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Development of Interactive Learning Media for Low and Overhead Passing Techniques in Volleyball Based on Android Technology Using MIT App Inventor

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Abstract--Education is one of the sectors affected by COVID-19, including education in universities, resulting in the transformation of synchronous learning into asynchronous learning. Because COVID-19 suddenly came to change the entire process of human life in the world, including changing the learning process in the world of education. Educators are required to be able to use technology in the preparation of teaching materials so that lectures continue to run as they should. Based on the learning process in the July-December semester which is fully online, of course, many problems are found.

Based on the problems faced, the purpose of this research is to develop interactive learning media for the technique of passing down and passing over based on android technology using MIT App Inventor. The sample in this study was 120 students who took volleyball lessons. The stages of research methods are analysis, design, development, implementation, and evaluation. From the results of data analysis on the media validation test to see the feasibility of the media carried out, it was obtained an average value of 67.5 with a percentage of 77% and was categorized as feasible after revision of the media. Furthermore, the results of the analysis of the feasibility of the material used obtained an average value of 60.5 and the percentage of quality is 81%, so it is categorized as very feasible. After testing the feasibility of the media and materials carried out, the output of this media design is given beta testing to find out for sure based on data about the responses from students who take volleyball learning courses by sending via e-learning to install applications that have been designed then students are asked to evaluate the media and answer the statements given through the questionnaire that has been given. then the results obtained who answered strongly agreed were 45 people (37.5%), who answered agreed were 69 people (57.5%), and answered neutral, namely 6 people (5%). Furthermore, from the results obtained, the percentage for the quality of the media used was found to be 82.50%.

Keywords---android technology, down passing, learning media, MIT inventor, up passing.

Introduction

The Faculty of Sports Science is one of the faculties at Universitas Negeri Padang which consists of four Study Programs, and among them is the Physical Education, Health, and Recreation Study Program. Lecture activities at the Physical Education Study Program for theory classes are conducted fully online, while blended learning is applied for practical classes. The subjects in the Physical Education, Health and Recreation Study Program curriculum are dominated by practical classes, including the Volleyball subject. From the learning implementation plan perspective, for this volleyball subject, the description of the subject consists of theoretical and practical lectures on volleyball games which include learning and training in physical conditions, techniques, and tactics of volleyball games done by students for one semester through a structured and systematic learning approach as a form of preparation of students to face the practice of field education and assignments as school teachers in the future. Meanwhile, the learning outcomes of the volleyball subject that have been prepared by the subject Teaching Team explain that students must be able to master and capable of doing basic volleyball techniques properly. They must also be able to teach the basic volleyball techniques systematically and effectively to students later in the field. Based on the July – December 2020 semester experience, online classes provide more theory than practice. As a result, the volleyball class is less than optimal for students to learn the volleyball

technique skills. In online learning, lecturers find it difficult to demonstrate technical movements to students, and vice versa, students cannot understand the movements explained by lecturers online.

When students are assigned to do the volleyball techniques individually, many of them fail to do it properly because there are no media such as videos to demonstrate movements of the volleyball techniques. Another obstacle that is often faced by students is the internet network in accessing the e-learning platform because many students come from areas where the internet connection is still weak and unstable. Based on the problems mentioned above, the offered solution is the development of interactive learning media for low and overhead passing techniques based on android technology using the MIT App Inventor (Azzajjad et al., 2021). App Inventor is an application builder provided by google labs (Syaputrizal & Jannah, 2019), which can be installed by students on their androids so that students can study independently or practice volleyball techniques with the media in demonstrating the correct technique of the volleyball subject (Marpaung & Hambandima, 2018; Ginaya et al., 2020). Interactive learning will be more achievable by the usage of technology-based media (multiple media) (Sari et al., 2019).

The purpose of this research is to develop interactive learning media for the technique of low and overhead passing based on android technology using the MIT App Inventor so that the objectives of the learning can be achieved successfully (Abdallah & Fayyumi, 2016; Barata et al., 2013). Based on a circular letter from the Rector of Universitas Negeri Padang, No. 6307/UN35/AK/2020, regarding campus activities for the January – June 2021 semester to be alert of the COVID-19 pandemic that practicum lectures are conducted online and offline with the implementation of learning activities with concern to harmonization and balance between synchronous and asynchronous learning activities (Rinartha & Suryasa, 2017). Therefore, in dealing with this policy, this research is very urgent to be carried out as soon as possible since this interactive learning media is profoundly necessary to achieve the main objectives of the volleyball subject (Erbas et al., 2021). Volleyball subject is a compulsory subject that must be taken by all students in the Physical Education, Health, and Recreation Study Program. Moreover, volleyball is one of four international sports that is very popular among men and women since the Olympic games in 1964 (Cengizel, 2019), and volleyball is also a popular sport at every level of education in schools. The learning outcome of the subject is that students must master the technical skills in volleyball, including the technique of low and overhead passing (Easby, 1978; Crawford, 2015). One can obtain Volleyball techniques if they practice regularly to automate the movements in each of these techniques. According to Eylon et al. (2017), the main goal of each sport is to develop the physical activities needed for each sport constantly. Furthermore, Anggraini (2014), explains that physical activity will develop individuals to be more sporty and proficient through these physical activities. A Modern approach in learning is necessary to obtain effective movements from the practical teaching of skills (Soytürk, 2019). The psychomotor development of volleyball techniques and movements requires physical strength obtained from exercise (Yusmar, 2017).

The technique of low passing and overhead passing is a technique in a volleyball game that aims to pass the ball to a place or a teammate and is the first step in preparing an attack (Astuti et al., 2020). Before the COVID-19 pandemic, lecturers can demonstrate directly how to do the passing techniques properly and correctly so that students will also be able to transfer their knowledge to their future students later if they are in the field, but in the current conditions, classes cannot be conducted as usual with full face-to-face and direct training as opposed to the semester before the COVID-19 pandemic. Therefore, following the current industrial revolution 4.0, lecturers should innovate by utilizing recent technology. For achieving the goal of learning effectively, effective learning media is needed following the characteristics of students, (Putra et al., 2017). According to Lamatenggo & Uno (2016), Media are several forms and a channel that is used to convey information or messages. Furthermore, Putro & Lumintuarsa (2013), explain that learning materials containing textual, audio, and visual media will attract students' interest in learning. In this case, innovation will be achieved by creating a learning media for low and overhead passing techniques using the MIT App Inventor which is an application that can be installed on Android (Gikas & Grant, 2013; Zhang et al., 2015). This combination of technology usage in the development of this media will later create several variations of exercises to improve low passing and overhead passing skills. To produce changes or improvements in motor ability from sports techniques, it must be done with continuous practices (Astuti & Mardius, 2018). The forms of exercise that will be developed in the MIT App Inventor are individual exercises, exercises in pairs, and exercises in small groups. Therefore, this application that is accessible on the student's smartphone, is expected to increase the student's eagerness to improve volleyball techniques, especially the low passing and overhead passing techniques.

Based on data from appinventor.mit.edu, 195 countries have used this application, and 34 million people have registered with the MIT App Inventor (Mikolajczyk et al., 2018). In consequence, the author will also try to combine sports science with technology with an expectation to create student independence in learning. The use of interactive learning media that employs technology such as smartphones or android will increase students' motivation in learning (Anderson & Davidson, 2019). According to Wihidayat & Maryono (2017), mobile technology-based applications are one type of technology that is developing rapidly in this era and beneficial to support the online learning process. Furthermore Syaputrizar & Jannah (2019), said that MIT App Inventor is an application that consists of two main elements, a component designer and a block editor which are then integrated. Subsequently (Negara et al., 2019), added that the definition of MIT App Inventor is an application builder that aims to make applications run on the android system provided by google labs and to create these applications using the internet connection and a browser. On top of that, Alkodri (2019), explained that App Inventor is convenient visual programming in developing and building android applications with the drag-drop tool feature. Based upon the opinions of some of these experts, it can be understood that one of the applications that can be used to design interactive media is by developing applications with MIT App Inventor by entering components into the designer page of the application.

Methods

The method used in the research is the Luther development model consisting of 6 stages, namely concept, design, material collection, assembly, testing, and distribution. At the concept stage, the researcher observes and discusses the obtained data, followed by recording the movements for volleyball techniques, namely low and overhead passing, at the material collection stage (Gates, 1983). Afterward, at the design stage, designing media or applications using the MIT APP Inventor and then continued by the assembly stage of applications/products, testing of applications, and distributing the created applications/products. To produce or validate a product, including a product for the world of education which is later expected to help solve problems encountered in volleyball lectures. The Volleyball Field Campus II Lubuk Buaya, Faculty of Sports Science, Universitas Negeri Padang, is the planned location where the researcher will conduct this research. The population in this study are all students of Physical Education, Health and Recreation, Faculty of Sports Science, Universitas Negeri Padang, who took volleyball classes totaling 120 people. Meanwhile, sampling applies a saturation sampling technique, denoting that the entire population is sampled. Thus, the number of samples is 120 people. In this study, the observed/measured variable is the effectiveness of using interactive media using the MIT App Inventor application for the skills of low and overhead passing in volleyball. The applied data collection technique uses validation from media experts to test the feasibility of the media used in volleyball learning. Furthermore, using validation from a material expert, namely about the material of the low passing technique and the overhead passing technique to ascertain whether the material provided is suitable for students to use or not in volleyball courses. Afterward, a questionnaire is given to all students in the Physical Education, Health, and Recreation Study Program, Faculty of Sports Science, Universitas Negeri Padang. It proposes a statement related to the used material and the media that has been designed using a Likert scale questionnaire with alternative answers, namely: strongly agree, agree, disagree, and strongly disagree. Based on the obtained data from the media validator and material from the interactive designed media, all the collected data is used to improve the media in the form of the MIT APP Inventor application. On the other hand, the data obtained from students who have filled out the questionnaire is used to identify the feasibility of the created application, an android-based application using the MIT APP Inventor. The further analysis of the data is applying the percentage of quality with the formula:

$$\text{Quality percentage (\%)} = \frac{\text{Observation score} \times 100\%}{\text{Expected score}}$$

Results and Discussions

Interactive learning using the MIT APP Inventor for volleyball subject learning is one of many options that can be applied for assisting students in online classes. Several steps are taken in this study, namely by analyzing problems, collecting data, designing media using the MIT APP Inventor, testing the validity of the media, and material validity about low and overhead passing, revising the media, and conducting trials to students as well as running data analysis and conclude

from the research results. Based on the results of media validation to identify the feasibility of the media, the average value is 67.5 with a percentage of 77% and is categorized as feasible after the media revision. Therefore, the media designed for volleyball learning classes, especially the low and overhead passing technique, is viable in the lecture process.

Furthermore, the results of the feasibility analysis of the used material, the average value is 60.5, with a quality percentage of 81%. Hence, it is very feasible categorically. Therefore, it can be concluded that the designed material, using an android application through the MIT APP Inventor, can be used for online volleyball classes for low and overhead passing techniques. After the media feasibility testing and used material analysis, beta testing is given as an outcome of the media design process. The purpose is to ensure based on data about the responses from students who take volleyball learning classes. The instructions are sent to them via e-learning to install the application, and then students are asked to evaluate the media and answer the statements given through the questionnaire. The sample in this study was 120 students who took volleyball learning classes. The results of the questionnaire are, 45 students answered strongly agree (37.5%), 69 students answered agree (57.5%), and neutral was the preferred answer of six students (5%). Furthermore, from the obtained results, the quality percentage of the applied media is 82.50%. In conclusion, the designed media for low and overhead passing techniques for volleyball learning subjects is more than feasible in supporting the online class process for the students.

Conclusions

Based on the results of the data analysis, it was concluded in this study that the interactive learning media designed using the MIT APP Inventor for online volleyball learning subject is very feasible in helping students to achieve the objectives of learning which expects that students must be able to know of overhead and low passing as well as having volleyball skills in the overhead and low passing techniques.

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