Developing a Multimedia Learning Module (MLM) Android-Based to Enhance Students' Interest toward Work and Energy Material

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Abstract

This research is aimed to test the multimedia learning module feasibility as a product to be used for learning; examining the enhancement of students' interest in learning by operating multimedia learning module android-based. This research is typically Research and Development (R&D) by a research model, ADDIE, stands for Analysis, Design, Development, Implementation, and Evaluation. The multimedia learning module (MLM) has been validated by professional and experienced validators. Also, validation from the concerned teacher about work and energy material before it is ready to be tested. The media testing took place in Senior High School 3 Samarinda was undergone by the tenth grade of IPA 1 students as experimental group meanwhile the tenth grade of IPA 2 students as the control group. Both classes consist of 32 students and had been evaluated to analyze their interests. The result showed that multimedia learning module android-based toward work and energy material is applicable and quite good as effective as enhancing students' learning interest.

Keywords: Android; Energy; Interest; Multimedia Learning Module (MLM); Work.

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1. Introduction

Education obtains skillful, creative and innovative human resources [1]. In this 21st century, the quality of teachers required success from the students [2,3]. The invention of learning media is capable to upgrade a better quality of education [4]. Correspondingly, technology advancement helps teachers to make learning media spent amount of high cost. One of Physics sub material which need multiple properties demanded expensive cost in order not to cover the use of learning activities [5,6]. Because of Physics material subject needs to have demonstration either simulation in every meeting [7]. Moreover, learning media is highly demanded to support learning activities and useful for learning quality [8]. As time goes, technology and information have a rapid development so that it controlled most of the human activity. Therefore, it emphasized work to conceive over sciences [9]. One of the purposes of the multimedia learning module is worthwhile to create, keep and deliver in text, animation, video, etc. Thus, people easily in navigating, interacting and communicating [10,11]. The use of economy-priced smartphones is one of the supporting factors caused by android users drastically increased [12]. According to a survey in 2018, smartphone users in Indonesia reached over 100 million users [13]. Therefore, it defined Indonesia as one of the most active users among other countries [14]. Android is a mobile operating system Linux-based including operating system, middleware, and application [15]. Android provides an open resource platform for developers to invent their applications [16]. It becomes one of the most favorable operating systems due to its open-source and free access given to the developers to invent their application [17]. Most of the students use their android smartphone for playing online and offline games either browsing social media [18,19]. As a result, they can barely concentrate during class. This inhibits students during the learning process also most subjects are delivered conventionally [20,21]. Worse of all, they were easy to get bored or they addicted to playing games on their smartphone [22]. Consequently, to prevent those negativities, smartphones wisely to be involved during the learning process to habituate students to be self-learner [23,24]. In education, the more students owned and used a smartphone, the easier to determine the opportunity of using technology [25]. Practically, the privilege of using technology especially smartphones during the learning process occurred known as a multimedia learning module [26]. The existence of a multimedia learning module completed the background of the learning process for students to fill the gap about school material every time and everywhere [27,28]. Some students bring their laptops while going to school and some of them bring their textbooks to support learning in the class [29]. Nevertheless, bringing a laptop to go to school is not a great idea and consider being inefficient due to its heavy [30]. Furthermore, learning media of smartphone android-based is urgently needed. The android operating system technology is the most smartphone users [31,32]. According to Geyeski, multimedia is a group of media computer based and communication system use to build, save, transfer, and receive information in graphic, video, text, audio, etc. [33,34]. Meanwhile, Hofstetter stated that the use of computer to present and combine text, audio, image, and video with device will help the user to simply navigate, interact, create, and communicate [35]. Research finding by Mustafa Al-Emran showed significant differences between students' attitude and M-learning in connection with ownership, country, and the age of their smartphones [36]. Furthermore, the result concluded that M-learning could be one of pedagogic technology guaranteed to be used in higher education in Saudi Arabia [37]. In accordance with the relevant researched studies of students' interest by observing in Senior High School 3 Samarinda found that media was rarely used as a result it overdrove teachers either overwhelmed them to manage the class. Work and Energy as

one of the material need to be delivered contextually, but teachers tend to derive conventionally. Therefore, students got to be boring and over fullness easily. However, further methods are demanding for the teachers to increase students' interests during learning [38]. Following the description above, the research about the development of multimedia learning module android-based to increase students' interest toward work and energy material will be conducted.

2. Research Method

2.1. Research Design

Research and Development design opted for this study. The development of the learning process adapted from the ADDIE model (i.e. Analysis, Design, Development, Implementation, and Evaluation) which formerly found by Dick and Carry.

 This research underwent the experiment in Senior High School 3 Samarinda academic year 2019/2020. It took two classes, i.e. tenth graders of IPA 1 acted as experimental group and tenth graders of IPA 2 acted as a control group. Both classes consist of 32 students.

2.2. Research Procedure

In the ADDIE model, there were some processes and steps needed to be required. The following steps were; (1) Analysis, the main responsibility of the stage to collect and define prerequisite data highly correlated to the learning process; (2) Design, this process systematically decide and determine the purpose of learning, plan the learning activity, prepare the teaching devices, prepare the module, and post-learning evaluation media; (3) Development, the applying of research design occurs in this step; (4) Implementation, this is a real process of an ongoing learning system. Meaning, the developing media ready to be examined during the learning process; (5) Evaluation, is highly demanded to the learning media validation process to the learning process whether it is compatible and suitable or not.

2.3. Data Collection Technique

The data in this research technically collected by giving questionnaires to students. The questionnaire purposed to get the responses formed statement about media developed with multimedia learning modules. It also created to get validation from professional and experienced validators and teachers.

2.4. Data Analysis Technique

A descriptive-analytical data technique was applied in this research methodology. Also, Likert Scale categories (e.g. very good, good, fair, bad, very bad) applied technically in this research. After got the score from all validations, it measured the average score of every aspect by the formula [39]:

Hereby the terms explained

$$\bar{x} = \frac{\sum x}{n} \qquad (1)$$

$\bar{x}$ = Mean

$\sum x$ = Total Score

n = Total Validation

The calculation to get a validation percentage by the following formula

Hereby the terms explained

$$K = \frac{F}{N} x100\% \qquad (2)$$

K = assessment percentage

F = total responses' respondents

N = total ideal score

Herewith the score of conversion table which was adapted from Ridwan [40] the quantitative questionnaire data results transformed into qualitative data.

Table 1: Score conversion of learning media

No	Range	Category
1	81% - 100%	Very good
2	61% - 80%	Good
3	41% - 60%	Fair
4	21% - 40%	Bad
5	0% - 20%	Very Bad

3. Result

This research and development aimed to invent a product of android based learning media. The implementation of this learning media required the researchers to follow several prominent procedures:

Analysis

The analysis stage consisted of some following activities as follows: (a) Problems of Student Analysis, the tenth grade of Science major students at Senior High School 3 Samarinda had difficulty while comprehending work and energy material which most of it was about calculating and analyzing. More, the teacher frequently used

conventional methods to deliver the material; (b) Learning Complexion Analysis, the teacher frequently delivered subject material in the class conventionally; (c) Potential Analysis, Senior High School 3 Samarinda students mostly were friendly-users of computer technology and practically used it every day whether in-home or school.

3.1. Design

Design systematically divided into some points, e.g. test arrangement, media selection, format selection, and initial draft. Test arrangement was a process systematically began to decide and determine the learning purpose, prepare the learning activity, prepare the teacher devices, prepare the module and design post-learning evaluation media. The test was divided into pretest and posttest. Media selection was a well-chosen which developed into multimedia learning module android-based application to increase students' interest. Format selection focused on developing work and energy material. Meanwhile, the initial draft was about learning model design principled conceptual and initiated the process fundamentally. In case, it had two parts, i.e. concept and program design. The concept consisted of (1) Decide and Determine the learning purpose, learning purpose adjusted and adapted by syllabus used in Senior High School 3 Samarinda; (2) Target users, the learning media appropriately will be used by the tenth grader Senior High School 3 Samarinda students; (3) Determine the type of product, a product derived from media as a result of android-based application which was interactive and student-centered. The final product formed an application file named "My Physics" which simply can be found in Playstore then installed into your drive. The design consisted of (1) architecture design, it was one of the steps in which data were displayed into the program; (2) interface design, the drafting of the program structure was conceptually explored in this stage. The display was designed by following through the diagram flow which was planned to simplify the process of display making; (3) Procedural design, was one of programming language frequently used. Final result product in this research was an android based learning media. The application used as learning media connecting with buttons. One of the product display has been resulted and viewed on figure 1 and 2.
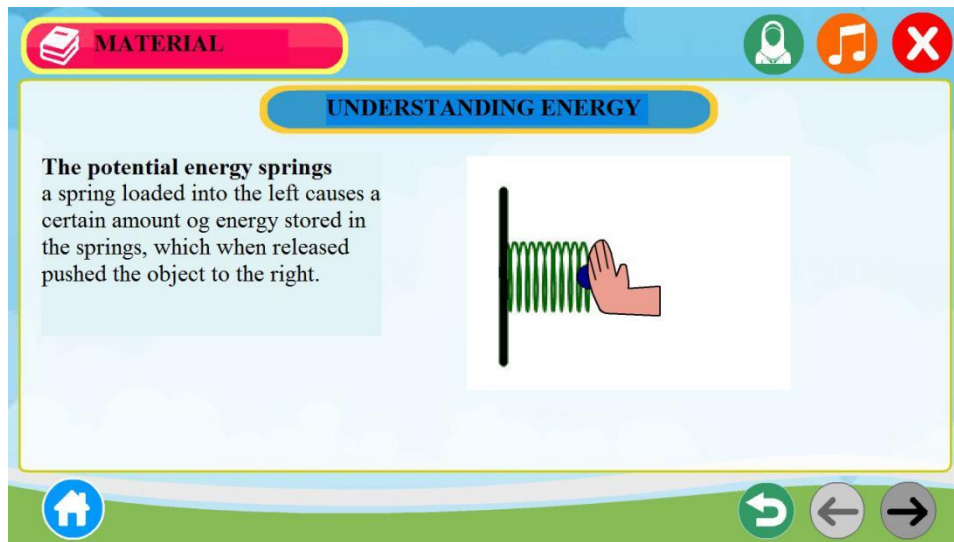

Figure 1: Home display

Figure 2: Material page display

3.2. Development

During the process, whole planning from previous processes turned into an object. The developing process of multimedia learning module android-based on work and energy material divided into validation and revision.

3.3. Expert Validation

Expert validation is an essential part of this research to evaluate the learning media by professional and experienced validators and subject teachers to complete the learning media into perfection. Learning material validated by a professional and experienced lecturer of Ahmad Dahlan University which correspondingly expertise in the Physics field. Moreover, learning material validated by experts considered content truth aspect and learning aspect. According to learning material data analysis, it resulted in the validation amount of 69.02 % which categorized as "Good". In line with learning material, learning media data analysis validated by one of the professional and expert Ahmad Dahlan University lecturers with his deep knowledge in learning media. The data derived from learning media data analysis amount 66% which categorized "Good "as well as from the learning material data analysis. The next validation from the subject teacher which was essentially determined whether learning media ran as well as the lesson plan. The amount from the subject teacher showed the highest score among others about 87.04 % which categorized Very Good.

3.4. Revision

Revision helped researchers to fix media after validated by experts. According to correction and suggestions from both expertise lecturers and professional teachers, learning media set up to be perfect and ready to be implemented.

3.5. Implementation

Revised media by experts was ready to be tested by students. The tenth grade of IPA 1 students acted as the experimental group, meanwhile, the tenth grade of IPA 2 students acted as the control group. Both groups from Senior High School 3 Samarinda consisted of 32 students.

3.6. Students Responses

Students' responded to the learning media by questionnaires that were shared in this research. The data analysis showed an amount of 76.5 % which categorized "Good".

3.7. Students Interest

To find out students' interest in learning media within the learning process from every subject, it needed to be measured to get to know students' interests. The data analysis showed a percentage amount of 82% toward students' interest which categorized "Agree".

3.8. Evaluation

Evaluation purposed to check and ensure the capability of the developing media whether successfully capable and suitable enough or not. The evaluation concluded the use of learning media by students' interest level compared with learning media was drastically increased showed by the result of the questionnaire of learning's interest and correspondingly categorized "Agree".

4. Discussion

The final product of this Research and Development design was learning media for Work and Energy material by using multimedia learning module application android-based which invented corresponding with competency standards and basic competencies of tenth grader Physics level. The Physics learning media android-based functioned to enhance academically made by Adobe Flash Professional CS 6 computer program successfully. Learning media product resulted file in android package format (apk). This format file is consisted application installation requirement in android device. If it is opened in android device, it will automatically install the learning media android-based on it. This media capable to enhance the students' learning process toward the tenth grader of IPA 1 and IPA 2. This media consistently well designed to emerge students' responsibility to be self-learner during the learning process so that the teacher might not give them any accompaniments. The invention of this media took several prominent stages during the process into its perfection. It also measured by a capable professional and experienced experts on their field. The developing media validated by expert meanwhile the users validated for the minor scale. In every step of the test, evaluation and revision maintained periodically to improvise the learning media into well designed. The validation was supervised by both professional and experienced lecturers. Learning Material was validated with consideration of the media content-truth and learning aspect. Validation aimed to adjust the learning material by learning module's syllabus in Senior High School 3 Samarinda similarly. The explanation about Work and Energy provided the main subject matter, e.g. definition of work, the definition of energy, the law of conservation energy and power. The material delivered in such a manner to help students understood comprehensively during learning so that the

addition of animation either interesting pictures to elaborate the explanation. Besides, learning media was administered with consideration of the content and purposive aspect, instructional and technical aspects. Learning Media validation purposed to find out the simplicity in the usage of media started from the beginning until the end. All of the collected data were measured and determined the mean. According to each score, results will be categorized by Likert Scale which has been predetermined. Collected data were measured and calculated as follows; (1) Learning material validation amount score 69.02% which categorized "Good". Meanwhile, (2) Learning media validation amount score 66% also categorized "Good" constant with learning material validation result. Afterward, (3) Subject teacher validation showed the highest number among others amount 87.04% which categorized "Very Good". Lastly, (4) Validation from students showed good perspectives amount 76.5% which categorized "Good". According to the data analysis above, it can be concluded that multimedia learning module application android-based from material and media were capable, suitable as learning media, and applicable in the learning process properly. This research not only measured the quality of developing media but also the students' interest in using learning media after joining the class. Moreover, this research also validated the ability of students by exam to get to know how depth the students' understanding of the material. Thus, the data showed by the interest of students' amount 82% and categorized as "Agree". Learning media android-based has a positive impacts i.e. friendly user, attractive, and simple, learning can be everywhere, also can be accessed by offline mode or no need internet connection. Correspondingly, Sulisworo and his colleagues (2016) [41] verified that the use of multimedia learning modules was proven to improve the interest and support of students during self-learning. Learning media was one of the helpful systems in the class to assist students got meaningful, delightful, and unmistakable learning. Besides, learning media correspondently triggered students' interest increased drastically and attracted to the subject delivered by the teacher. Astuti and Bhakti [42] clarified that psychomotic ability enables one to increase if learning not monotone and using interactive media. Multimedia learning also gave a chance in the education system to advance the learning techniques [43]. According to Mustofa (2019) [44], Sakat (2019) [45], Anggraeni & Kustijono (2017) [46] and Jabbour (2017) [47] agreed that learning media android-based would enhance students' interest and improve the learning to be more attractive and joyful either make a positive impact toward students' achievement. The development media enhanced motivation in learning also cognitive result of study due to the media developed appropriate with students' level of thinking Sudjana & Rivai (2018) [48]. Human level of thinking kept up with development stage; began with think concretely into abstract level; think simple into complexity. The used of learning media was highly correlated with stage of thinking because of learning media may improvise the abstract information into concrete, also complex information may be simplified. This study has several limitations; among other things, this research is limited to the subject of junior high school students in one school, so the results of this study cannot yet be generalized to other school subjects. Another limitation is the age and education level of the subject, subjects in this study were limited to subjects with a junior high school, so this scale cannot yet be used on subjects at other educational levels. The data analysis technique used is to build the model so that the new model can see the suitability of the theory with the subject conditions at the research location. For further research should be able to conduct research with more subjects and a broader scope. Data analysis techniques used in subsequent studies can use other SEM techniques so that models can be tested, so that the model formed becomes more adequate.

5. Conclusion

Based on the results of the analysis and discussion, it can be concluded that: 1) The altruism scale meets validity and reliability. 2) All aspects and indicators can form altruism variables, namely aspects of empathy, voluntary and desire to help. The aspect that has the most dominant influence on altruism is empathy and the weakest aspect of reflecting altruism is desire to help. In this study, an altruism scale measurement model was formed which corresponds to empirical data obtained from subjects at the study site.

Acknowledgements

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