

Integral Calculus Module Through Mobile Learning In Mathematics Learning

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Abstract. The purpose of this research is to give information to educators and students that the use of modules accompanied by IT can make learning more effective. Furthermore, the purpose of using the integral calculus module through mobile learning is to be able to change the way students learn, make it easier for students to understand integral concepts, be able to study anywhere and without lecturers, change the smartphone function from just playing social media to learning. This type of research is a qualitative descriptive study through in-depth observation and interviews. The mathematics module is a reference that can facilitate students in learning. Integral calculus for one of the courses that require modules to make learning easier and more enjoyable. Moreover, the module is juxtaposed with mobile learning. Modules are designed by lecturers who teach based on their experience while teaching, so that the language, content, sentence modules that are paired by mobile learning are more favored by students and can follow the speed of their mathematics learning. Therefore, educators can use modules and mobile learning applications in learning mathematics.

Key Words: *Module; Integral Calculus; Mobile Learning; Learning Mathematics;*

1. INTRODUCTION

Mathematics is a fundamental science that is important to many other sciences in the world. Therefore, from elementary school level to college mathematics remained in the study. One of the math lessons learned in the lecture is integral calculus. In this research the author made a module on integral calculus, modules are made as interesting as possible and can help students because the module contains how to investigate integral calculus problems easily and can be accessed Through their respective smartphones. So it can maximize the use of Smartphonanya. On this occasion will be discussed about the usefulness and effect of using integral calculus modules through Mobile learning in learning. In addition to the positive response from learners, mobile learning applications can improve the ability of critical thinking, active participation of learning and so forth.

To support the research that researchers do, it is necessary to study theory. This is because the theory is a series of concepts that can see the problem in the research systematically, based on analysis among the variables studied, so as to explain the phenomenon or problem in the research. The activity of drafting theory is important to be able to determine the next step in conducting the research. For that, in this article we discuss the theoretical studies we use in the development of mobile application learning in mathematics learning in Calculus 2 courses. In addition, these studies are expected to be beneficial to researchers or educators about the benefits that use mobile learning applications in learning.

2. RESEARCH METHOD

In this article the method used is to explain the theories of theory used to shoot calculus 2 modules with mobile applications. Theoretical studies are based on clear sources. In the theory study in this article about module studies; Integral calculus; Mobile applications in calculus and other materials. In the research we developed, the theory studies used put a special course on the integral calculus coursework in colleges by creating integral calculus modules using mobile learning applications. The development of Calculus 2 Integrated Mobile learning module is based on the theories of theoretical studies.

3. FINDINGS AND DISCUSSION

Definition of modules

In the process of learning a good educator must prepare what is needed before teaching. One that can be prepared by educators is the teaching materials. The teaching materials are well-prepared and better provided by the educator. According to Amri and Ahmadi (2010:159) Teaching materials are all forms of materials used to assist educators in conducting teaching and learning activities in the classroom, so that learning can be carried out smoothly. According to Dwicahyono and Daryanto (2014:175) The teaching material is divided into five types namely information sheet, operation sheet, jobsheet, worksheet, handouts and modules other than that Dwicahyono and Daryanto (2014:173) stated also that there are 4 types of teaching materials i.e. material teaching (visual), teaching materials with hearing (audio), hearing materials (Vidio audio) and interactive multimedia teaching material.

Module is a teaching material arranged in a specific form that can be used for learning purposes, as revealed by Prastowo (Ekasari, 2013:106) that the module is a teaching material compiled systematically with the language Easily understood by learners according to their level of knowledge and age, so they can self-study with the Help or minimum guidance of educators. According to Fatikah and Izati (2015:50) There are seven elements that must be achieved in the manufacture of modules that are titles, study instructions, competencies to be achieved, supporting information, exercises, instruction, and evaluation. The purpose of using the module according to Prastowo (Tjiptianiy DKK, 2016:1939) learning by using the aiming module (1) Students are able to study independently or with the help of teachers to a minimum, (2) The role of the teacher does not dominate and is not authoritarian in Learning, (3) Training students ' honesty, (4) accommodating different levels and students ' learning pace, and (5) students can measure their own doctrinal mastery levels learned

According to Daryanto (Fatikkah and Izati, 2015, 50) characteristics that must be considered in developing modules are as follows:

1. Self instruction, which is one of the characteristics owned by the module, that can be used by individuals without assistance from other individuals.

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2. Self contained is the overall learning material needed in the module.
3. Stand Alone is a characteristic of modules that are not related to the teaching materials/other media, or should not be used in conjunction with other materials/media. Using a module, learners do not need other teaching materials to study or perform tasks in the module.
4. Adaptive means that modules can adapt or adapt to the development of science and technology.
5. Friendly/Familiar (User Friendly) or friendly/familiar with the wearer. Each instruction and exposure of the information displayed is helpful and friendly to the wearer, including the convenience of the user in responding and accessing it in accordance with the wishes. The simple use of language, easy to understand, and using commonly used terms is one of the user friendly forms

A module will be meaningful if learners can easily use it. Learning with modules allows a learner who has high speed in learning to complete one or more of the students more quickly. Thus the module should describe something students will accomplish. Presented with a good language, interesting is complemented with illustrations. Therefore researchers making module on integral calculus material through mobile learning (based multimedia interactive) modules are made by note the objectives or benefits, characteristics and elements that must be achieved. So that the module is a good module and can be utilized by anyone especially students in learning integral calculus.

Integral Calculus

Calculus is a mathematical analysis tool on changes or movements therefore. It is all in the changeable world, in fact calculus has been applied in the field of scientific investigation (Jean, 1999, 164). That's why calculus is very useful, one of which is integral calculus. The integral calculus is a branch of mathematical sciences that learns the definitions and applications of two interconnected concepts. The use of integrals as a science of AIDS in geometry, technology, economic biology can not be thought. The person who in history first presented the idea of one unity was Arcimedes a Greek scientist from Syracusa (287-212 BCE). Archimedes used this integral idea to find the area of the circle, a area bordered by parabolic and rope and so on. History records the most qualified society in the development of the integral Kelculus Georg Friederich Benhard Riemann (1826-1866).

Mobile Learning

Definision *Mobile learning*

According to UNESCO (Samuel, 2016:8), mobile learning involves the use of mobile technology, either alone or in combination with other information and communication technology (ICT), to enable learning anytime and anywhere. Learning can unfold in a variety of ways: people can use mobile devices to access educational resources, connect with others, or create content, both inside and outside classrooms. Mobile Learning also encompasses efforts to support broad educational goals such as the effective administration of school systems and improved communication between schools and families. The opinions expressed above can be concluded that mobile learning is an application that can

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be used as a learning tool that can be accessed via mobile phones and is one of the efforts to utilize existing technologies around the students.

According to Deni (Samuel, 2016:8), mobile Learning provides students with the opportunity to receive information and involve individual learning thoughts and activities anywhere and anytime. Therefore, mobile learning or mobile learning is a learning model that utilizes technology as a means of learning the individual learning activities can be implemented anywhere and anytime.

Mobile Learning application in Integral calculus

The Mobile learning application developed in this research is an application used in the course of integral calculus. The app can be easily downloaded on the App Store or Playstore on your smartphone, by typing in an easy way to learn this application calculus you can easily get. This mobile learning app on the main menu contains competencies, materials, reference exercises, evaluation and a help bar. There are also icons that can be helpful in using this application.

The competency of this application contains the thing that students must be able to achieve in an integral calculus course. The material contains a summary that students easily understand about the integrals of both the definition and the concept. In the application there are several options sub material of integral calculus. The module is also equipped with exercises and evaluation questions where there is a correct answer and how to work easily in understanding allowing students at the time of the student not to know the answers or answers are chosen incorrectly

Mathematics Learning

The understanding of learning is found in the regulation of the Republic of Indonesia LAW number 20 year 2003 article 1 point 20, "learning is the process of student interaction with learning Resource educators in a learning environment". According to Joseph (Hamzah and Muhlisrarini, 2014:45) Learning essentially pays attention to how to teach someone not to what someone is learning. From both opinions it can be concluded that learning is a process of student interaction with educators, the source of learning in a learning environment that emphasizes to teach is not what is learned.

Mathematics learning as a process purposely designed for learning purposes is achieved, the goal is to create a good and safe environment of the classroom so that it can carry out mathematics learning activities at school. From the description it can be concluded that math learning is an activity deliberately designed to create an atmosphere of learning mathematics. As a teacher should be able to create a good learning environment so that the mathematical learning activities can be carried out well and according to what is expected.

Speaking of math lessons, many people argue that math lessons are difficult lessons therefore one of the ways teachers can learn can be done well and the mainset about learning A difficult mathematical is preparing the teaching materials before teaching. Because good and mature teachers ' readiness will make math learning work well and fun. One of the materials that can be used is a module. These modules can be prepared by the

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teacher in either print or application. To be more interesting and not boring can be by utilizing technology that is now often called mobile learning. Therefore, researchers make teaching materials in the form of modules where applied to the learning of mathematics that is integral calculus, where the module is in the form of mobile learning.

Discussion

In this study specializes that the module that is paired with the mobile learning application in the integral calculus courses can facilitate students in learning besides it can also utilize their smartphones with the maximum. Accordingly, Sevimli (2016:16) found in his research that students on technology-based learning better understand the concept of comparing students whose studies are tardially. Because learning is traditionally able to memorize concepts and does not understand the meaning and learning only abstract is difficult to imagine, learning by using technology can overcome the problem. Furthermore Herlina and Istikomah (2018) acquired 75, 10% of respondents gave a positive response to the presence of mobile learning applications in mathematics learning.

In addition, Taleb (2015:83) suggests that there is a positive and significant relationship between the use of learning with mobile learning and math learning. There is also a positive and significant link between using mobile learning and student participation in mathematics. In addition, the relationship between moving learning and the diversity of teacher training methods is positive and significant. The findings of this survey show that mathematics teachers interested in using mobile technology in learning mathematics technology can improve the motivation and participation of students in mathematics learning and provide opportunities for diversity of methods Mathematics training. Moreover, mobile device utilization increases motivation. The last result of this study demonstrates effective Mobile learning on student participation in mathematics learning. It can therefore be concluded that mobile learning can improve student motivation and active partitioning in learning.

In the learning very needed a good model of learning and according to the circumstances of the class. Therese (2016:1) implementing an inquiry-based model is very effective and can make learning active. This Inquiry-based learning (IBL) is implemented using the module inside the learning calculus. In its application it found advantages and high benefits. Where students gain experience in real in filling the modules provided. Its relation to research researchers is its similarity to use in Calculus learning modules. It's just that researchers utilize mobile learning to take advantage of existing technology.

4. CONCLUSIONS

Based on several journal findings in theoretical studies and several other journals, IT was found that the use of modules and IT in learning was very effective and could improve the various students ' mathematical skills. Researchers conducted preliminary studies to design the development research of integral calculus modules through mobile learning applications. Researchers expect to be able to make educators and learners understand integral calculus and improve their mathematical abilities. In addition, it can optimize the use of smartphones that are owned and can learn anywhere and anytime. Following this

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preliminary study researchers have been and will be designing and developing a module integrating a valid and practical Mobile Learning application. Hopefully these theory studies can be beneficial to researchers who will develop research in IT or Mobile applications in learning.

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