

Modelling the Learner's Perspectives on Mobile Learning in Higher Education

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Abstract— Mobile learning is a novel learning technique prevailing in the modern world. It has been identified that the important and balanced contribution from different stakeholders are required to create an environment for a better mobile learning experience. There are many reasons for learners to select mobile learning as an environment for their academic activities. The main objective of this study is modelling the learner influencing factors on mobile learning adoption for their learning activities in applicable and sustainable manner. The six main adoption factors are identified for the proposed model namely usefulness, interactivity, motivation, attitude, facilitating conditions, and ease of use. In the evaluation process, online pre-usage and post-usage questionnaires were used to introduce above six factors and 150 undergraduate students were obtained as a sample. Initially, the students were asked to fill the pre-usage questionnaire and secondly, they were obtained in the novel mobile learning system by using its features and facilities and finally, asked to fill the post-usage questionnaire. Results of the present study reveals that the most significant influencing factor is “Interactivity” on the learner’s mobile learning adoption. In conclusion, incorporating interactivity, usefulness, motivation, attitude, facilitating conditions and ease of use into the mobile learning adoption can better explain the learner perspectives in applicable and sustainable mobile learning framework.

Keywords— Mobile learning, learner perspectives, influencing factors, higher education

I. INTRODUCTION

In the present world, both mobile and communication are the technologies heavily impact on changing the human lifestyle as compared to one decade earlier [1]. These technologies change the human day-to-day activities in various areas such as education, health, diet, finance, recreation, religion, travel and many more areas that are possible. Major reasons for changes in these areas are mobility, wireless accessibility, and continues improvement in these technologies [2].

A. What is mobile learning?

The term of “mobile learning” can be expressed in various ways such as m-learning, handheld learning, personalized learning, ubiquitous learning (or u-learning), anywhere/any time learning, learning on the move, learning while mobile,

and a subset of the e-learning [3]. Mobile learning inherits e-learning features such as multimedia content and collaborative communication with peers [4], but it distinctive from flexibility in time and location [5]. Simply, the mobile learning can be defined as doing any learning task using mobile devices and wireless communication facilities at any time anywhere [6]. In mobile learning, learners enable study with different mobile devices such as smartphones, tablet PCs, personal digital assistances (PDAs), iPads, iPods, electronic readers, laptops, and any other handheld devices which have computing capabilities. In the mobile learning, learners access digital content files in various electronic forms such as text, video, audio, PDF, and many more digital formats via mobile devices. Due to the ambiguity of the term ‘mobile’, does it relates to mobile technology or learners’ mobility?, and the rapid development in mobile related technologies, Kukulka-Hulme on 2009 stated that there is no fixed definition for mobile learning [7]. Some of the remarkable features in mobile learning are, here and now mobile learning which allows learners to access information anytime and anywhere from mobile learning sources and accessing information sources while studying in the classrooms [8], self-learning ability [9], independent learning with flexibility [10] [11], and integration of latest computing technologies such as augmented reality. Further, the different mobile-based learning strategies i.e. text-based concept mapping, image-based concept mapping provides perfect and variant learning experiences. However, by using such strategies effectiveness for learning achievements are questionable but image-based concept mapping improves learner understandings, creativeness and provides comprehensive & miscellaneous study opportunity [12].

B. The learner

Oxford dictionary defines the word ‘Learner’ as a person who is learning a subject or skill. Normally, a learner state as any person who involves the practices of obtaining new knowledge and/or evolving new skill. The learners can use their own different learning styles when work on their desire leaning stuffs and these learning styles navigate them to a particular learning behaviour [13]. According to each learner’s learning style, learners can be categorized commonly as a visual learner, an auditory learner, a read and write learner, and a kinaesthetic learner [14]. Further, the

learner can use different learning strategies [15] to become more independent, autonomous, lifelong learners [16] [17], and learning quicker and more effective [18].

C. Learner and mobile learning

The learner is frequently connected with the mobile device has a chance to connect with learning resources, collaborate with educators and peers in and out of the classroom. This creates learner for new learning prospects with training and support from the same mobile device equipped educator [5]. Accessibility for learning contents at anytime and anywhere enables lengthen the learning time exceed the school day and four walls of the classroom, also educator spend less time on rote work, but more time spend on supporting learners with energetic learning. Learner able to carry on his or her learning activities with digital content through mobile broadband suit with own level, pace and learning style. Study progress of learners can be monitored via mobile tools such as dashboards using real-time updated data. Educators have the flexibility to spend classroom time for learners effectively [19]. Learners face assessments and exams at place and time independent convenient environments and high trusted device generated exam results.

II. LITERATURE REVIEW

Present world mobile technology and communication technology (MTCT) are developing rapidly [20] and their immersion to the education field occur simultaneously [1]. Most parts of the world MTCT are integrated with education to benefit the learners for studying with up-to-the-minute technology environment. Hence, the number of researchers in the fields education, mobile technology and computer science conduct research to advance the technology and simpler the usage.

Facilities such as downloading mobile content, searching online educational material, and quality educational materials are the learner's preference factors in university ML systems. Most used features are calculators, online text translators, dictionaries and reference books, and foreign language learning. With mobile learning systems, students' subject learning interest, as well as learning achievement, are increased [21]. The behavioral intention is one of the major influence factor for learners for using the ML in higher education [22]. The factors which effect on learners' intention to embrace mobile learning as a learning method in a mobile-based interactive learning environment, is mainly depending on the individual tendency towards acceptance of cutting-edged technologies in IT [20]. Mohammadi is identified that subjective norm and perceive image of mobile learning are most important factors on intention to use mobile learning in Iranian government higher education institutes at Teheran and also, user satisfaction and intention are important to use mobile learning for the learners in this domain [23]. Mobile device ownership is a positive attitude to the learner for using ML methods in education and this attitude is changed on learner's age, but not on learners' gender [24] [25]. Motivation is a factor for students to be considered in ML for their studies. Most of students motivate when ML system is developed by analysing factors such as their learning habits, expectation and perception, traditional educational system, and cultural factors to be work on self-learning environment [9]. A mobile personal learning environment enables to integrate institutional learning

management systems as well as student preferred mobile applications to increase the learner motivation towards mobile learning [26].

The motivation on engaging m-learning in learning environments can be increased by attaching collaborative communication application, providing facilities to customize and personalize to have different learning styles and preferences, and providing capabilities to acquire related learning information from other resources. However, these motivational factors may subject to change by the economy of the country as well as the type of higher educational institute [27]. In this paper, we propose the sustainable and applicable mobile learning framework for higher education permitting to the learner's perspectives.

III. RESEARCH MODEL AND HYPOTHESIS

The model developed to describe the factors that depend on learners for sustainable and applicable mobile learning framework. Mainly six observed variables are identified with the mobile learning adoption to elaborate the proposed model. These observed variables are Usefulness, Personalization, Motivation, Attitude, Usability, and Acceptance. These six observed variables are generated by categorizing more than thirty effective factors which identified through the previously done mobile learning related researches.

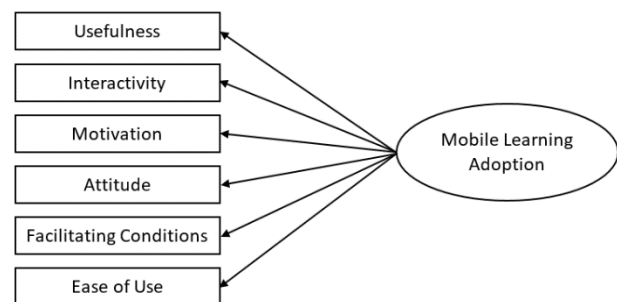


Fig. 1. The proposed model for learner adoption in mobile learning

A. Learner's adoption of Mobile Learning

There are various constructs, theories, and models prepared to explain the learners' different learning styles [28] and different learning technology preferences [29] to accept, adapt, and use them [30] [31] [32] [33].

When studying effective factors required to sustainable and applicable mobile learning system for learners, it should be taken into account both individual factors of learners' regarding mobile learning systems and characteristics of mobile learning systems.

1) *Usefulness*: Perceived Usefulness is defined as an insight of a person that her or his particular routine work performance may improve by using a particular new technology [31]. Mobile base learning strategies such as text-based concept mapping and image-based concept mapping improve learners' cognitive processes such as understandings and creativeness with comprehensive miscellaneous study opportunities [12]. Such improvements in cognitive processes are considered as useful features for the learner to pursue studies using mobile-based learning systems or mobile-based learning applications. When developing mobile learning applications or systems, usage

expectation is one of the critical factors to be considered. Because, actual usage of a mobile application or system, depending on its usefulness and user expectations on particular study purpose or area [34]. On the other hand, in the present, one of useful mobile-based study area is, providing work related theoretical and practical training to employees. These employees believe mobile-based learning is very useful because of its practically soundness specially in personalized and collaborative environment; their managers believe its technology soundness and ease-of-use enhance usefulness of mobile learning [35].

Here we define the usefulness as, “the insight developed by the adherence that using a particular mobile learning system improves individuals’ performance with the system qualities for the individual such as cognitive processes and usage expectation while demanding that the particular system is applicable and sustainable”.

H1: Usefulness will have a significant influence on Learner for adopting applicable and sustainable Mobile Learning System.

2) *Interactivity*: Interactivity can be defined as a combination of three factors such as characteristics of technology, communication interchanging mechanism, and the point of view of the user regarding the experience that the user received from the particular technology or mechanism [36]. Also in [37] suggested that interactivity can be defined using four constructs such as control, playfulness, connectedness, and responsiveness in the areas of online marketing, teaching, learning and evaluating using Micro-blogging services. User interactivity is a useful requirement for mobile learning with nice content presentation and graphical user interface [38] and the interactive contents increase the mobile learning adoption [39]. Some characteristics of the learner are directly affected with learning achievements in the field of English learning via mobile phones. For instance, learners’ self-management capability and playfulness are positively effect on their final learning outcome [40]. Mobile learners who receive their work related training more prefer to have personalized and collaborative mobile learning application for their learning activities [35]. Meanwhile, engagement capability of the mobile learning applications increases the learning productivity and mobile learning adoption [41]. Therefore, learners prefer to have interactive learning environments with self-management, engagement, and collaborative capabilities for their study purposes.

Here we define the interactivity as “the capability of a mobile learning system to change its functionalities according to the individual learner characteristics, self-management capabilities, playfulness, engagement and collaboration to improve individuals’ performance while demanding that the particular system is applicable and sustainable”.

H2: Interactivity will have a significant influence on learner for adopting applicable and sustainable mobile learning system.

3) *Motivation*: Motivation can be defined as “the reasons underlying behaviour” while it is defined as “the attribute that moves us to do or not to do something” [42]. Basically

motivation can be divided as intrinsic motivation and extrinsic motivation. Intrinsic motivation energizes and sustains activities through the spontaneous satisfactions inherent in effective volitional action. It is manifest in behaviours such as play, exploration, and challenge seeking that people often do for no external rewards [43] whereas extrinsic motivation is considered by engaging in a task to achieve some separable outcome and it is contradictory of the intrinsic motivation [44]. However, the academic motivation is defined as “enjoyment of school learning characterized by a mastery orientation; curiosity; persistence; task-endogeny; and the learning of challenging, difficult, and novel tasks” [45]. Learners prefer to pursue studies using motivational mobile learning systems implemented in self-learning environments and developed by integrating motivational factors such as enjoyment [41], students’ learning habits, expectation and perception, traditional educational system, cultural factors [9], eagerness of new users for modern mobile devices [46], location based context learning [47], self-initiating using self-experience technology, flexible with routines [48], texting, educational games playing, social learning, electronic learning materials reading, assignment and quizzers completing [49], and various LMS and learner preferred mobile applications [26]. Also in the music learning educational environment, a mobile learning application with integrated games can be used to acquire theoretical and practical music knowledge enthusiastically. Educators sensitive to mobile learning technology and motivational mobile learning apps, motivate learners to have better learning achievement with the functionality of monitoring and improving weaknesses of the learner. Intrinsic motivation in mobile learning is further suggesting with a view to motivate the learner and more motivation will make better musicianship [50]. On the other hand, intention to adopt mobile learning for working learners depending on various motivational elements such as cognitive, affective and social needs over attitude. Motivation of these learners can be increased to adopt mobile learning in learning environments by attaching collaborative communication application, facilitating to customize and personalize applications to have different learning styles and preferences, and facilitating to acquire related learning information from other resources [27]. In addition, integration of mobile games to mobile learning applications with the functionality of multiple guiding approaches for completing quizzers is another successful approach to motivate learner for mobile learning [51]. Moreover, the inquiry-based ubiquitous mobile gaming approach is another successful learning tactic with the requirement of learners inherit motivation. This learning approach is very effective and enhance students’ problem solving and critical thinking abilities [52].

Here we define the motivation as “individual reasons such as different interests, inspirations, eagerness, and enjoyment for the learner to pursue learning via technology. Though motivation along these reasons may intrinsic or extrinsic, the objective in this learning endeavour is the success while demanding that the particular system is applicable and sustainable”.

H3: Motivations will have a significant influence on Learner for adopting applicable and sustainable Mobile Learning System.

4) *Attitude*: Attitude is defined as “psychological tendencies that are expressed by evaluating a particular entity with some degree of (dis) favour” [53]. According to the technology acceptance model, major philosophies influence attitude toward system use are, perceived usefulness and perceived ease of use and ultimate reason for actual system use [54].

Learners have a positive attitude to access information from diverse sources in anytime and anywhere. It is an optimistic sensitivity for mobile learning system developers or educators [8]. Further, the learners also have positive attitudes, when they use stress-free mobile applications in their learning activities [55], and when they have ownership of smartphones and tablets. But some of learners have negative attitudes for security and mobile signal strength of the mobile learning devices [56]. Employed learners' intention to use mobile learning is depending on motivational applications integrated with according to their social attitudes [27]. However, perception for mobile learning is diverse for different learners. Some learners see functionalities are very successful in studies, while others do not believe it and therefore they need more training on mobile learning [57]. Mobile learner's viewpoints regarding teaching and learning using mobile devices can be categorized as advantages and frustrations. Speedy information retrieval, communication between learners and teachers, diverse learning methods (i.e. Audio, video, text, graphics), on the spot learning [58], location based context learning [47], are some advantages and anti-technology teachers, device challenges (i.e., small screen, small key board), device distraction are major frustrations [58]. While intention to use mobile learning is mainly depending on individual tendency towards acceptance of cutting-edged technologies in information technology [20]. In addition, subjective norm and perceive image of mobile learning are most important factors on intention to use mobile learning for mobile [23]. However, learners of the mobile learning with the perception for resistance to change to technology tend to be unsuccessful [40].

Here we define the attitude as “individual psychological tendencies that are expressed by evaluating a system with some degree of favour or disfavour such as perception, intention, resistance to change, and learner characteristics while demanding that the particular system is applicable and sustainable”

H4: Attitude will have a significant influence on Learner for adopting applicable and sustainable Mobile Learning System.

5) *Facilitating Conditions*: The “facilitating conditions” is defined as “found objective factors in the environment that observers agree to make an act easy to accomplish, provision of support for users in the case of need or in the case of difficulties and also easily controlling environment according to own mind” [59].

Usability is one of major facilitating conditions and mobile learning usability of the mobile technology experience learner is high. These learners have more capabilities to pursue high complex and lengthy learning activities using mobile learning [9]. When learning technically sound subjects or algorithms, learners and teachers may have to face usability problems in devices. In

such situation, it is required a better integration between applications, mobile devices, and technical infrastructure to overcome such problems [60]. In addition to that mobile technology affordability is another factor to be considered when carrying out the mobile learning [11]. Factors to be considered related to affordability are soundness in financial, psychological, and technical backgrounds while financial affordability is significant matter in mobile learning [61]. Learners prefer to acquire knowledge using sophisticated technology because to obtain better results in their exams. These technology usage the learner depend on the technology affordability [62]. Therefore, it is required solutions for affordability in mobile technology specially for infrastructure and various other costs [63]. Moreover learners acceptance for fruitful mobile learning systems due to various facilities or facilitating conditions such as behavioural intention, students' opinions with supporting to educational institution strategy [22], meaning full content, subjective norm, behavioural control [64], audio & video based content, SMS base learning [65], SMS based assignment [66], security for data with integrity & privacy, offline accessible, simplicity as simple and understandable contents [67], blended learning mode [68]. However, blended learning is a learning mode and it is important to do further research whether such existing learning strategies for web-based or computer-based systems are suitable for mobile-based learning systems, or is it required to implement new learning strategies for mobile learning [69]. Furthermore, individual factors such as individual tendency towards acceptance of cutting-edged technologies in IT [20], performance expectancy, effort expectancy, social influence, perceived playfulness and attitude are positively impact on students to accept mobile learning, while poor facilitating conditions and self-management are impacting negatively on accepting mobile learning for individuals [70]. It is obvious that facilities such as support [63], training [57] and independence [11], trustworthiness [39], prior learning experience [63] [41], are important conditions for learners to pursue studies through this medium. On the other hand, one of the principle condition in mobile learning is student readiness for mobile learning [71] and it is worth to include student's m-learning readiness to institutional mobile learning implementation plan with other features such as design guidelines, development phases and articulating norms [64]. Because student's financial, psychological and technological readiness [61] is important for sustainable and applicable mobile learning in an institute.

Here we define the facilitating conditions as “found objective factors in the system such as usability, affordability, acceptance, support, independence, prior experience (or learning experience), user-training, trustworthy, readiness, blended learning, and learning methods (or learning strategies) that observers agree to make an act easy to accomplish, provision of support for users in the case of need or in the case of difficulties and also easily controlling the system according to own mind while demanding that the particular system is applicable and sustainable”.

H5: Facilitating conditions will have a significant influence on Learner for adopting applicable and sustainable Mobile Learning System.

6) *Ease of use*: In the Technology Acceptance Model (TAM), the term “ease of use” was defined as “the degree to which an individual believes that using a particular system would be free of effort” [31].

Presently, mobile learning can be used to provide work-related theoretical and practical training for employees. The managers of the above mentioned employees identify mobile learning as a medium which ease of use for providing knowledge for their employees [35]. Besides the effectiveness of learners on their learning achievements depend on various reasons. One such reason is mobile learning applications development strategies. One of problem in such strategies in development is, high mental loads for the learner. The reason for the above issue is, request learners to complete learning activities through the application in the very short period of time with the high memory usage. As a result the learner have to keep learning content and system instructions in their memory [72] and it effect badly for ease of use of the application. To enhance self-efficacy and satisfaction of the education with mobile learning, it is important to have fewer memorable and thinkable steps to handle educational mobile applications with more user-friendly learning environment [39]. Therefore, designing mobile application is vital in mobile learning. It is essential to identify learners’ requirements when designing mobile applications. Learners prefer to pursue learning endeavours in the ubiquitous environment with self-initiating, using self-experience technology, and flexible with routines [48].

Here, we define the ease of use as “the degree to which an individual believes that using a particular system would be free of effort, because that system is less cognitive loads (fewer memory loads) in content, user-friendly, and flexible while demanding that the particular system is applicable and sustainable”.

H6: Ease of use will have a significant influence on Learner for adopting applicable and sustainable Mobile Learning System.

IV. SYSTEM FUNCTION AND ARCHITECTURE

Mobile Learning Application (MLA) was developed as a prototype naming MLFRAME to identify learner’s perspectives on applicable and sustainable mobile learning environment in higher education. Open source software development tools were used to develop the MLA in the Apache Cordova/PhoneGap development framework [73]. Also, this framework allows developing platform-specific mobile applications such Android, iOS, Windows, and etc. The Fig. 2 represents the architecture and Fig. 3 represents the mobile interfaces of the proposed system.

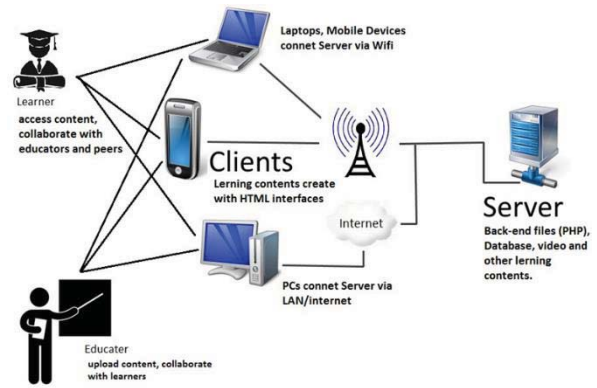


Fig. 2. The architecture of the proposed system

The server is running on Linux platform and both database and PHP back-ends run on it. The connection between client side and PHP files is done by JavaScript through Ajax request. Hence, the database and learning contents would be able to provide secure environment. Therefore, clients have no idea about the database or backend files. Educator or content developer can create and upload content (video, PDF, text, pictures, etc.) through the secure interface and able to access via PC. In addition, they can collaborate with learners. Learners allow to access learning contents and collaborate with peers as well as educators through MLA. Furthermore, they can access the same content using the mobile web site.

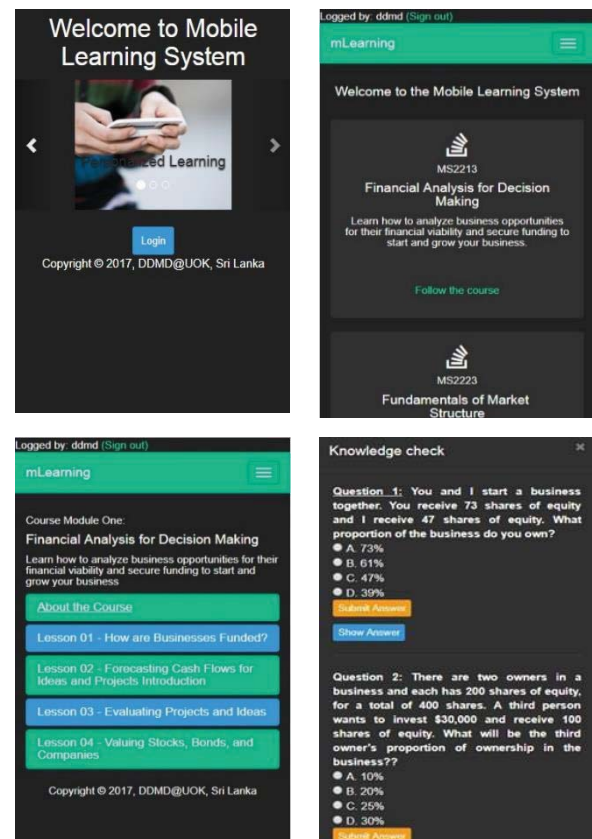


Fig. 3. Mobile interfaces of the proposed system

V. RESULTS AND DISCUSSION

The pre-usage and post-usage tests were conducted using 150 undergraduate students. Among students’ responses, 134 completed valid responses were selected for the data analysis. The five-point Likert scale ranging from -10

“strongly disagree”, -5 “disagree”, 0 “neutral”, 5 “agree” and 10 “strongly agree”.

The paired sample-T test was applied for the pre-usage and post-usage survey data to find the influence on mobile learning adoption in higher education through the interactivity, usefulness, motivation, attitude, facilitating conditions and ease of use. Finally, the dependency of the popularity of proposed system with above features is shown with the correlation model (Pearson correlation coefficient). The data follows the normal distribution (Anderson Darling Normality Test p-value < 0.005) as well as data amount exceed 30. Hence, paired sample-T test (parametric) was applied for advance analysis. The hypothesis is set as below.

$$H_0 : \mu = 0 \quad \text{VS} \quad H_1 : \mu > 0$$

H_0 =Interactivity/Usefulness/Motivation/Attitude/Facilitating Conditions/Ease of Use has not significant influence on learner for adopting applicable and sustainable mobile learning system.

Table 1 represents the mean values and p-values regarding the above factors. According to the paired sample-T test results, the p-values of interactivity, usefulness, motivation, attitude, facilitating conditions and ease of use are equal to 0.000 (<0.005). This implied that the H_0 is rejected and H_1 accepted. All the mean values are greater than 0 and near to the 5 point of the Likert scale. This would imply that the learners strongly agree with the system interactivity, usefulness, motivation, attitude, facilitating conditions and ease of use. Hence, all factors have influenced significantly to the learner for adopting applicable and sustainable Mobile Learning System.

TABLE I
MEAN VALUES AND P-VALUES

Factor	Mean value	P-value
Interactivity	5.73694	0.000
Usefulness	5.73694	0.000
Motivation	6.74627	0.000
Attitude	6.74627	0.000
Facilitating Conditions	6.74627	0.000
Ease of Use	6.74627	0.000

Finally, the Pearson correlation coefficient was calculated between student response weight, counts and used rules in Table 2 to interpret the correlation coefficients.

TABLE 2
CORRELATION COEFFICIENTS INTERPRETATION RULES

Correlation coefficient	Positive	Negative
0.0 – 0.3	No correlation	No correlation
0.3 – 0.5	Weak positive correlation	Weak negative correlation
0.5 – 1.0	Strong positive correlation	Strong negative correlation

Following hypothesis tests were applied with the p-value. If the p-value is less than 0.05, the hypothesis is rejected at 0.05 significant levels.

$$H_0: \rho = 0 \quad \text{vs} \quad H_1: \rho \neq 0$$

Table 3 represents the correlation coefficient values and p-values according to the Pearson test. The result reveals that the p-values of all factors are less than 0.05. This would imply that the H_0 rejected and H_1 accepted.

TABLE 3
PEARSON CORRELATION COEFFICIENT TEST RESULTS

Variable	Correlation	p value
Usefulness	0.925	0.024
Interactivity	0.936	0.019
Motivation	0.923	0.025
Attitude	0.919	0.028
Facilitating conditions	0.886	0.046
Easiness	0.923	0.025

Fig. 5. Pearson correlation coefficient test results

According to the Pearson correlation coefficient test between student response weight and counts calculated using MINITAB computer application and correlation of each observed variables greater than 0.5 and close to 1. Therefore, each observed variable’s null hypothesis (H_0) is rejected and each observed variable’s original hypothesis accepted. Hence each observed variable is strongly connecting to the latent variable mobile learning adoption. According to correlation values, the proposed system and its feature model is illustrated as Figure 4. The results of the present study revealed that the most significant influencing factor is “Interactivity” on the learner’s mobile learning adoption.

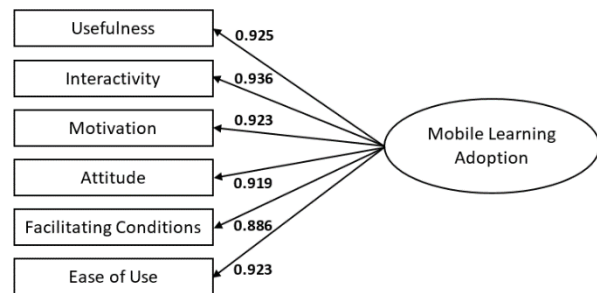


Fig. 4. Proposed model for mobile learning adoption with correlations

However, we can have assumed that the reason for this result may be due to higher value of the factors such as individual learner characteristics, self-management capabilities, playfulness, engagement and collaboration of the learners selected for this researched are young group of university students. Butoi and et al. on 2013 obtained interactivity as the highest influencing factor for cloud based mobile learning system [38]. On the other hand, it is well obvious that mobile learning system strongly correlated with proposed influencing factors because each influencing factor has correlation value very close to 1.0. Among them facilitating condition has lowest correlation with the system. According to our proposed definition, this may prevail due to a difficult facilitating condition in this experiment environment for learner to carry out learning activities through this mobile learning system.

VI. CONCLUSION AND IMPLICATIONS

This study was conducted to identify the influencing factors for the learner to adopt applicable and sustainable mobile learning framework. The six main factors were

proposed and analysed with paired sample-t test and Pearson correlation coefficient test. Learners strongly accepted each observed variable through the proposed system and each observed variable strongly connected with the latent variable 'mobile learning adoption'. The "Interactivity" is the most significant factor (while other factors are also much significant excepting "Facilitating Condition") to be considered when designing and developing applicable and sustainable mobile learning framework in higher education while other factors are important.

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APPENDIX

Pre and post survey questionnaire where used in this study were added.

According to your experience of the mobile learning system you used, provide your ideas to the below (Key to answers:SD: Strongly Disagree, DA: Disagree, N: Neutral, A: Agree, SA: Strongly Agree)	
i. Usefulness	
Usefulness	
01	This system improve your learning ability equally compare to class room learning process
Cognitive process	
02	This system helps to see factors in different ways in different direction
03	This system helps generate new knowledge and innovation
Usage Expectation	
04	This system enhance learning achievements by finding new knowledge, completing assignments, and collaborating peer learners and teachers.
ii. Interactivity	
Personalization and self-management	
05	This system can be personalized and self-managed (such as maintain personal profile and do learning activities at any convenient place and time).
Interactivity	

06	This system provide interactive learning environment by integrating various interactive tools and facilities to interact with peer learners and teachers while studying (such as commenting, chatting, etc.)?
Playfulness	
07	This system contains entertainment nature, which stimulates your curiosity, enhance exploration and not realize the time elapsed.
Engagement and collaboration	
08	This system provides facilities to engage and collaborate with peer learners and educators to get support in study-difficulty or learning recommendation (chatting, commenting, social media, etc.).
iii. Motivation	
Motivation	
09	This system facilities and tools motivate you to use it for studies to have better results and learning satisfaction.
Interest and inspire	
10	This system's various tools engage and inspire you to carry out learning (such as texting, playing games, accessing social networks, reading electronic materials, watching video tutorials, and completing assignments & quizzes).
Eagerness	
11	This system eager for studies because of its using the mobile technology.
Enjoyment	
12	The using of this system is enjoyable for day today study because of its integrated recreational and other facilities.
iv. Attitude	
Attitude and perception	
13	The selection of this system for studies is a wise idea and will be a best method of learning.
Intention	
14	The adaptation of this system in to university courses causes to obtain high educational achievements
Resistance to change	
15	The changing your current learning methods and using new system to learn does not feel any uncomfortable.
Learner Characteristics	
16	The system can access at any convenient place and time in your lifestyle.
v. Facilitating Conditions	
Usability, Readiness & affordability, and acceptance	
17	The system is most of the time fulfilled learner requirements within short time in acceptance manner and affordable way.
Support & user-training, Prior/Learning experience	
18	The system provides support & user training and user do not need to have prior/learning experience to use it.
Independence and Trustworthy	
19	The system allows you to learn independently and trustworthy by integrating better security for its learning contents.
Blended learning mode and Learning Methods/Strategies	
20	The usage of system can enhance by providing blended learning mode (online, offline and face to face) and different learning methods (SMS, MMS, E-mails and Social Networking).
vi. Ease of Use	
Ease-of-use	
21	The system is easy to use.
Less cognitive/memory loads	
22	The system requires less operating steps, which need to keep in memory to operate it and carry out studies.
User-friendly	
23	The system provides easy way to operate it and clear, understandable user guide.
Flexibility	
24	The system has flexible of changing learning process according to learner possible access time; access place, device and device's operating system.