

Mobile Learning Support with TELD to Facilitate in Learning Environments

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ABSTRACT— *Mobile learning application is learning trends that integrate mobile technology advances the benefits of education by utilizing internet access as a communication tool to disseminate information. Mobile learning applications in general are able to improve the results of the learning process by changing students learning habits and learning methods. Through a pedagogical approach to methodology of Teaching by Example and Learning by Doing (TELD) has present to reinforce dynamic interactions and provide instruction how to time integrate and harnes teaching for students. This emerging 21st century conception the principle that learning can be done from anywhere, anytime and anyhow-learning in formal education can be held effectively and efficiently should it, is done in a systematic and holistic way. This article purposes a strategic design mobile learning for effective mobile learning implementation. A courseware approach is being selected as vehicle to conduct learning activities within m-learning environment.*

Keywords--*Mobile Learning, TELD, Learning Environment*

I. INTRODUCTION

In this area of digital disruption, there is an opportunity to minimize the risk and maximize the opportunities following the past paradigm shift from personal computers in the home to small hand-held mobile devices that are portable and provide a combination of handphone, data storage, internet, management features and application (apps). One such opportunity is m-learning through data and communication transfer made possible by mobile technologies [1]. An obvious benefit is that m-learning user can learn anywhere on the higher education institution at any time through the use of mobile devices include mobile phone, smart phone, as well as digital audio and their usual place of learning like classrooms or personal computer. This mobile device which have a number of advantages for e-learning environment, for instance permitting students and teachers to use their free time to finish any allocated home work or to prepare lessons [3]. With m-learning it allows learning to be made away from the environment of the classroom, m-learning as an extension, allows learning to be made away from a fixed locale. However, there is a contention that m-learning through these portable device will never take place of the classroom or other e-learning method in accordance.

On the other hand, many literatures on the m-learning have been reviewed. It is believed that m-learning has gained great attention of many researchers as a result of what educators are implementing at their classroom.

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M-learning along support TELD environment is worthy to be further studied. The main objective of the paper is proposing a m-learning theoretical model that can be implemented in TELD environment.

II. LITERATURE REVIEW

2.1 Mobile Learning (*m-learning*)

M-Learning is an expression when in the field of learning has been used extensively in various places in all countries of the world, besides this m learning is also known as online learning which has also been encouraged by experts to be used in higher education, university and other institutions because several aspects of support have been available such as the availability of mobile phones, the ability of teachers to support motivation and freedom to students, as well as the provision of privacy in sharing, giving and getting information.

M-learning also can be defined as the intersection of mobile computing and e-learning: accessible resources wherever you are, strong search capabilities, rich interaction, powerful support for effective learning, and performance-based assessment [4]. Based on these definitions, the m-learning is a learning model that utilizes information and communication technology. Early perspectives of m-learning mainly focused on technology, but currently several different m-learning perspectives have focused on diverse features and aspects [5].

This m-learning relates to the development of technology and its mobility from day to day, student mobility and related to the mobility of forms and learning models that provide and give a higher perspective to education [6]. In this day and age, educational institutions are confronted with a very good fact that mobile phones have experienced technological development very quickly becoming a smart phone and have experienced a wider distribution in the world and this has been lined up as a device for e learning throughout the world.

This also affects the increase in storage requirements and the processing speed of mobile devices. In addition to that the decline in the price of smart phones from day to day makes cell phones have become a part of life and even become a major necessity such as clothes attached to the body, no longer like the accessories [7]. The fact is that smart phones are used not only for communication, but its technology has also been used for learning devices.

Mobile technology supports highly interactive learning environments, whether or not they are part of formal education. There is relatively little knowledge about how individuals learn with the technologies, particularly in informal learning settings, where mobile devices mediated learning practices predominantly occur. Knowledge about how individuals learn to employ mobiles in their learning practices is needed if educators are to understand and operationalise in formal education.

Moreover, m-learning is also interactive. The learning process is happening through numerous social and content interaction, which are mediated through mobile devices [8]. Students can be in different locations and participate, interact with friends and teachers.

In addition, in order to make it run effectively, teachers must redesign their learning materials, develop them according to the needs of new types of learning. Mobile phones have been operated as instructional learning functions like communication functions due to the advancement of mobile technology. Learners can receive and send teaching materials through various types of messages such as text, voice messages and pictures via mobile

phones [9]. Moreover, interesting learning content through various educational sources on the internet can be used as learning material for students inside and outside the classroom can be created and developed with mobile devices and supporting learning tools [10].

In m-learning, learners can learn across time and space [11]. Learning can occur outside the classroom and learning material are not limited to text books. Mobile devices, for example communication, data capturing and content creation [12]. Thus, mobile technology has great potential to extend and enhance teaching and learning .

On the concept of the learning m-learning brings benefit from the availability of attractive visualized teaching materials can be accessed from any time and anywhere. It is important to note that not every suitable teaching material utilize m-learning [13].

2.2 Teaching by Examples and Learning by Doing (TELD)

The core of the TELD method is to combine real and hypothetical cases, which aim to motivate students who take part in systematic learning, provide a good mix of collaboration and an active learning atmosphere. Student performance is expected to improve by using the online learning methods. Although, sometimes the real situations at some cases may occur differently if students get inadequate information. A combination of the exploitation of a problem-based approach and project-based learning that is done simultaneously can get better results [14].

As we all know that the learning approach that is based on the problem that occurs is the type of learning approach that is concentrated on students and expected to be active and encouraged ability to make a combination of the theory obtained with the practical exercises to be done, as well as efforts to solve problems with applying various skills and knowledge that they have [15]. In various experiments, it appears that there is a relationship between students' critical thinking in the classroom with the Teaching by Example and Learning by Doing approach method in the teaching learning process, especially compared to the teacher that still use traditional lecture-based approach for their method. There have been several studies using online web systems that investigate the various effects of problem-based learning methods taught to students at the class on the results of performance appraisals and critical thinking skills of learning [16].

So far, many various project-based learning approaches actively can be found in engineering learning class [17]. The project-based learning approach will be able to improve the learning model so that it is centered on students in increasing student learning abilities by using the application of cellular devices and wireless communication will of course provide assistance in efforts to facilitate online learning activities [18]. The TELD method helps teachers to apply intelligent pedagogical learning atmosphere. It will make learning process more efficient and timely effective.

2.3 Facilitate Mobile Environment

The creation of a strong learning environment will provide an atmosphere for students to be able to learn well. With a good learning atmosphere they will be able to be given motivation and encouragement in the learning process. The expectation is the creation of an activity of mutual dialogue and mutual opinion as argumentation and will lead to sharing information and the emergence of new knowledge through a discussion. Furthermore, this will

lead to learning about ways to solve problems by bringing out new ideas and students' thinking that are critical of a problem. This is an in-depth learning that functions to link it to concepts and rules of principle that have been learned, and will be directed towards understanding and retaining long-term concepts in solving various unknown problems in the future.

It is important to pay attention to the most important features of mobility in an effort to create a mobile environment. The point is that we still need to be able to be interconnected and connected without having to rely on conventional use of communication. [19]. Mobility for users or mobility for devices used and service mobility are three aspects that can be made conceptually different, and technically they must be handled well and contextually must be good too.

The active involvement of students in a constructive discussion one each other and dialogue to solve the problem would stimulates their contra perceptive and elaborate some questions. This is a mechanisms for students to enrich, combine and expand their ability to understand problems that found and have to be get solved when they are bring out activities to encourage the learning process by sharing some new knowledge and other opinions, try to explain their self, information reflection, and do critical discussion to construct sharing knowledge.

It is very important to pay attention to the design of the interface for each user [20]. Developer have to design the interface based on every type of users' needs and consider some weakness of mobile devices such as limited storage, screen size, speed, input method, virtual memory and battery life time. Those weakness can make loading time longer and operating too slowly.

If the design process and the creation of a mobile environment for learning are in accordance with user needs, the teacher and students as users will be able to interact meaningfully and get sufficient learning resources, learning materials and media, teaching materials, learning tool support and guidance [21].

The design for m-learning also should be considered as supporting to learning and teaching process by students and teachers in the classroom. The m-learning exist with some features such as connect by communication easily, simple access to find educational media and material and also lots of various information available.

In the development trend of various applications on mobile phones and smart phones to be successful because it is rich in media as its material [22]. There are some characteristics of m-learning content, but the most commonly encountered is that the content must be delivered in short details rather than a large unit of information, and it must also get support from the use of appropriate media as content material. These various types of media must properly support the content. In addition, users who use the application are also very important to be able to use some kind of simulation tool in participating and learning the concepts and processes behind it all [23], instead of learning by rote that will stand just for a moment.

One feature that has been noted by many cellular technologies is that they are able to make constant and perpetual contact. Certainly this sense of communication technology support will be able to contribute to the possibility of other uses of m-learning that are used. For an example given that in collective learning material about a field visit which is assisted by communication support [24].

2.3.1 Learning Resources

Various knowledge needed by learners to achieve targeted competencies is produced by various learning hubs, in both physical and virtual form. Because of its diversity, learners need a variety of ways to access them. Technology is a major tool in accessing resources for learning. Learning resources available in school or campus environment are coming from both physical assets and virtual arena (internet network), which have been packaged in such organized way.

M-learning concept assumes, that learning resources can come from anywhere, in the become source of learning. If conventional learning environment has teachers, lectures, instructors, researchers, books, laboratories and libraries as a sources of learning, in a virtual digital environment, various terms such as e-lectures, e-books, e-library and e-laboratory are introduced [25].

As seen in the architecture, the physical and digital environments jointly form the diverse learning arena connect to each other [26]. Learning resources can be located in the territory or perimeter of school or campus. Learners in this context are considered as content consumers who enjoy the product of content provider, which are produced, packaged and supplied by content service providers.

2.3.2 Learning Area

The Virtual Learning Environment (VLE) also defined as a commonplace in modern teaching and learning context where pedagogical activities are being conducted [27]. VLE itself takes a form of various emerging systems, such as: personal learning environment, cloud computing environment, virtual machine environment, dynamic mobile environment..

This virtual learning space has tight interaction with various knowledge sources and repositories available that can be accessed by learners.

III. METHODOLOGY

In the initial stages the scientists collect learning material as a preliminary development towards TELD and using its main platform is m-learning. Further development began with making courseware that has concepts that are designed and developed following the storyboard to be displayed in the educational material interface application.

The thing that has an important role in a methodology for the successful implementation of learning is the creation of several conceptual models and good storyboards. the conceptual model's role is to provide a comprehensive visualization of the learning material in order to create tasks and functions of each element in the m learning that exists in a prototype [28]; it is important to involve several components such as users, media content and environment assessment for perfecting complete courseware results. Figure 1 show the conceptual model of the educational material and courseware.

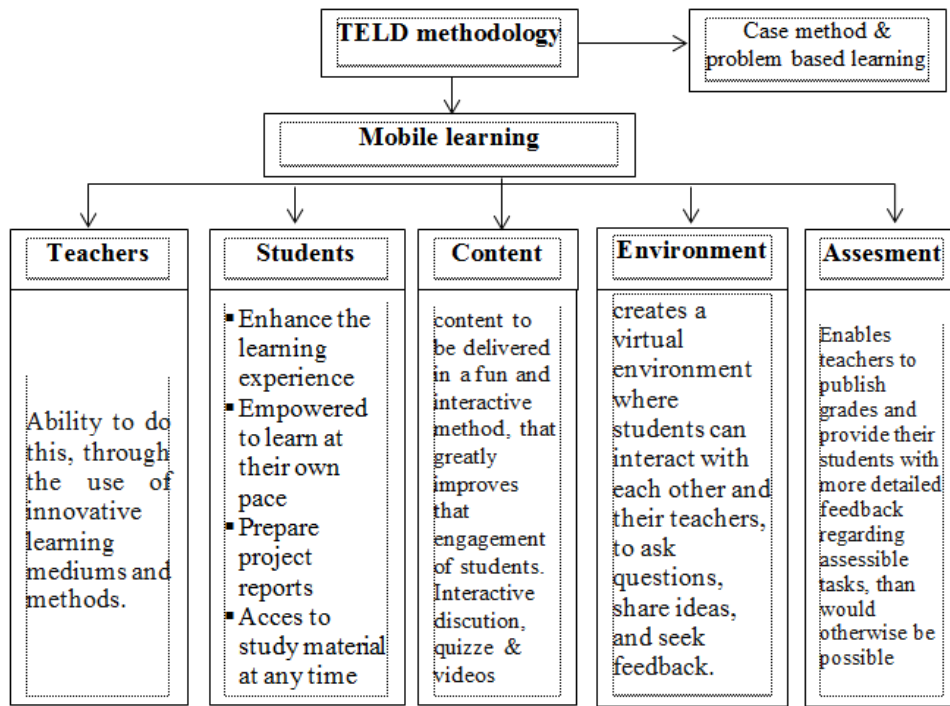


Figure 1: Conceptual model for educational material

3.1 Development and Implementation

The form of development of educational materials at TELD which is applied to the concept of m-learning is done by combining material in the form of recorded text, images, animation, audio and video in digital form. Educational material can also be combined into an impression of adventure. The atmosphere display of learning material can be developed from ordinary to extraordinary but still user-friendly, based on what you feel and what you see, what you get. The desired expectation of m learning is to get a learning experience and also an interesting and effective atmosphere for students.

Some teaching objectives that are become references for a learning environment based on TELD expected to be obtained in to be included in this paper, which is described as follows:

1. tools for teachers to give students solid and strong knowledge in learning in each subject taught
2. an effort for teachers to introduce operational rules, laws and strategies that should be applied in their learning
3. as experience to run and operate an m-learning environment that is accompanied and given support by related information systems and devices in daily life
4. to develop students' abilities such as soft skills for those who follow m-learning, including skills in solving various problems encountered, students are able to think critically, good communication skill, and also get as well as good at their analysis ability.

In this paper, the TELD method provide compares to there main steps that exists [29]. Firstly, the student will learn by some examples about animal cell that given by teacher. Example given such as relevant case and

information to introduce about animal cell or other subject as a basic knowledge to students and also some related problems will proposed to be solved. The students will be asked about animal cell, definition, numbers, structures, organelles, and other related information. Secondly, students will asked to learning by what they doing. M-learning system will give assistance to students when they observe and look carefully at animal cells model to give students experience like reality as like as followed project based learning. Thirdly, teacher do comprehensive assessment to students when they asked to do two-way communication through an m-learning network and discuss with others. Assessment has an important role in educational activities undertaken, especially in the atmosphere of teaching and learning activities [30]. The topics in the discussion are not limited to definitions, but also might developed about the differences between animal cells and plant cells, their individual shapes and parts, types, functions, and structure.

The TELD method is not only able to unite problem-based learning methods and several case methods but it is also able to represent the form of an m-learning. At this time the TELD system in the form of a prototype has been developed. Figure 2 shows a general scenario in supporting student learning using TELD.

In term of TELD is known as Teaching by Example and Learning by Doing. This reflects the ancient Confucian educational philosophy which states that, 'if I hear and I forgot, if I look and I remember, if I see and I understand'. The TELD also reflects this philosophy nowadays in education within modern and intensive technology environment. 'Teaching by Examples' set the learners' condition for to see and remember. 'Learning by Doing' also set learners' condition to do and then they can understand [31]

M-learning is a situation where teachers are given educational materials for both of teachers and students for typical situation of online learning with distance [32]. furthermore, the facilities in this m learning are the same classrooms but have been improved and teachers with traditional learning are given additional teaching abilities and each student is also given m-learning knowledge, with the last situation being formed is virtual classrooms.

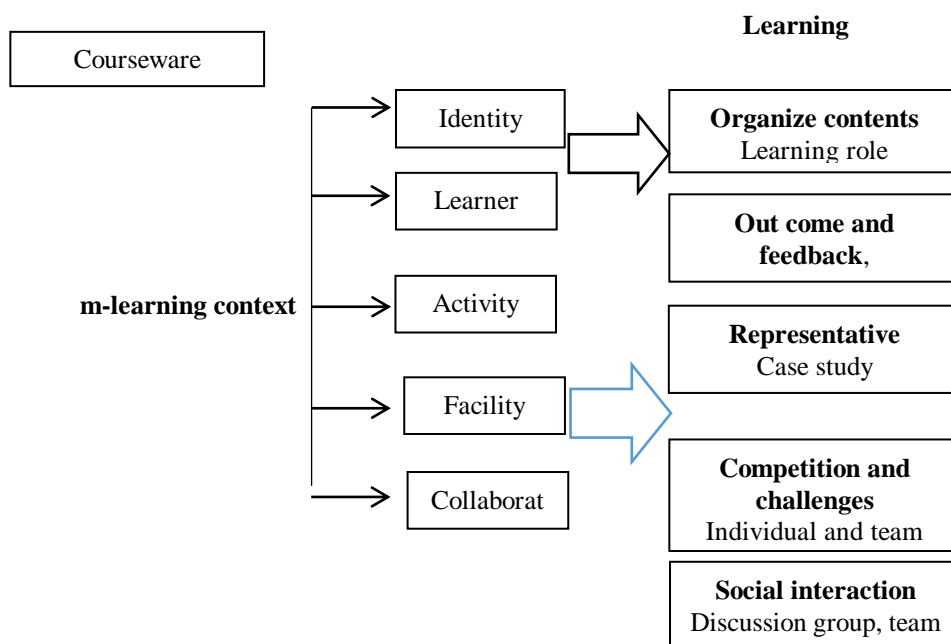


Figure 2: Interact navigation flow

How the m-learning context was interact consist of; Identity of the user of m-learning is an important point component. Learner; because each students has a different psychological so that it has an impact in the learning experience. Activity; the most interesting from m-learning is collaborative based learning using a mobile system, learning can be done anywhere, any time and in the context of the students. Improving communication skills two directions in a learning environment are expected to improve students' abilities. Facility; the tools provided such as those in group places are questioned between students and teachers, the quiz is determined by the time limit for the work and there is direct feedback from the teacher. Collaboration; the subject matter is given equally to all students. In m-learning, learning is initiated from students based on what they want to know on a learning topic. Learning based on questions, problems, or certain scenarios proposed by the learner. Therefore each students might get new knowledge that is different from one another, but still on the same topic.

The most basic learning component is the students' experience in learning. Preparation of learning content, making conclusions from the material, so that learning objectives can be achieved, and provide feedback as a response given to what students have done, which can be done individually or in groups by giving a score on the test. Social interaction in study groups will help students provide learning experiences to build a solid team to achieve the learning objectives to be achieved.

I. RESULT AND DISSCUSION

One of the key for setting up m-learning is about a courseware with infrastructure of technologies. Due to the large number of courseware functions that do not meet the needs of the user, a solution is needed by building and adapting small functional components for the educational application. One solution taken is about the component methodology, where customized educational applications are built from many small functional components [33]. An assessment of experienced person must be made in making the appropriate arrangement and composition of the m-learning application.

The term courseware is being used to represent the packages of teachers in the form of digital/electronic, which is delivered through online learning process s teaching material. Componen of such online courses can be essentially translated into four distinct models : domain model, learning context and pedagogy model, learning resources model and courseware model [34]. Basicaly the development, methodology of open courseware can be categorized into six stages : planning, design, development, application, control and assesment. And the last domain is super structure, whose main function is to produce and run appropriate rules and standards necessary to implemet m-learning initiative.

By definiton, courseware is a mean for learners to achieve its learning goal copetencies. Therefore, the process of designing online courses, which are integrated with a concept of m-learning, is a very crucial process that should be well undergon. This means that instructional design is the key determinantof either success or failure of the implementation of courseware based m-learning. In terms of learning out comes, there should not be a different between the competencies of learners that are achieved through e-learning program and conventional face to face

mode. As courseware being implemented in formal higher education environment, any m-learning course shall be designed, constructed, developed, applied and evaluated in a good quality manner.

Integrating the concept of m-learning that rests on the freedom of conventional pedagogical approach in education has been a challenge in the field of instructional design. A designer has a responsibility to analyse and to develop courseware that align with m-learning perspective and paradigm. Understanding m-learning in a holistic way involves a need to understand a broad perspective of the matter, where various components are interconnected, influential and integrated.

M-learning is a complicated aspect and its main activities require efforts to be adaptive, and its development is not only in technical skills, but also has a goal to improve the ability of the learning process [35]. Such learning organizations are never finished, but continue to improve the way they work [36]. The practical type courseware can be used as instrumental to assess every big or small learning environments' value, identify function of every usefulness issues found, develop for solutions that available inside of applications and also position for decision making of every type stakeholders. Educational materials like these will accelerate the presence of m-learning that is actually expected. TELD can be present to provide several joint solutions to this problem. Nowadays so many efforts are being made by experts in these aspects to make integration for TELD and be expected will be showed in the future. TELD which has qualified facilities and accompanied with upgraded facilities is hoped to play an important role in the m learning environment in the future.

II. CONCLUSION

Moving towards m-learning is not an option, but a must effort for modern campus. The rapid development of information technology, renewal theory and the concept of dynamic education, human characteristic in different generation, and the nature of globalization, are reasons for such proposition. With TELD support in m-learning will provide an interactive and attractive learning environment for students. The existence of m-learning as a form of technological progress provides much convenience in the activities studies. The facilities this modern technology, learning become easier and more enjoyable. To understand of material students should learn in the classroom assisted by teacher. They can be studied independently by utilizing a wide of mobile learning like a tutorial, quiz and simulation. Various facilities are expected to increase learning over the years.

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