The Application of Augmented Reality Learning Media Based on Android to Improve the Learning Outcomes of the Biology of Grade IX Students of SMPN 4 Bangkala Barat

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ABSTRACT

The lack of interest in learning or student motivation is because teachers tend to use direct learning models in the form of chart media in demonstrating the ma terial being taught, so that it does not activate students as a whole which has implications for low student learning outcomes. This research aims to find out whether the application of Android-based Augmented Reality learning media is able to improve the learning outcomes of class IX students at SMPN 4 West Bangkala, Jeneponto Regency. The research method used was Classroom Action Research (PTK) with the research subjects being class IX students at SMPN 4 West Bangkala with a total of 25 students. The research results showed that there were differences in learning outcomes between cycle I and cycle II. The average value of student learning outcomes which experienced an increase from cycle I was 63.2, while the average value of cycle II was 81.92 with a difference of 18.72. Apart from that, the completeness of student learning outcomes also increased as seen in the number of students who completed the first cycle, which was 1 student (4%) and increased in the second cycle to 24 students (96%), which has exceeded the predetermined success indicators. Based on the results of the discussion, it can be concluded that through Android-based Augmented Reality learning media, it can improve the learning outcomes of class IX students at SMPN 4 West Bangkala, Jeneponto Regency.

How to Cite

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INTRODUCTION

Education is a process obtained by every human being to make humans understand, understand, and more critical of thinking. Education is also interpreted as a basic and planned effort to create an atmosphere of learning so that students are actively able to develop their potential to have spiritual power, religion, self -control, personality, intelligence, noble character, and the skills needed by themselves, society, nation and country (Wahyudin & Zohriah, 2023). Education as a human effort to foster and develop the potential of nature both physical and spiritual in accordance with the values that exist in society (Rahman, *et al.*, 2017). Through education, individuals are able to develop the

knowledge they have to be applied in the community. Therefore, every human being needs to develop their identity so that they are able to pass down to the next generation to be developed in their lives and lives (Sabir, 2022).

Education has a very strategic role in preparing for the next generation who have high knowledge and intelligence and master various competent expertise. Education is a connecting bridge in delivering us to the learning community (Learning Society) (Akbar, 2022). The educational process needs to be maximized by utilizing the role of IT as a learning medium. The application of the media can be a support for students to attract learning interest so that students can better understand learning material. Therefore, teachers must be more selective and creative in choosing teaching methods for students.

The application of appropriate learning strategies is able to maximize student learning outcomes (Febrianti, *et al.*, 2023). Therefore, to succeed learning an innovative strategy is needed to activate students learning, one of which is through the use of media as a supporter of the achievement of learning objectives (Warsita, 2017). Learning media is everything that is used to channel messages and can stimulate the thoughts, feelings, attention, and willingness of students so that it can encourage the occurrence of intentional learning, aimed and controlled (Firmadani, 2020). This can be realized by applying technology in learning media or conducting internet -based learning activities, Android, and other technological devices (Mardian, 2023).

Based on the results of observations at SMPN 4 Bangkala Barat, especially class IX there are several problems in the learning process including lack of interest in learning or student motivation. This is because during the learning process the teacher is more likely to use direct learning models in the form of charts in demonstrating the material being taught, so that it does not activate students as a whole. The development of technology,

especially in the world of education, has a significant influence on students' interest in the learning process. As a result of the development of technology, causing students to be more interested in seeing objects in 3D form (Siva & Noriza, 2024). This is because the learning object presented 3D becomes more real and easy to understand.

Based on these problems, one alternative that can be used as a solution is the application using Android -based Augmented Reality technology. Augmented reality is a technology that is currently developing and is widely developed, especially in the field of information and education (Lino, et al., 2022). Augmented Reality, which is a technology that is able to combine two -dimensional and three -dimensional virtual objects into a real environment and then raise and project it in real time. Augmented reality has also been applied in the devices used by many people, such as on smartphones by utilizing the camera features in almost all smartphones today (Nur, *et al.*, 2022). The main purpose of Augmented Reality is to create a new environment by combining real and virtual environmental interactivity in real time so that users feel that the environment created is real (Rosa, 2019).

The use of mobile with the Android operating system is now widely used by almost all parents of students so that this application is fairly easy to apply. Android is an operating system on mobile phones that are open and based on the Linux operating system (Pratama, 2018). The existence of Android -based AR media is expected to be able to increase the motivation and learning outcomes of students in general so as to achieve a minimum value of completeness (Priyanti & Nurhayati, 2023)

Based on the background above, the researcher wants to combine the Android -based Augmented Reality learning media to be able to support learning in class so that students can more easily understand Biology subjects. So that researchers are interested in

conducting research on the application of Augmented Reality Learning Media based on Android to improve the learning outcomes of Biology of Class IX Students of SMPN 4 Bangkala Barat Kab. Jeneponto. This study aims to find out whether the application of Augmented Reality learning media based on Android is able to improve the learning outcomes of class IX students of SMPN 4 Bangkala Barat Jeneponto Regency.

METHOD

Types of research

The type of research used is Classroom Action Research (CAR) is a type of practical action research, this is because this research concerns a series of activities carried out by the teacher everyday. This classroom action research consists of action planning stages, implementation of action, evaluation and reflection. This research is a classroom action research conducted in 2 cycles consisting of four stages, namely planning, implementation, observation and evaluation as well as reflection.

Research Subject

The subjects in this study were students of class IX SMPN 4 Bangkala Barat, Jeneponto Regency, Lecuan Year 2024/2025 with 25 students.

Research design

This classroom action research was carried out as many as two cycles. Each cycle is changed according to the objectives to be achieved. In detail the implementation of research for these two cycles, namely the first cycle three meetings and cycle II as many as three meetings. Both of these cycles are a series of interrelated activities.

Research instrument

The research instrument used is a learning outcomes test to measure the development and progress of student learning on the material being studied, observation and documentation sheets.

Data collection technique

Data collection is carried out through learning outcomes tests, observations and documentation. The learning outcome test presented consists of 25 questions in the form of multiple choice tests with five answer choices. Meanwhile the observation sheet contains an assessment checklist of the observed learning process aspects.

Data analysis technique

Data analysis is carried out through descriptive quantitative data analysis. Learning outcomes data were analyzed using SPSS Version 25 to see the minimum, maximum, average and median value of data. The qualification scale of learning outcomes and student learning completeness qualifications is described in the following Table 1 and Table 2.

Table 1. Student Learning Outcome Qualification Scale

Value	Category
89 – 100	Very high
77 – 88	High
65 – 76	Currently
40 – 64	Low
0 – 39	Very Low

Table 2. Classification of Student Learning Completeness

Value	Category
$\geq$ 70,00	Completed
< 70,00	Not Completed

Success Indicator

Based on the minimum completeness criteria (KKM) formulated by the school, namely the value of 70, the researcher determines the success criteria of the action in this study must achieve 80%classical completeness. If overall in each cycle increases, then this research is said to succeed in improving biological learning outcomes.

RESULTS AND DISCUSSION

Research Result

Data on learning outcomes of students in class IX SMPN 4 Bangkala Barat Cycle I and Cycle II in the coordination, reproduction and homestatic system materials can be seen in Table 3 below.

Table 3. Student Learning Outcome Values

Description	Cycle I	Cycle II
Research Subject	25	25
Ideal Value	100	100
Minimum Value	52	68
Maximum Value	72	92
Median	64	81,92
Modus	64	84
Mean	63,2	84

Based on Table 3 it can be seen that of the 25 research subjects, the average student learning outcome value in cycle I was 63.2 and the average student learning outcomes in cycle II were 84. Based on the acquisition of the value of learning outcomes in the first and cycle II cycle shows that there is an increase in the average student learning outcomes. Furthermore, if the mastery of the students above is grouped into five categories, the frequency and percentage of learning outcomes can be seen in Table 4 and Table 5 below.

Table 4. Frequency and Percentage of Student Learning Outcomes in Cycle I

No	Interval	Category	frequency	Percentage
1	89 – 100	Very high	0	0 %
2	77 – 88	High	0	0 %
3	65 – 76	Currently	8	32 %
4	40 – 64	Low	17	68 %
5	0 – 39	Very Low	0	0 %

Table 4 shows that the cycle I did not find students who got grades in the category very high and high, while students who received the moderate category were 8 (32 %), then for the low category there were 17 (68 %). Furthermore, no students get grades in the

very low category. The research results in the first cycle show an average value of 63.2 which means that it is in the low category.

Learning completeness can be seen based on student absorption. If the student's absorption of the Human Coordination, Reproduction and Homeostatic System material is grouped in the complete and incomplete category, then descriptive student learning completeness in cycle I can be seen in Table 5 below.

Table 5. Descriptive of Student Learning Completeness in Cycle I

Student Absorption Capacity	Category	frequency	Percentage
$\geq$ 70,00	Completed	1	4%
< 70,00	Not Completed	24	96%

Based on Table 5, after granting class action in the first cycle found 96% of students in the incomplete category and 4% of students were included in the complete category.

Table 6. Frequency and Percentage of Student Learning Outcomes in Cycle II

No	Interval	Category	frequency	Percentage
1	89 – 100	Very high	2	8 %
2	77 – 88	High	17	68 %
3	65 – 76	Currently	6	24 %
4	40 – 64	Low	0	0 %
5	0 – 39	Very Low	0	0 %

In Table 6, information is obtained that in cycle II found students who got grades in the very high category there were 2 (8%), while students who received grades with a height category were 17 (68%), medium category 6 (24%) In addition No students were found who got the value of learning outcomes in the low category and very low categories. The results of the study in cycle II showed that the average value of learning outcomes of grade IX students of SMPN 4 Bangkala Barat was 81.92 which means that it is in the high category. Learning completeness can be seen based on student absorption. If the student's absorption of pressure material is grouped into a complete and incomplete category, then descriptive learning completeness in cycle II can be seen in Table 7 below.

Table 7. Descriptive of Student Learning Completeness in Cycle II

Student Absorption Capacity	Category	frequency	Percentage
$\geq$ 70,00	Completed	24	96%
< 70,00	Not Completed	1	4%

Based on Table 7, it was found that of the 25 students of class IX A SMPN 4 Bangkala Barat Jeneponto Regency, after granting class action in the first cycle, 96% of students were found in the complete category and 4% of students were included in the incomplete category.

Based on Classroom Action Research (CAR) that has been carried out both in the first cycle and cycle II it can be described that at the beginning of learning cycle I students still look awkward to be active in the learning process. This is due to the learning media of Augmented Reality based on Android is not

used to being used by students. However, from this learning the teacher explains the goals and importance of the material to be learned to encourage students to play more active and able to understand and connect the subject matter with real life around them.

At the next meeting students have shown changes little by little, but there are still shortcomings, among others, students lack confidence in expressing opinions and lack of courage to ask questions and answer questions. Therefore, the first cycle must be continued to cycle II because it has not yet reached an indicator of success that has been determined at 80 %, which means that of 25 students must reach 80 % of the students' values are complete.

Furthermore, in cycle II, the learning process has reached an increase where the category of student learning completeness reached 96%. This shows the indicator of success that has been predetermined. This increase can be seen from the average student learning outcomes. This increase is an implication of improving the quality of the teaching and learning process. The positive influence that arises from the use of Android - based Augmented Reality learning media in the teaching process is considered sufficient as evidence of the success of the research, therefore the action implementation cycle can be stopped.

Discussion

The results of research on the application of augmented reality learning media showed an increase in cycle II. The results obtained in the first cycle are still less than optimal. This is because students do not really understand how to apply Augmented Reality based on Android so that their learning outcomes and learning completeness are still relatively low.

In the second cycle there was an increase in the average value to 81.92 in the very high category. Improved learning outcomes obtained by students that the teaching and learning process using Augmented Reality

learning media based on Android provides a positive contribution to student academic achievement. The results of previous studies conducted (Pradana, 2020) regarding the use of augmented reality, there are advantages of using this media in learning, namely in terms of interactive. Augmented reality displays three -dimensional objects with attractive interfaces and approaching the actual form so that it can increase the reasoning and imagination of students (Wulandari, *et al*., 2023). Therefore, the use of augmented reality in learning is diverse and considered suitable.

If it refers to the criteria for the achievement of student learning activities, the results of this observation are included in the active category. Based on the reflection, in the second cycle the teacher has implemented the use of Android -based augmented reality in learning well. This can be seen from student activities, learning outcomes and implementation of teaching and learning processes that have been going well. Therefore, the learning process does not require too much revision. However, what needs to be considered for further action is improvement of the next learning process (Mus, *et al*., 2022).

Data regarding the completeness of learning outcomes can be seen based on student absorption in the first cycle and cycle II. In Table 5 information is obtained that the first cycle shows the completeness of student learning is not optimal. It can be seen that students classified in the incomplete category amounted to 24 (96%) and students in the complete category amounted to 1 (4%). Whereas in cycle II student learning completeness has increased, namely students who are in the complete category of 24 (96%).

The success of improving the learning outcomes of class IX A students through Augmented Reality Learning Media -based Android is a learning method that is relatively new for students because the picture is in 3D form and has never been obtained before so that it gives new learning and can foster student enthusiasm and more interesting

attention In the learning process. The results of this study indicate that the application of Android -based Augmented Reality in learning has positive implications in improving student learning outcomes. This can be seen from the increasing understanding of students of the material delivered by the teacher (Wahyudi, 2020)

Based on data on student learning outcomes that are active in learning tend to have good learning outcomes and vice versa so that this research is stopped in cycle II because it has reached a predetermined success indicator that students reach a complete value of 96%. The success of the action in cycle II cannot be separated from the amount of student involvement in finding, finding, and exploring their own knowledge.

Yahya (2022) which defines learning outcomes is a series of abilities possessed by students, after they receive various learning experiences that can be seen from cognitive, affective, and psychomotor changes. In accordance with the circumstances during the study, students experience changes related to the learning process, both from the cognitive, psychomotor and affective domains. This illustrates that the teacher's ability to manage learning is good, so that the positive impact on student learning outcomes is quite significant.

CONCLUSION

Based on the results of the discussion, it can be concluded that through the learning media augmented reality based on Android can improve the learning outcomes of class IX students of SMPN 4 Bangkala Barat, Jeneponto Regency, especially in the material of the Human Coordination, Reproduction and Homeostatic System. This is seen from the average value of student learning outcomes that have increased from the first cycle of 63.2 while the average cycle II value of 81.92 with a difference of 18.72. In addition, the completeness of student learning outcomes

also increased in the number of students who were completed in cycle I as many as 1 student (4%) and rose in cycle II to 24 complete (96%) had exceeded the specified success indicators.

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