

Research Article

The Use of Mobile Learning in Senior High School Education: An Empirical Review

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Abstract.

This study uses the use of mobile learning which involves students and teachers in distance learning. In order to assess the knowledge and learning effects gained by the use of mobile learning, this study was a semi-experimental, survey-based approach. In the conditions of distance learning using mobile learning, students and teachers in groups of various kinds of applications where the teacher shares knowledge and stimulates distance learning for 5 months. The findings show that students and teachers use mobile learning to a large extent influence the impact of student outcomes. The findings reveal that 30% of the research results on mobile learning activities are in accordance with a behavioristic approach to learning. 70% focus more on student learning from the device. Even so, it was found that mobile learning as the main way that allows students to get more learning material has different perceptions of each student and teacher in conducting distance learning using mobile learning. Therefore there are still many possibilities for developing mobile learning.

Keywords: Mobile learning; high school education; learning effects

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1. Introduction

Education is one of the most important aspects in the advancement of a country. Education is a shaping of the character of the nation, therefore every citizen has the right to get a proper education. [2]states that education is an effort, influence, protection and assistance provided to children so that they are aimed at maturity, or rather helping children to be competent enough to carry out their own life tasks. Education basically intends to help students to empower their potential or to develop their human potentials. Therefore, the target of education is human. So, the notion of education is often interpreted as the process of humanizing humans. Research conducted by Deniz "The Effect of mobile learning Approach on University Students" Academic Success for Database Management Systems Cours "found that the Mobile Learning learning model positively affects student academic achievement. The telecommunication infrastructure that supports the implementation of Mobile Learning is no

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longer monopolized by the big cities, but is gradually starting to penetrate small cities. This is what underlies the development of the Mobile Learning model[3]. The results of research conducted by Green "Trends And Patterns of Mobile Learning: A Study of Mobile Learning Management System Access" concluded that the use of cellular technology such as smartphones and tablets is deeply embedded in school life by generation Z (students born between 1995 and 2010) [4]. Based on this evidence, there is considerable interest in leveraging the availability of these technologies to increase access to education, this is because learning using mobile devices is one approach that holds great promise for increased access to higher education in developing countries[5].

Other positive sides of the use of mobile technology in higher education include social and emotional presence, as well as pedagogical changes where learners can learn anytime and anywhere, through mobile learning which is emerging as an innovative learning approach. Mobile learning makes learning more enjoyable, flexible and interactive because learners are not immobilized by the limitations of desktop computer technology or traditional classroom settings[6]. Just like any other technology, mobile devices have limitations. These can be broadly categorized as infrastructure, policy and perception based. Recent research reports show that mobile devices are limited by a lack of processing power relative to a laptop or desktop computer, have small screens, low processing and storage speeds, short battery life, content and software application challenges[7]. Additionally, cell phones in particular, can enhance and evoke a sense of ambient co-presence and continuous availability among learners[8]. The issue of teacher perceptions is further discussed by Wheeler (2000) who shows that while some teachers are passionately integrated with technology (such as computers); others have rejected it properly[9]. Through Mobile Learning, students can communicate with their teachers anytime and anywhere, and vice versa, teachers can communicate with their students through electronic media. The nature of communication can be closed between one student and the teacher or even together. Through Mobile Learning, it is possible for students and teachers to be able to learn even if they are not physically present in the classroom. Learning activities are very flexible, this is because the existence of communication tools has become part of human life, one of which is cellphones or cell phones. Mobile or cell phones are one of the most ingrained communication tools in the community so that almost all people use them. Human needs will increase so that it encourages mobile phone manufacturers to develop sophisticated features that can attract public interest, one of which is by developing an OS (Operating System).

This is one of the reasons for developing Mobile Learning in the learning process, where this learning model will be a reference when an institution or educational

institution wants to develop the quality, quantity and scope of education. With this development model students and teachers no longer always have to meet face to face, but the learning process can be done at any time and is always sustainable. Suggests that mobile learning is a learning strategy that involves the use of handheld and mobile technology. states that the process of acquiring various information, knowledge and skills through the use of mobile technology results in a change in the behavior of its users. In the Journal Of Information Technology & Software Engineering entitled Prospects And Challenges of Mobile Learning Implementation: A Case Study said that the opportunities and challenges of implementing Mobile Learning in the teaching and learning process in Kuwait affect the perceptions of students and lecturers, the attitudes of students and lecturers, socio-cultural problems in the implementation of M-Learning can improve student learning outcomes[10] [11] [12]. Research conducted in the research title "The use of mobile learning in higher education: A systematic review", concluded that most mobile learning models have a positive impact on student achievement. Meanwhile, in his research entitled "Testing the novelty effect of an m-learning tool on internalization and achievement: A Self-Determination Theory approach" says that mobile learning tools and digital versions of textbooks are considered newer than books. traditional text. However, only mobile learning tools enhance students' basic psychological needs. This learning system that uses the Mobile Learning Approach was also researched by Wen Min Hsieh in Taiwanese high school teachers' conceptions of mobile learning who concluded that mobile communication has changed. Through data analysis, it was obtained six qualitatively different conceptions of mobile learning: 1) fulfilling student preferences, 2) administering classes with efficiency, 3) strengthening and enhancing learning, 4) separating from traditional teaching, 5) centering on student ownership, and 6) expanding learning outside of school. Similar to the research conducted Faculty of Engineering, Makassar State University with the title "Learning Media of Applications Design Based on Android Mobile Smartphones", produces products in the form of Android smartphone-based learning media applications that are valid, practical, and efficient and worthy of use[13] [14] [15].

Based on the facilities contained in portable mobile devices and their applications in the learning process such as basic communication between students using Wi-Fi or Bluetooth and NFC to send and receive voice and messaging via WA, Telegram, SMS, MMS, Google Classroom, LMS, Google meet, Zoom Meeting. In addition, with GPS (global positioning system service) students can access GIS (Geographical Information System), and they can use digital compasses to determine their movement useful in scientific journeys or even in determining their path when traveling between different areas.

Training is another service for using a mobile device; Recent trainings provide training for learning through applications such as Videoconferencing or sending multimedia files such as videos, Word, PDF, and PowerPoint presentation slides to trainees via the Internet. Multimedia creation is one of the most popular mobile device services and methods of learning "on the go", however, when students are outside their classroom can use the camera to take scientific images (JPEG or GIF), especially when it is on scientific tours. Also with a microphone they can record sound files and digital notes during their scientific experiments or lectures using a smartphone, digital media player, or iPod, also a digital pen (stylus) can be used to draw graphics or design electronic geographic maps. On the other hand, interactive social networking is one of the services of portable mobile connected directly to popular social networking sites (Facebook, Twitter, Youtube, LinkedIn, etc.). For example, Facebook offers collaborative discussions, by sending questions, assignments to a group of students. Furthermore, Twitter provides micro-blogging services to improve student interactive skills. In addition, the mobile Web (Web Information), is another important service provided by mobile devices because students can access a lot of educational material, and share it via email, or blog, or via a wiki, or they can use E-Readers to browse e-books, newspapers, magazines and language dictionaries or scientific dictionary [16] [17] [18]. For the application of M-learning in learning, suggests five general categories that must be considered when implementing M-learning, namely: transport, delivery, platforms, language development, and media technology. say that there are several barriers to the application of M-Learning such as: content of M-Learning, environment; content and existing network infrastructure. Also, clarified that environmental factors of M-learning are a technical challenge, as the device's mobile memory size is very important when downloading learning materials. Battery life: shorter battery life than handheld devices can create negative stimuli among learners. The smaller screen size and phone buttons can make students uncomfortable. The mobile interface is reduced to the essential. Furthermore, learning materials can be in various file formats and not all formats are supported by mobile device processing platforms [19] [20].

Listed three obstacles related to learning content delivered using mobile devices, namely (1) the content of the material presented was less attractive because the existing platform only focused on text-based content, (2) the content was too long, which was designed for elearning not for M-Learning, (3) learning content designed for large screen devices is not designed for small screens. And also, classified the challenges of implementing M-Learning into three categories, technology, education and general, first, technological challenges: small screen, small screen, shorter battery consumption,

and low storage capacity, second, educational challenges: designing and preparing education curriculum for mobile, digital and technology gaps between students while learning using mobile applications, and opportunities to cheat in M-learning, common challenges: high costs, the need for an infrastructure, modern wireless networks and mobile learning devices, and multiple security breaches for wireless and cellular networks[21]. Reviewed research when the Covid-19 pandemic had affected education systems around the world. Many countries around the world have closed educational institutions to reduce the spread of this pandemic. Therefore, education in secondary schools faces challenges. This study provides a broad overview of current mobile learning trends in education. Neither, however, provides a detailed analysis of the mobile learning that is the focus of the learning experience. Therefore, in an exploratory approach, this study examines the empirical evidence of the use of mobile learning at the high school level in Pematangsiantar city.

2. Methods

2.1. Research Purposes

The purpose of this research is to analyze studies that focus on mobile learning in high schools during the Covid-19 epidemic from January 2020 to September 2020 in Pematangsiantar city. This is to see the extent of the use of cellular technology in learning in schools, the characteristics of the study in the form of solutions to problems with learning outcomes during the Covid 19 pandemic, the challenges and perceptions of teachers and students regarding the integration of cellular learning in the Upper Menengah School educational institutions in Pematangsiantar City. Formulation of the problem: Two questions driving this empirical review of mobile learning in senior secondary education in Pematangsiantar city are: (1) How do teachers and students perceive mobile learning in Pematangsiantar City Senior High School?. (1) What are the challenges related to the integration of mobile learning in senior secondary education in Pematangsiantar?

2.2. Research Provisions And Limitations

The use of M-learning includes applications available on the Internet network such as Google Classroom, Google meet, zoom application, Ms. Teams application, LMS used

to present lesson content, from smartphone operating systems; as a useful tool for students and teachers to interact online outside of the classroom anywhere, anytime.

M-learning: is a new form of learning including using mobile phones, smartphones, personal digital assistants (PDA) and tablet PCs, netbooks (ultra-mobile laptop PCs), personal digital multimedia players, portable but not desktop games. The operational definition of M-learning: is a learning model that adopts the development of cellular technology and mobile devices (HP) which are used as a learning medium.

Perception: the tendency of individual responses to M-Learning learning between accepting and rejecting or a psychological impact on individual characters that brings a positive or negative response to a problem. (Oxford Dictionary, 2014). So it can be said that a person's response from M-Learning can be positive, negative or neutral.

Obstacles: according to the large Indonesian dictionary is an obstacle or obstruction. Barriers have a very important meaning in carrying out every task. A task or job will not be carried out if there is an obstacle that disturbs the worker. Obstacle is a condition that can cause implementation to be disrupted and not carried out properly. Barriers tend to be negative, that is, they slow down the pace of something someone is doing. In carrying out activities, there are often several things that hinder the achievement of goals, both obstacles in implementing the program and in terms of its development. It is a series of obstacles that someone experiences in learning. Learning barriers are things or events that contribute to a situation that hinders their application during the learning process. Barriers also mean something that hinders understanding, or anything that hinders progress, access and so on. The operational definition of barriers is the variable that limits research using mobile devices for learning. This research is limited to high school students in Pematangsiantar, and during the 2 semester of the school year 2019-2020.

3. Results and Discussion

3.1. Research Procedures and Data Collection

Before starting the implementation of the experiment, the researcher explained what M-Learning was, and what was the aim of the study on 36 students (the main sample), and the students were asked whether they were willing to participate in the experiment or not, after which a scale of perception and resistance was applied to the five students of the participants, and they respond in 30-45 minutes, and it shows readiness for final deployment. Table 1, shows the reliability statistics of the two scales, with the Cronbach

Alpha coefficient, the reliability is found as Cronbach Alpha $\alpha = 0.79$ both for the overall perception of the scale, however, Cronbach Alpha $\alpha = 0.82$ is acceptable for the field of Measurement and Academic Achievement, either Cronbach Alpha $\alpha = 0.80$ for the field of Communication and Cellular Interaction, and Cronbach's acceptable Alpha $\alpha = 0.71$ for the field of Information Access. Also, it was found that the Cronbach Alpha $\alpha = 0.87$ was good on the overall resistance scale, however, all reliability coefficient values for the resistance scale item were accepted according to the study sample because they were higher than 0.66. This shows the reliability of the student sample for the perception scale items and the resistance scale items. Then, the teacher began teaching students with M-Learning using cell phones, the experiment lasted for almost 5 months from the first of January 2020 to 31 May 2020.

TABLE 1: Item-Total Statistics of Perceptions Scale and Barriers Scale.

Scala	No	Fields	Mean	Variance	Correlation	Cronbachs Alpha
Perceptions	1	Academic Achievement Measurement	234.555	106.718	0.261	0.738
	2	Mobile Learning Communication Interaction	259.5943	124.654	0.364	0.704
	3	Information Access	206.8888	91.882	0,517	0.625
		Overall Scale Fields	136.1862	45.003	1.000	0.703
Barreier		Overall Scale	57,89	99.256	0.737	0.87

3.2. Teaching Steps Using M-Learning

At the beginning of the semester, identifying the content of the subjects and the number of students for the experiment, and before starting the experiment the researcher prepared the teaching materials in the google classroom, after which he created a group entitled "Civics", then received a code to be given to students joining the group. After that, start teaching students using smartphones through M-Learning, at the beginning of the learning process of sending guides to students, then including the title of the subjects to be taught, also at the beginning of each lesson determine learning objectives, and then uploading subject files, and subject syllabus lesson for one semester, then send the M-Learning user guide link on YouTube, then start discussing the subject, after that ask questions to make sure of the understanding of the learning material. then the teacher gives some examples to emphasize the important concepts, and sends some web site links, then asks the student activities to follow the course, finally creates a quiz with short answers.

3.3. Research Problem Statement

Currently the existence of mobile learning is very much needed. This is the result of the impact of the COVID-19 pandemic. However, before this occurred, entering the twenty-first century, especially in the last decade, many international conferences related to M-learning were held in various countries (Sweden, England, Italy, Australia, South Africa, Canada, USA, Malta, etc.) which promote the use of mobile wireless technology in learning, for example in Sweden 2002 the “mLearn” held the first annual international conference and workshop on cellular and wireless engineering in education, in Canada and Greece in 2006 held two other M-learning conferences.

Since the implementation of social distancing in various countries including Indonesia in the field of education, mobile devices are integrated with student life because the majority use mobile devices such as smartphones, phaplets, tablet PCs, iPads, e-book readers, however, reported by the International Telecommunication Union (ITU) Cellphone users worldwide will exceed the actual population of the world by 2020, and the number of smartphone users globally will continue to increase from year to year. In 2019, there were at least 3.2 billion users, up 5.6% from the previous year. Meanwhile, the number of active devices used reached 3.8 billion units. China is the country with the largest number of smartphone users. This Panda country controls 27% of the world's total smartphone users. of the total users. Over the past year, the world's active online user population is around 4.12 billion users. (Read: Samsung Smartphones Are More Popular Than Apple) In 2022, the number of smartphone users is predicted to reach 3.9 billion users. This growth will be driven by developing regions, including the Middle East and Africa, Latin America, and Southeast Asia.

Although most studies related to mobile learning often run into obstacles and currently there is quite a bit of research being conducted to determine the level of students' perceptions about M-learning and to identify their barriers at the same time especially during the current Covid 19 pandemic situation. Therefore, this study will try to investigate the level of perceptions and barriers faced by students and teachers in M-learning through the use of their mobile devices to achieve learning goals. Finally, the importance of this research is to determine whether students and teachers have positive perceptions about M-learning and what are the weaknesses in the application of M-learning in learning. The identification of M-learning barriers will contribute to the field of cellular technology because it can be the first step to overcome and improve M-learning as a form of new learning process in the coming years as a form of learning at the high school level.

4. Conclusions

This study recommends future research to undertake a longer and larger scale study exploring the impact of mobile learning on high school education. Additionally, schools must take advantage of existing mobile learning and other educational technologies. If these issues are addressed, the impact of mobile learning at the senior secondary level can be accurately evaluated and the study results can be used to design appropriate policies to guide effective mobile learning pedagogy in senior secondary education institutions.

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