunity for Myanmar universities and training schools to consider implementation of online education which can be accessed by mobile devices.

However, before any implementation of mobile education, the investigation of learners' readiness is a basic requirement so that universities are able to design effective strategies for new learning environment. In this work, not only the m-learning readiness but also the items affect the learners' readiness are examined and discussed. To explore the learners' m-learning perspectives and their impacts, this research studied 1024 students from Yangon Technology University (YTU) and Mandalay Technology University (MTU) which are the best technological universities in lower and upper Myanmar. The remainder of this paper is organized as follows; research methodology applied in this study, then result and discussion in investigating of students' m-learning responds, and finally, conclusion.

2 Methodology

The study used a quantitative method, in which a survey was conducted. Though still in the initial stage, the study also tries to highlight the students’ use of mobile devices. It addresses the benefits and challenges presented by the feedback of students. Then in second stage, its purpose is to seek the students’ mobile learning readiness and the influences on their intention to use m-learning. To examine the readiness for adoption of mobile learning, this study employed the technology acceptance model (TAM) which developed by Devis [10] as the bench mark model. The two major constructs of TAM have been investigated and their validity confirmed by a number of information systems scholars and researchers [11][12]. These are perceived usefulness (PU) and perceived ease of use (PEU) in predicting the individuals’ acceptance of different information technologies. In this work, we propose a research model for m-learning readiness which is an extension of TAM, with five constructs; background usage(BU), learning behavior(LB), personal innovativeness(PI), perceived usefulness(PU), expected usefulness for teacher(EUTF) and intention to use(ITU).

Totally, sixty-one questionnaires were developed and inserted into those seven factors to examine mobile readiness. The feedback items were measured using a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). Descriptive statistics were used to summarize each item and their mean values are divided into three levels to determine the classification level for readiness, i.e, 1-2.33 as low, 2.34-3.67 as moderate and 3.68-5.00 as high levels. The questionnaires were randomly distributed as paper-based documents to 1024 students from two technological universities, in January, 2017. To examine structural relationships, the hypothesized causal paths were measured as shown in Fig. 1. The reliability analysis measured the internal validity and consistency of questions used for each construct by calculating Cronbach’s alpha coefficient.

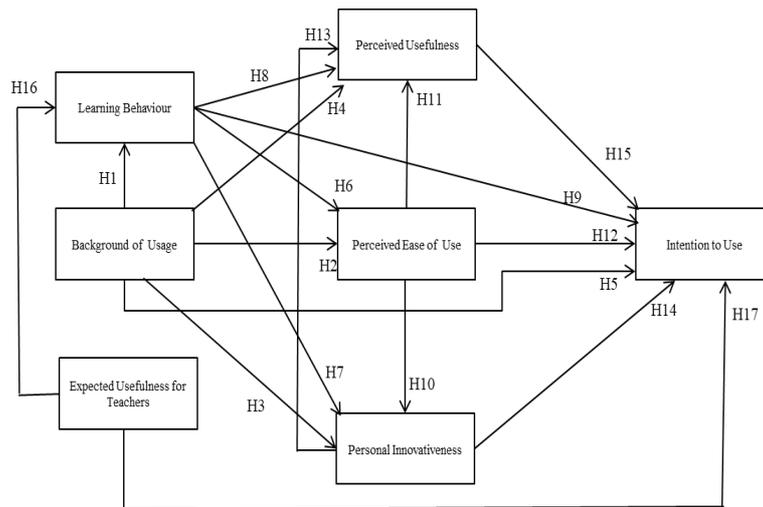


Fig. 1. Research Model

3 Result and Discussion

A better understanding of the students perspectives toward m-learning can assist researchers and educators to realize how to take into consideration factors in m-learning adoption. The research is to investigate learner attitudes toward m-learning based on the seven factors. Habit reflects compulsive behavioral tendencies developed during the past history of the individual. It also plays different role at different phases of IT adoption because the users are more engaged during the initial usage[13][14]. The descriptive data from Table 1 describes that out of 1024 respondents, 68% (n = 698) are from MTU and the remaining 31%(n=326) are from YTU. In considering the ratio of gender, over 58% (n=599) of the female students participated while male ratio is over 41% (n = 425).

Table 1. Demographic profile of the respondents

Group		Frequency	%
University	MTU	698	68.2
	YTU	326	31.8
Academic Year	1 st	293	28.6
	2 nd	215	21.0
	3 rd	210	20.5
	4 th	61	6.0
	5 th	148	14.5
	Master	68	6.6
	PhD	29	2.8
Gender	Female	599	58.5
	Male	425	41.5

3.1 Investigating of Students' Mobile Phone Usage

Most students used to cost their internet service themselves. To confirm this, their monthly internet service charge was investigated. In Fig. 2, we found that the majority of the students' internet cost per month lies between one to fifteen dollar. Their monthly mobile phone expenditure ranged from one to five dollars at least. In Fig. 3, the major source of internet connection is the students which both their private connection and university connection. It shows that 79% of students use both connections while only 2 % of them focus on university connection. These findings indicate that private internet service controls students' internet usage and students have to pay themselves for it.

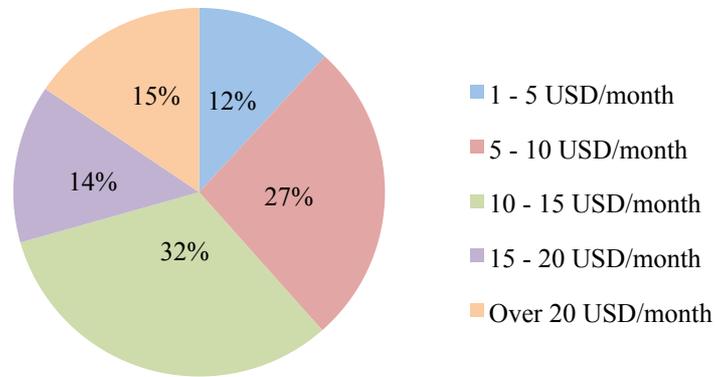


Fig. 2. Monthly Cost for Internet Usage by Mobile Phone

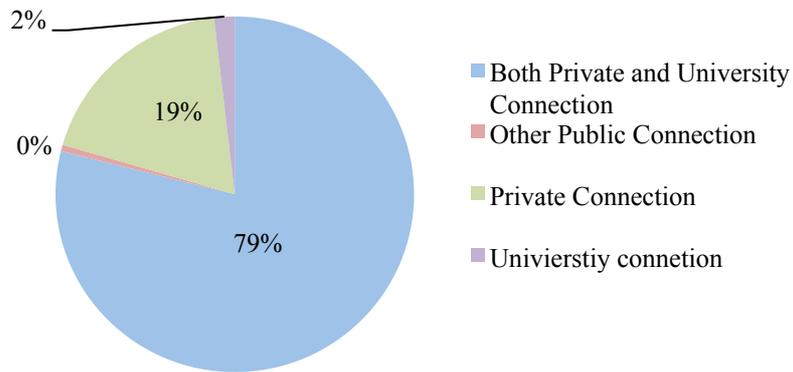


Fig. 3. Mobile Internet Access (Connection)

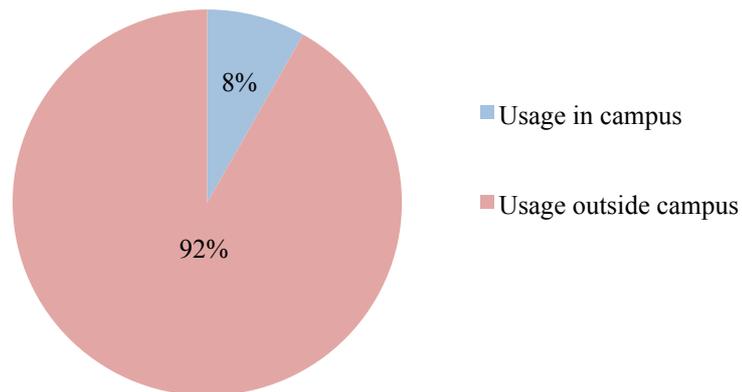


Fig. 4. Mobile Internet Access (Location)

However, if compared to their university connection, Fig. 4 indicates that the students did more internet access via their private connections. When the students were asked about the location of internet usage through mobile, it was found out that 8% were using internet mainly on campus. The remaining 92 % replied their most accessed location is outside campus. Until 2017, there are three telecom providers (MPT, Telenor and Ooredoo) in Myanmar and we studied students' current preferences for their communication. For phone communication, Fig. 5 displays that they also used to take more than one mobile service providers and, most of their communication are provided by both MPT and Telenor. Besides, for internet connection, their responses in Fig.6 indicated that most of them were using MPT and Telenor networks. The participants prefer to use more than one telecom provider. It means that any provider was not able to provide stable network connection.

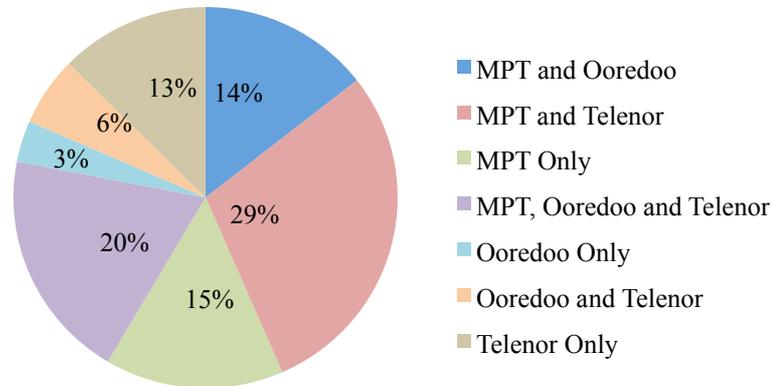


Fig. 5. Service Providers (Mobile Phone Communication)

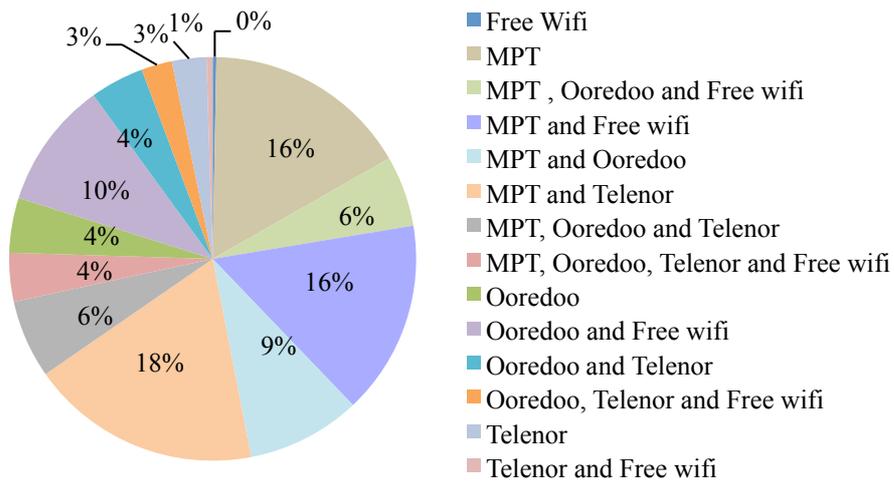


Fig. 6. Service Providers (Internet Access)

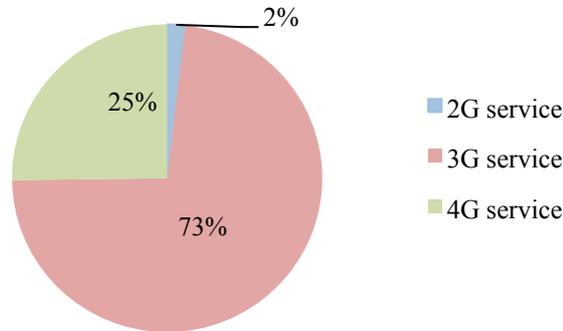


Fig. 7. Mobile Phone Network

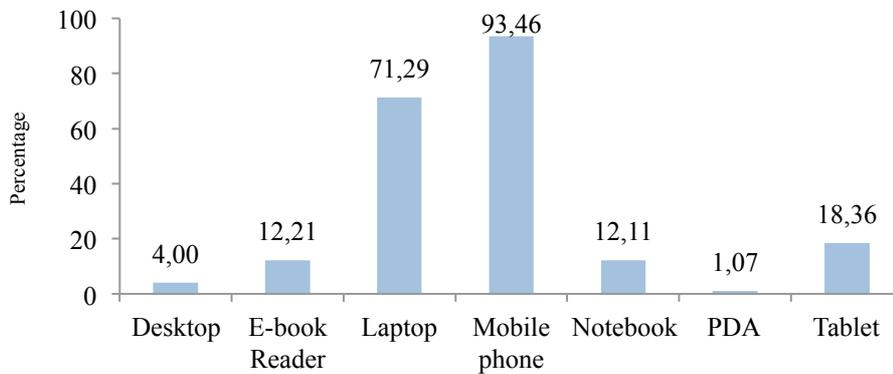


Fig. 8. Personal Devices Ownership

The high mobile phone availability among students as well as the good mobile infrastructure are all important factors that can enhance the shift to mobile learning. The findings on Fig. 7 point out the status of mobile network which students' personal devices can access. Over 73% of students responded their portal mobile devices can serve 3G and 25 % of them are accessible the 4G network. Moreover, due to development in mobile networks, now most of Myanmar places serve the 4G connection. Mobile devices can become a more significant learning tool and a typically raised area. Its technologies can support students in their learning by exploring their world through these technologies. Because, today's university students use mobile phones more than desktop computers and even laptops [15]. In our study, we seek out the popularity of mobile phone among students. In Fig. 8, over 93% of total students own mobile phones, over 12% of students are using notebook, and over 18% of participants have tablets. It is a good opportunity for the universities and teachers to start to develop and provide flexible and interactive learning contents which can be accessed by the mobile devices of their students.

3.2 Investigating of m-learning readiness and its influences

As the mobile devices have been popular in Myanmar, the students might be familiar in its usage. Because these devices have internet access, they allow the user to have access to many things including emails, instant messages and social media. In related to students' background habits with mobile phone, the seven questionnaires were shared to the participants. Based on the results of Fig.9, there are high levels in sharing photo/video(BU2), accessing webpages(BU3), downloading files(BU4), sending/receiving emails(BU5) and messages(BU6), and accessing social sites(BU7). But their background is moderate in video call through mobile phone(BU1).

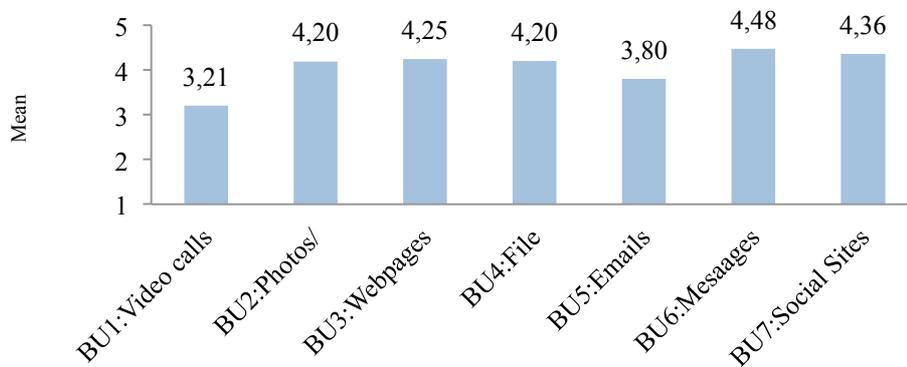


Fig. 9. Background Usage

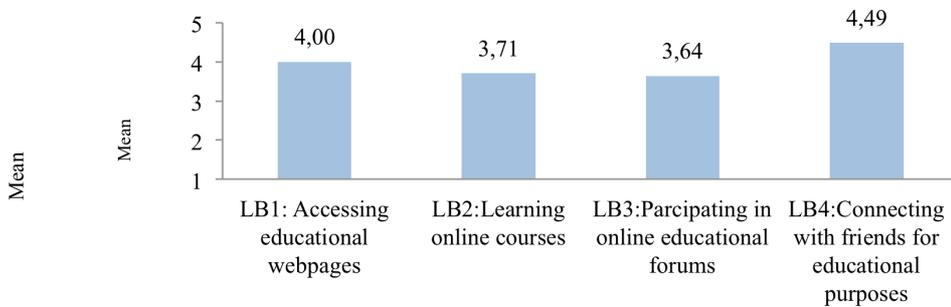


Fig. 10. Learning Behavior

Every person has their own learning style, which affects their motivation when learning new information depending on how they are being taught or studying. By understanding the learning behaviors of the students, the teachers and education practitioners are able to design appropriate instructional strategies that meet their students' needs and preferences [16]. The results of Fig.10 indicate that the participants' learning behaviors are high level in accessing educational webpages(LB1), learning online courses(LB2) and communication with their friends for educational purposes (LB4). But the finding on LB3 shows that they are not strong to join with online educational forum by mobile phone.

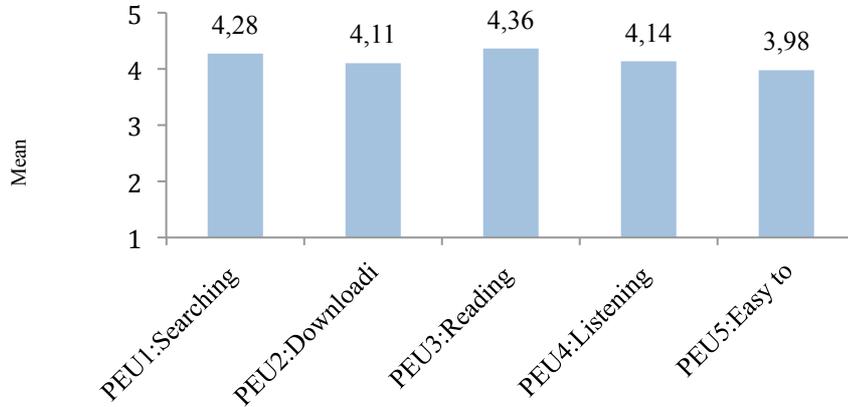


Fig. 11. Perceived Ease of Use

Perceived ease of use (PEU) is the degree to which a person believes that using a particular system would be free of effort which is an imminent acceptance driver of new technology-based applications [10][17]. Results in Fig. 11 reveal that the students' PEU degree is high in all items, referenced their mobile phone usage in educational materials; searching (PEU1), downloading/uploading (PEU2), reading (PEU3), listening (PEU4) and ease to use (PEU5).

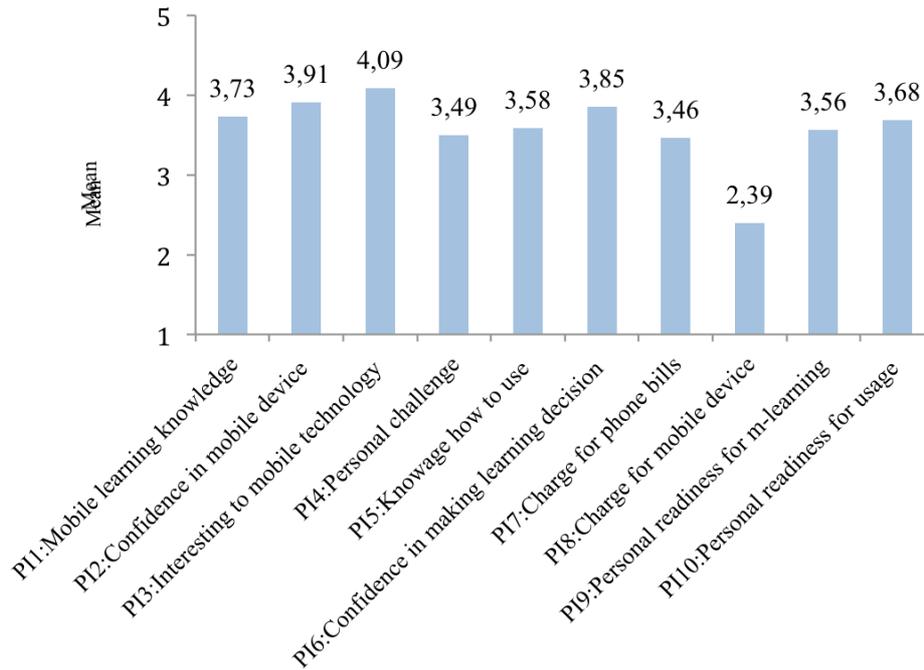


Fig. 12. Personal Innovativeness

Personal innovativeness is the willingness of an individual to try out any new information technology [18] and it plays an important role in determining the outcomes of user acceptance of technology. According to the feedbacks, we found that students have positive personal innovativeness for m-learning. The findings on Fig. 12 indicates that students are high level in m-learning knowledge (PI1), confidence in mobile device (PI2), interesting in mobile technology (PI3), confidence in making learning decision (PI6). But the remaining items; personal challenge (PI4), knowledge how to use (PI5), charge for phone bills (PI7) and device (PI8), personal readiness for m-learning (PI9) and its usage (PI10), states their innovativeness is still moderate.

Perceived usefulness (PU) is the prospective user's subjective probability which will increase his or her performance within an organizational context, by using a specific application system. It is also a major determinant of usage behavior and intention to use [10]. In this study, we measure the PU as the degree to which an individual student believes that use of mobile phone will improve his or her learning performance. Results of Fig. 13 reveal that the level of students' perceived usefulness is high. They gave positive feedbacks in the statements of motivation (PU1), flexible time and location (PU2), interests in learning (PU3), learning opportunities (PU4), quick feedbacks (PU5), encouragement in collaboration (PU6) and class activities (PU7), improvement in learning ability (PU8), quick work done (PU9) and usefulness (PU10).

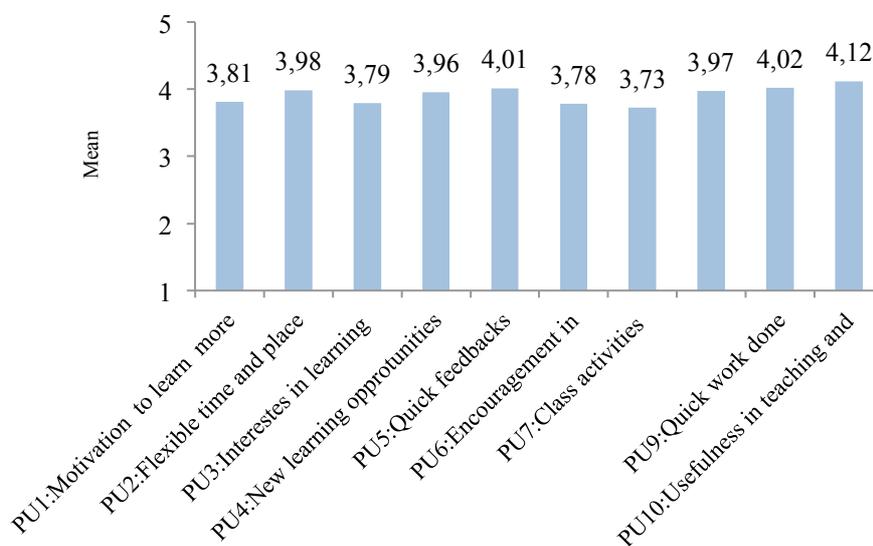


Fig. 13. Perceived Usefulness

The effects of culture are important as one of major factors in learning readiness. Some students in developing countries remark the teacher's role as central to the learning process, instead of taking responsibility themselves for independent learning

in mobile education[19]. The teachers always impart their teaching, using a variety of attractive teaching strategies. And the students also should acknowledge the effective of new teaching method provided by their teachers. It will be useful for better educational commination among teacher and students, the successful implementation and delivery of mobile contents.

In Fig. 14, we found that students have high positive attitudes in mobile-learning's effectiveness for their teachers, although their responds on the performance evaluation(EUTF9) was moderate. But the remaining feedback in advance in education(EUTF1), relationships between teachers and students(EUTF2), enjoyment in teaching and learning(EUTF3), learning encouragement in and outside classroom(EUTF4), conformability in usage(EUTF5), effective delivery for lessons(EUTF6), test preparations(EUTF7), understandability of learning materials(EUTF8) and wishes for integration(EUTF10).

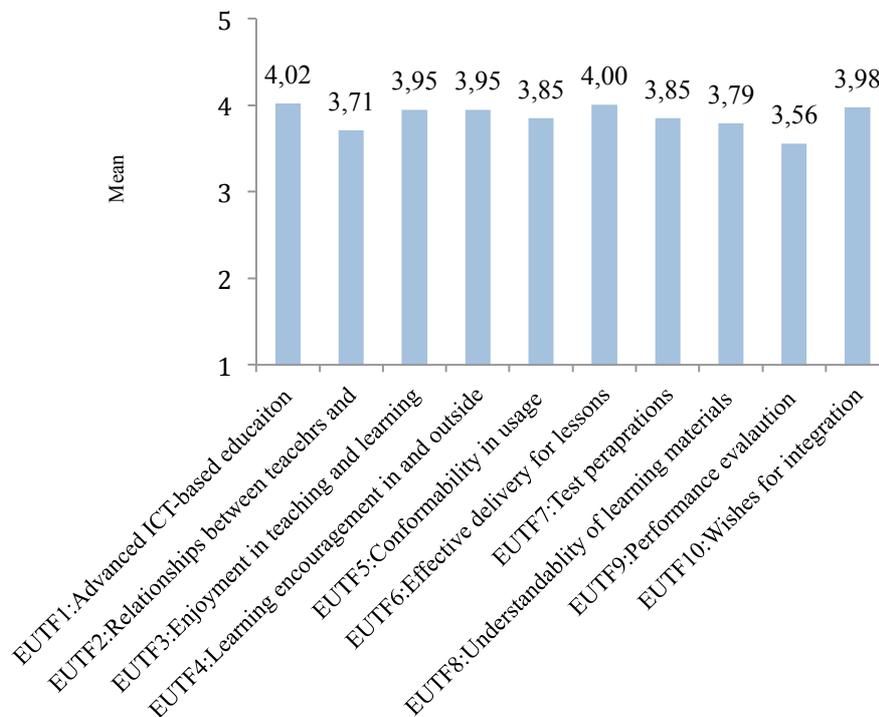


Fig. 14.Effective Usefulness for Teachers

The intention to use is a measure of the likelihood that a person will adopt the application[20]. In measuring the individual's intention to use m-learning, thirteen of fifteen items in Fig. 15 states that they have high degree. The students replied higher likelihood in m-learning intentions; to use without experience(ITU1), to use without experienced friends(ITU2), to know how to use(ITU3), to integrate with face-to-face

learning (ITU4), to prepare device(ITU5), to use for general purposes(ITU6), to use for up-to-date information(ITU7), to use for class information(ITU11), to communicate with teachers and friends(ITU12), to use for mobile courses(ITU13), to make discussion (ITU14), to use as a better educational tool (ITU15). But they gave the moderate feedbacks in three items; to use for research-device(ITU8), to use for research-environment(ITU9) and to use for research-technology(ITU10). This might assume that the students from technological universities are strongly active to adopt mobile-learning, even though its requirement is not sure for their research.

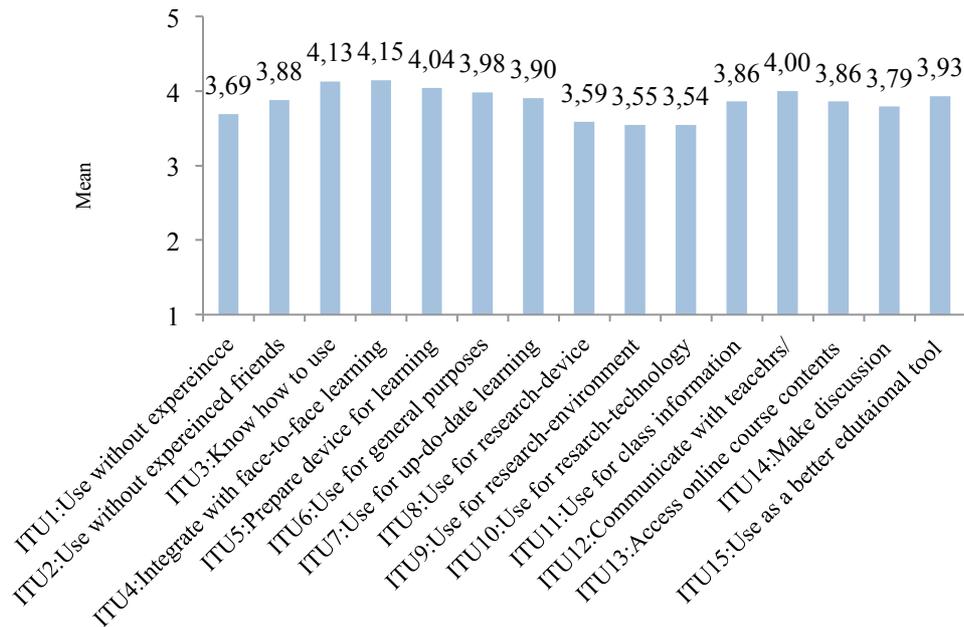


Fig. 15. Intention to Use (ITU)

The next step of data analysis in this study was to analyze the significance of the hypothesized relationships in the research model. Table 2 illustrates the results of the hypothesized relationships. Overall, 11 out of 17 hypotheses were supported by the data. The results indicate that the endogenous variables in this study are as follows: BU significantly influences both LB ($\beta=0.286$ and $p < .001$) and PEU ($\beta=0.237$ and $p < 0.001$). Thus, H1 and H2 are supported. PI ($\beta=0.057$ and $p < 0.151$), PU ($\beta=-0.066$ and $p < 0.143$) and ITU ($\beta=0.059$ and $p < 0.231$) are not significant in influencing BU. Thus, H3, H4 and H5 are supported by the data.

In addition, LB was found to be significant in influencing PEU ($\beta=0.269$ and $p < 0.001$), PI ($\beta=0.155$ and $p < 0.001$), PU ($\beta=0.154$ and $p < 0.001$) and ITU ($\beta=0.114$ and $p < 0.05$). Hence, H6, H7, H8 and H9 are also supported by the data. PEU was found to be significant in influencing PI ($\beta=0.082$ and $p < 0.05$) and ITU ($\beta=0.242$ and $p < 0.001$) but not PU ($\beta=0.076$ and $p < 0.1$), thus supporting H10 and H12 but not H11. PU ($\beta=-0.112$ and $p < 0.05$) was significant influenced but not support by PI. ITU

($\beta=0.362$ and $p < 0.001$) and ITU ($\beta=0.188$ and $p < 0.001$) was found to be significant in influencing the PI and PU. Hence, it caused both H14 and H15 to be supported. EUTF significantly influences on ITU ($\beta=0.220$ and $p < 0.001$) and LB($\beta=-0.046$ and $p < 0.05$). But its influence is negatively and hence, H16 is only supported but not H17. For confirmation of validity of data, Cronbach's Alpha is computed and as shown in Table 3. The Cronbach alpha's value for all the constructs is above 0.7, this study obtains acceptable reliability score.

Table 2. Hypotheses Testing Results

No.	Path	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Result
		β	Std. Error	Beta			
H1	BU-LB	0.286	0.028	0.307	10.124	0.000	Supported
H2	BU-PEU	0.237	0.030	0.253	7.925	0.000	Supported
H3	BU-PI	0.057	0.040	0.055	1.438	0.151	No Supported
H4	BU-PU	0.066	0.045	-0.068	-1.467	0.143	No Supported
H5	BU- ITU	0.059	0.049	0.051	1.197	0.231	No Supported
H6	LB-PEU	0.269	0.031	0.267	8.556	0.000	Supported
H7	LB-PI	0.155	0.042	0.139	3.713	0.000	Supported
H8	LB-PU	0.154	0.048	0.146	3.232	0.001	Supported
H9	LB-ITU	0.114	0.052	0.093	2.191	0.029	Supported
H10	PEU-PI	0.082	0.041	0.074	2.022	0.043	Supported
H11	PEU-PU	0.076	0.046	0.073	1.656	0.098	No Supported
H12	PEU-ITU	0.242	0.050	0.197	4.864	0.000	Supported
H13	PI-PU	0.112	0.035	-0.119	-3.162	0.002	No Supported
H14	PI-ITU	0.362	0.037	0.330	9.759	0.000	Supported
H15	PU-ITU	0.188	0.034	0.160	5.573	0.000	Supported
H16	EUTF-ITU	0.220	0.024	0.218	9.049	0.000	Supported
H17	EUTF-LB	0.046	0.015	-0.056	-3.023	0.003	No Supported

Table 3. Reliability Score

Factor	No. of items	Cranach's Alpha
Background Usage (BU)	7	0.773
Learning Behavior (LB)	4	0.763
Perceived Ease of Use (PEU)	5	0.830
Personal Innovativeness(PI)	10	0.805
Perceived Usefulness(PU)	10	0.916
Expected Usefulness for Teachers (EUTF)	10	0.867
Intention to Use (ITU)	15	0.879

4 Conclusions

This study reveals the mobile phone usage of Myanmar students, including their monthly cost for mobile, mobile services they took, and personal devices. In addition, mainly it points out the significant impact of students' background usage towards their attitudes on learning behaviors and perceived ease of use. We found out that the learning behaviors by mobile devices also influenced directly on their perceived ease of use, personal innovativeness, perceived usefulness and intentions to use. Moreover, in their perception to m-learning, the personal innovativeness and intentions to use were significantly influenced by the perceived ease of use. The significant influences of personal innovativeness and perceived usefulness on their intention to use m-learning were seek out. The results of this study reveals that the attitudes of students to use m-learning are controlled by their acknowledge about the effectiveness for their teachers. But this acknowledge has no significantly impact on their learning behavior. The findings of this study will be helpful for educational organizations including the universities, the schools and the vocational training centers, in their implementation of m-learning materials.

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