Development of a Fundamental Movement Skill Program Based on Augmented Reality Technology for Elementary School Students

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Article Info

Abstract

Basic movement is very influential for children's survival because when children have good basic movement skills it will encourage their consistent patterns in carrying out physical activities. After that, physical activity carried out regularly is what will encourage a healthy quality of life and will ultimately help them in their daily movement tasks. The aim of this research is to develop a Fundamental Movement Skill Learning Program Based on Augmented Reality Technology for Elementary School Students which is based on the National Sports Grand Design Master Plan (DBON) Program which has a similar mission, namely the realization of active student participation in sports to achieve the physical fitness level of Indonesian students. The research method used in this research was the ADDIE Development model and the product was validated by three Validators, namely teachers and two expert lecturers in Physical Education and implemented at SDN Margakaya I with expert assessment results having an average of 87.3%, and the results of program implementation in the field. In general, this program is considered feasible.
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INTRODUCTION

Physical Education, Sports and Health are one of the important subjects in the education system in Indonesia. Physical Education Learning Activities in schools aim to develop fundamental abilities, namely locomotor, non-locomotor and manipulative movements.(Gustiawati et al., 2019; Mahfud & Yuliandra, 2020). These three types of fundamental abilities can later be developed, therefore, a teacher must be able to modify the material so that students can move and train their fundamental abilities (Azis et al., 2022; Ricky & Triana, 2019) A basic movement pattern is a movement pattern that will become the foundation or basis for more complex movement dexterity (Nugraha et al., 2018). These three locomotor, non-locomotor and manipulative movements are the basic movements which will later help students improve their skills in various fields of science.(Bolger, 2021; Mas'an Al Wahid, 2022)

Basic movement is very influential for children's survival because when children have good basic movement skills it will encourage their consistent patterns in carrying out physical activities. After that, physical activity carried out regularly is what will encourage a healthy quality of life and will ultimately help them in their daily movement tasks (Kal, 2018; R. Kurniawan, 2018) The importance of fundamentals in this phase of elementary school children makes the role of Physical Education teachers in providing basic movement learning in schools very large. Therefore, teachers as educational drivers must be able to become facilitators so that the task of developing elementary school students can be fulfilled. Apart from that, teachers must

innovate in learning activities so as not to be left behind by the development of elementary school students (Khaulani et al., 2020).

The lack of references or guidance on basic movement material for Physical Education teachers at the elementary school level means that learning about basic movement material is rarely given to students even though it should be according to (Amali, 2022; Gustiawati et al., 2023) The development of basic motor skills (Fundamental Motor Skills) is an important aspect in early childhood. For this reason, there is a need for a reference on learning basic movements that is in accordance with the National Sports Grand Design (DBON). To strengthen sports development in Indonesia, the Indonesian Ministry of Youth and Sports developed the National Sports Grand Design (DBON). DBON is a framework that covers various areas of sport, including Physical Education. DBON emphasizes the importance of a holistic approach in student development, taking into account cognitive, affective and psychomotor aspects (Bastian et al., 2017).

In this context, DBON emphasizes the importance of developing students' basic motor skills and physical fitness. Basic motor skills include the skills needed to perform basic movements, such as walking, running, jumping, and throwing. Meanwhile, physical fitness includes aspects such as strength, endurance and flexibility. Developing students' basic motor skills and physical fitness can help them to be more physically active, both inside and outside of school. This can help reduce the risk of obesity and diseases related to physical inactivity, as well as improve students' overall health (Denatara et al., 2022). In addition, the problem solving

approach can be carried out with technology that is used as a means to improve Fundamental Movement Skills, such as Augmented reality (AR) technology provides an innovative and interactive way to learn certain concepts. With the help of AR, students can see abstract concepts physically through virtual objects in 3D, achieve more meaningful learning, and consequently higher academic achievement than learning without using AR (Ahmadi et al., 2020). Students are very interested in learning that combines the real world and the virtual world (AR) of Physical Education, especially in learning basic movements. The market used in AR-based learning can be in the form of cards or paper that are connected to Android through a scanning process carried out via Android (Akhyak et al., 2016).

Learning media are materials, tools or all material sources. Learning media that is currently being developed is using Augmented Reality (Rendi, 2021). Augmented Reality can be defined as technology that is able to combine virtual world objects into the real world by projecting them in real-time (Yudhistira et al., 2021). By developing AR-based programs at the elementary school level, it is hoped that students can acquire better basic motor skills and lay the foundation for the development of more complex physical skills in the future. In Augmented Reality there are three characteristics that are the basis for the system, including a combination of the real and virtual worlds, interactions that run in real time, and the last characteristic is 6 forms of objects in the form of 3-dimensional or 3D models.(Calabuig-Moreno et al., 2020). According to (Indahsari & Sumirat, 2023) Augmented Reality technology is able to add reality to the real world with elements of virtual objects where the boundary wall between the real and virtual worlds does not seem

to exist. With this Augmented Reality technology, students are invited to experience sports in an unusual way and it is hoped that students will be able to understand more about movement skills. Mastery of basic movement skills also has a positive impact on children's health, such as obesity, which is recently often found in elementary school students.(Zulfikar et al., 2021).

Literature studies related to Augmented Reality Technology have been researched by (Sintaro et al., 2020) with the research title "Applications for Learning Basic Futsal Techniques Using Augmented Reality Based on Android" with research results that the application built meets functional requirements. From the results of beta testing which was carried out using the acceptance method for respondents, it resulted in a score of 83% of respondents interested in using the 3D AR Futsal Basic Technique Learning Application. Other research was also examined by (Alvionita et al., 2021) with the research title "Literacy Studies: Pioneers of Meaningful Learning Using Technology."Augmented Reality On the Topic of the Environment in the Era of Freedom of Learning" with research results that the use of Augmented Reality as a learning media will be effectively used for the learning process in this era of freedom of learning. Apart from that, research conducted by (Ismiati et al., 2021) with the research title "Magic Card Application DesignAugmented Reality"On the Basic Movements of Sundanese Dance" with research results. Testing was carried out by 4 material experts, 4 media experts and 30 respondents. The test results for material experts were 89.68%, the test results for media experts were 92.70% and the test results for respondents were 91.42% in the category of Magic Card Augmented Reality Application in Basic Sundanese Dance Movements which is very suitable

for use. From several previous studies, researchers have differences in previous research, namely on usability and programs in applicationsAugmented Reality Namely the existence of a Fundamental Movement Skill Program For elementary school students. The aim of this research is to develop a Fundamental Movement Skill Learning Program Based on Augmented Reality Technology for Elementary School Students which is based on the National Sports Grand Design Master Plan (DBON) Program which has a similar mission, namely the realization of active student participation in sports to achieve students' physical fitness levels. Indonesia

METHODS

The research carried out is research and development (Research & Development) or R&D. Research and development methods are research methods used to produce certain products and test the effectiveness of these products. Through this research, researchers are trying to develop a product in the form of learning materials and models (Mawarni & Hendriyani, 2021). not to test a theory. The final goal and development research is to produce a product in the form of a learning program that uses Augmented Reality Technology and is integrated with DBON to improve the Fundamental Movement Skills of elementary school students, so that learning becomes more enjoyable and makes students' learning motivation increase. Researchers use the ADDIE development model steps because the research steps are concise, do not take a long time and have concrete goals (Andi Rustandi & Rismayanti, 2021). The ADDIE research steps go through 5 phases including Assessment/Analysis, Design, Development, Implementation

and Evaluation (Fachrozi Iwan et al., 2020). This model was chosen to help create movement education programs that are more effective and have a more systematic process (F. Kurniawan et al., 2022). At the Assessment/Analysis stage, an initial stage has been carried out, namely a needs assessment in the form of collecting materials and designing learning that can improve Fundamental Movement Skills. How to interpret the data obtained, its relation to the problem and research objectives, needs to be explained clearly. The following is a flow diagram in the ADDIE model where Augmented Reality technology can be presented as follows.
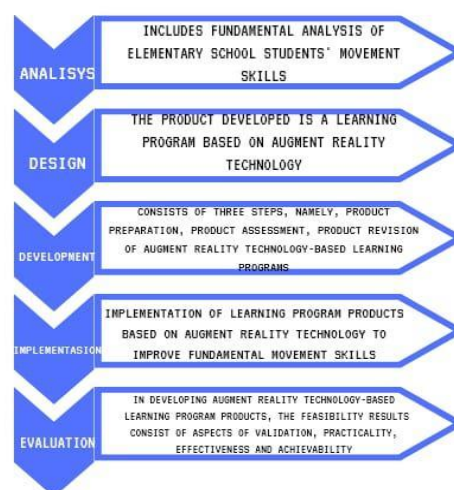
Graf 1. Model ADDIE

The data collection process carried out in this research used a questionnaire. During the validation process, the product was validated by 3 Physical Education experts who work as teachers & two lecturers and was implemented in one of the elementary schools, namely at SDN Margakaya I. The data analysis technique used was quantitative descriptive, namely percentages. The percentage criteria for the results obtained are in the following table:

Table 1. Product Eligibility Criteria

No	Percentage (%)	Criteria
1	68-100	Worthy
2	34-67	Decent Enough
3	0-33	Not feasible

Findings

Validation was carried out by three Physical Education Experts, namely Senior Teachers who have served for a long time and have sufficient experience in physical education learning. Apart from that, this product was also validated by two lecturers with Doctoral degrees who have very capable capabilities in the field Physical Education with Validation results as follows:

Table 2. Expert Validation Results

No.	Validator	Percentage (%)	Information
1.	Teacher	90%	Worthy
2.	Lecturer 1	85%	Worthy
3.	Lecturer 2	87%	Worthy
	Overall percentage	87.3 %	Worthy

DISCUSSION

Analysis is the first step in development research. The results of the data obtained were in the form of an assessment of product needs and what product specifications were needed to overcome these problems. For this reason, initial research was carried out by conducting direct observations in the field looking at Fundamental Movement Skills learning in schools. From the results of these observations it was found that there was still a lack of education teachers. Jasmani provides fundamental material during learning. Apart from that, the lack of references and creativity in providing material makes children bored in learning, for this reason there is a need

for a breakthrough in fundamental learning in schools using media that is very interesting for students. For this reason, researchers created a learning method using technology. Augmented Reality. Based on the expert validation results obtained, the development of a Fundamental Movement Skill Program based on Augmented Reality Technology for Elementary School Students is very feasible to be implemented in schools. After that, researchers implemented Fundamental Movement Skill learning using Augmented Reality Technology in one of the elementary schools located in Telukjambe sub-district. West, namely SDN Margakaya I. After implementing it with SDN Margakaya I students learned for 4 meetings which were attended by 56 students in grades 4 & 3 divided into 7 groups.

The teacher explains the material and stages of movement through the Augment Reality module, then students take turns practicing under his guidance. Observation results show that students are enthusiastic and actively involved in practical activities. Student interaction with Augmented Reality content helps understand movement concepts. Practice time also feels more real thanks to the Augmented Reality display. This shows that the Fundamental Movement Skill program based on Augmented Reality is effective in improving elementary school students' basic movement skills. Teachers also provide positive feedback on the implementation of this program, and assess that Augment Reality technology is useful as a medium for learning motor skills that can motivate students. Based on the results of the evaluation and feedback, it can be concluded that the Fundamental Movement Skill program based on Augmented Reality is suitable for widespread application in motor skills learning in elementary schools, as an effort to improve the quality of learning

that supports the achievement of educational goals and the National Sports Grand Design Master Plan Program (DBON).

CONCLUSION

The Fundamental Movement Skill program based on Augmented Reality which was developed to improve elementary school students' basic motor skills has been proven to be effective in implementation. This is based on the results of expert validation and the results of program implementation in the field. In general, this program is considered suitable for implementation because it meets the aspects of suitability for objectives, teaching materials and instructions. Expert assessment has an average of 87.3%, which means the program is valid enough to be used. From the results of this research, to continue with further research, it is hoped that there will be other learning programs besides Fundamental Motor Skills based on Augmented Reality Technology.

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