



The Use of Android Based M-Learning toward Understanding Concept on Motion System Subject

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Abstract

Education on 4.1 era is much using the technological advances on Information and communication field. Internet technology is one of technology that allows everyone to do everywhere and anywhere learning or can be called as mobile learning. Learning by using mobile learning can support the development of education. At this time, students are required not only to produce high scores but also to understand the subject matter that has been taught, so that, it can be implemented in solving problems for everyday life. On the other hand, Students are required to be able to solve a problem with toughness. Therefore, students must have a theoretical foundation or concept that is in line with the facts and to create mature decisions. In sum to make the students to become people who always want to learn and learn. The purpose of this study was to analyze the effect of using M-learning (mobile motion) on students' understanding toward Motion System subject matter on XI Science Class. This study uses the Research and Development (R & D) design and the technique used is a one shoot case study. The research was conducted at SMAN I Sendang Agung with 57 students as the research subject who divided into 2 classes. The results of the study are as follows: (1) on the subject scoring by subject experts 84, 45% was obtained and 85.33% with very good criteria, and the scoring by media experts 85.49% was obtained and 89.91% with very good criteria so that the media confirmed valid. The score which obtained from students who have used M-Learning Application and then answer the understanding concept questions were obtained an average score 95.7 after being analyzed based on the predetermined Minimum Completeness Criteria (KKM). The specified KKM value is 80. The result show that 94.73% students passed with the very high category. Therefore, it can be state that the use of m-learning (mobile motion) is effective on students understanding concepts.

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INTRODUCTION

Learning in the 21st century accompanied with the development of information and communication technology that has been used by both teachers and students as learning media (Roemintoyo & Budiarto, 2021; Talebian et al., 2014). Internet technology is one of technology that allows everyone to do to do everywhere and anywhere learning or can be called as mobile learning. Mobile learning can be used to learn and teach without any limitations of place and time. Therefore, the M-Learning application must be designed more effectively, efficiently, and optimally to overcome its limitations. M-learning applications are widely used on mobile devices, one of them is a mobile phone. Mobile phone is one of the most widely used gadgets by the public. Mobile phone is one of the most widely used gadgets by the public. The use of mobile phones as telecommunications today is still not optimally used for education (McMahan et al., 2017).

The use of M-learning by using an effective learning model can help the learning process to push ahead students to be able understand the subject matter by increasing the cognitive field. In addition, it will help the students to be able maximize their teamwork by increasing the affective field and enhancing their skills and interactive power in the psychomotor field. The improvement of these 3 aspects is related to the improvement of students' conceptual understanding and critical thinking. Along this time, students have a low understanding of the concept so that it cannot be implemented optimally. In this case, students are only required to memorize the theory or information presented by the teacher.

The problem faced in the world of education in Indonesia is the problem of the weakness of the learning process. It is where the process of learning activities carried out in class is implemented with the ability and the teacher wanted. That kind of learning process makes students less motivated in developing their ability to understand concepts. Even though, at this time students are required to be able to solve a problem with toughness. Therefore, students must have a theoretical foundation or concept that is in line with the facts, and can create mature decisions.

In sum to make the students to become people who always want to learn and learn.

The learning system that currently runs is still focused on the aspects of remembering 70% of the learning subject in the first 10 minutes. Next in the last 10 minutes they can only remember and understand 20% of the learning subject, this is called as low order of thinking. Surprisingly, those learning process does not pay attention to aspects of critical thinking and scientific performance of students; the results of observations show that student activity in learning activity is still low, students in learning activity tend to be more passive listeners; evaluation of learning has been carried out, but is still limited to paper and pencil tests. On the other hand, the evaluation of the aspects of skills and attitudes which are also demands of the curriculum on assessment of the learning process in the classroom has not been carried out optimally. Whereas, learning activities that are center on students (student centered) must be carried out, because the curriculum requires each unit to be more student centered, but in reality there are still many schools in their learning activities that still use the lecturer method.

Research conducted by Sastradewi et al. (2015) and Arvinda (2017), gives the results that students' critical thinking skills affect the quality of students' conceptual understanding. One indicator of students' intellectual abilities is the ability to understand concepts. The process of understanding the concept of Science must meet the constructivism approach (Amineh & Asl, 2015; Cobern, 2012). Concept understanding is also based on scientific consensus and is able to answer problems that occur in daily life. However, efforts to build understanding of the concept as a whole have not been maximally implemented in classroom learning. Some learning activity is more likely to try to remember and repeat facts. As a result, the knowledge gained is very easy to disappear from the student's memory. The use of learning resources which is still not varied provide many new phenomena and problems. This condition leads to the low understanding of students' concepts of the subject matter being studied. The factors that cause weak understating concepts are understanding concepts that are not in line with the actual concept. Information received by students is incomplete. Experience and low interest in learning

lead to weak understanding of concepts because they do not pay attention to the preconceptions possessed by students. The reason is because teachers teach based on the assumption that knowledge can be transferred completely from the teacher's mind to students (Brookfield, 2017). This is due to the lack of precise selection and application of the right learning model. As a result, students' ability to learn independently cannot develop properly.

So that there is a need for learning support who can apply science concepts into learning process so that they can have an influence on students' understanding of concepts. Android-based M-Learning (mobile motion) on the motion system subject matter developed in this study will be used as a solution to the problems faced by students.

METHODS

This research is a research and development or Research and Development (R&D). R & D is a process used to develop and validate educational products. The results of development research are not only the development of an existing product but also to find knowledge or answers to practical problems (Borg and Gall). The process of learning activities is done by using Android-based M-learning (Mobile Motion) using the inquiry learning method. The process of learning activities is done by using Android-based M-learning (Mobile Motion). This study aims to determine the effect of using m-learning (mobile motion) on students' understanding of the concept of motion system subject in class XII science. The research was conducted at SMAN I Sendang Agung. The research was conducted at SMAN I Sendang Agung with 57 students as the research subject who divided into 2 classes. The implementation technique that used on this research is a one shoot case study.

Table 1. Model One Shot Case Study

Sample	Treatment given	Results
Experiment Class	X	O

Validation of android-based M-Learning teaching materials on motion system subject and the value of the eligibility test index value for teaching

materials qualitatively according to Sugiyono (2015).

Table 2. The Eligibility of Android-based M-learning (Mobile Motion) teaching materials using the inquiry learning method

No	Range (%)	Criteria
1	81,25 < Validation Value ≤ 100	Very valid
2	62,5 < Validation Value ≤ 81,25	Valid
3	43,75 < Validation Value ≤ 62,5	Less valid
4	25 < Validation Value ≤ 43,75	Invalid

RESULTS AND DISCUSSION

Understanding the concept of subject matter mean to understanding correctly about the concept of those subject matter. In additions, students can translate, interpret, and conclude a concept of the subject matter based on the formation of their own knowledge, not just memorizing. Students can find and explain the relationship between concepts and other concepts. By understanding concepts, students can develop their abilities in learning and students can apply the concepts they have learned to solve simple to complex problems. Krathwol & Anderson (2010) state that students can be mean as understand if students can construct meaning from learning messages, both oral and written, as well as graphics, delivered through learning, books or computer screens. Students understand when students connect their “new” knowledge and their “old” knowledge. The basic for understanding is conceptual knowledge. Cognitive processes in the category of understanding include: interpreting, exemplifying, classifying, summarizing, concluding, comparing and explaining.

The result of this research is the development of android-based mobile learning media. Motion system subject matter for XI high school students using modified software in android packed (apk) format. The developed mobile learning media is used for XI high school students in the form of an apk file that must be downloaded first before use. Android-based mobile motion display developed:

Cover page (splash screen), on the splash screen there is the title of the material, the UNNES logo, the target user and the next button to go to the next page. The following is an image of the cover page in mobile learning media.



Figure 1. cover page in mobile learning media (mobile MOTION).

The main menu page contains several icons which are shortcuts. Moreover, those are used to open other application displays such as materials, videos, inquiry projects, concept understanding projects, critical thinking questions, evaluations, assessments and online class schedules.

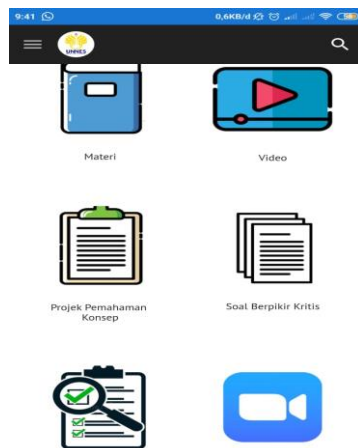


Figure 2. Main Menu page on M-Learning (Mobile Motion)

Validation that has been done by subject matter experts aims to analyse the eligibility of the content of the material or content in the M-learning (Mobile Motion) application. In sum, researchers get an input which will be used as material so that the application developed is better and possible for teaching materials in biology subject.

Table 3. Eligibility test of teaching materials by subject matter experts

Validation	Percentage Results (%)	Criteria
Validator 1	84.45	Very Good (Very Valid)
Validator 2	85.13	Very Good (Very Valid)

Eligibility test of teaching materials was validated by 2nd validators. Validation by The 1st subject matter experts got a presentation score: 84.45% and validation from by the 2nd subject matter experts got a presentation score: 85.13%, with a very good category. This shows that the content of the material contained in the developed application can be used. Therefore, the M-Learning (Mobile motion) application can be used by students in the learning process.

M-Learning (Mobile Motion) applications that are developed before use must be validated by media experts. Validation by media experts includes several indicators: Graphical Achievability, M-learning application media components, Language Eligibility. The results of the validation by media experts are presented in table 4:

Table 4. Eligibility test of teaching materials by subject matter experts

Validation	Results (%)	Criteria
Validator 1	85.49	Very Good (Very Valid)
Validator 2	89.91	Very Good (Very Valid)

Based on the results of the Validation, the results of the Validation by media experts I get a presentation value: 85.49% and validation from media experts II get a presentation value: 89.91%. This shows that the application developed has a high presentation meaning that the application is very good or valid. The M-Learning application (Mobile motion) can be used by students because the aspects of the possibility of graphics, the components of learning media and the practicality of the language have met (Radianti et al., 2020). The results of the validation by media experts above obtained an average score of above 10, so when viewed in the

Criteria table for m-learning applications (Mobile Motion) is included in the “Eligible” category.

The concept understanding test is done by the researcher after providing learning material first according to the indicators that student must achieve after completion. The researcher gives questions that refer to the indicators of understanding concept, questions that are given to students in the form of case studies which later students can solve the study case which in line with the indicators of understanding concept. Questions were given to 2 classes consisting of 57 students. The question of understanding the concept given was found in the M-Learning application and linked to the Google form so that students can immediately fill in the answer by starting with filling in the identity such as the class name and absent number first.

Table 5. Percentage of Understanding Concept Test Results

Description	Total	Score (%)
Students passed	54	94.73
Students do not passed	3	5.26

Based on table 5 the percentage of the results from the understanding concept test shows that the suitability between the purpose of using the m-learning (Mobile Motion). The learning objective, which is shown by student mastery which is more than 75%, it is 94.73%. Conceptual understanding test aims to make students understand correctly the concept of learning material and can translate, interpret, and conclude a concept of learning material based on the formation of their own knowledge, not just memorizing (Fernández-López, 2013). Students can find and explain the relationship between concepts and other concepts.

The use of Android-Based M-Learning Application with an inquiry learning model on understanding concepts in the motion system subject has a very good influence (Griol et al., 2017). That is shown by the Percentage Results of students' completeness in working on the understanding concept test questions.

This study has several limitations ranging from the limited number of samples due to the fact that the school used as the research site only has 2 science classes. Therefore, researchers must use

research methods that are suitable for the number of samples available. The implementation of the research was constrained by poor Wi-Fi connection so that access to the m-learning application was a bit slow. Even if the application was accessed using cellular data, only a few providers had a stable signal. The next problem is that there are some students who do not use Android-based smartphones so the application cannot be installed.

CONCLUSION

The eligibility of an android-based mobile learning application with understanding concepts and critical thinking of students on motion system subject, by media experts and subject matter experts is confirmed valid and suitable for use on learning process in class XI.

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