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IMPLEMENTATION OF AUGMENTED REALITY (AR) MEDIA TO IMPROVE UNDERSTANDING IN SOCIAL STUDIES LEARNING

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Abstract

This study aims to determine the increase in students' understanding in social studies learning through augmented reality media, to overcome the problem of learning that is still centered on textbook media, does not involve the integration of visualization-based digital media, so that students consider social studies learning to be unrelated to life. This research method uses a classroom action design on class VIII-A students of SMPN 1 Garut. Data collection techniques to measure students' understanding through pre- and post-learning tests, as well as through non-tests with observation and interviews to see changes in each cycle. The results of this study indicate that from the measurement of the cycle I test, the average student understanding was 77.73, cycle II 78.90, and cycle III 83.43, it can be categorized that student understanding has increased. In line with the results of observations and interviews that there are positive changes in students' understanding of social studies material through AR media which are indicated by students' enthusiastic responses in learning to be more active and interactive.

Keywords: implementation media; Augmented Reality; social studies understanding

Abstrak

Penelitian ini bertujuan untuk mengetahui peningkatan pemahaman siswa dalam pembelajaran IPS melalui media augmented reality, untuk mengatasi masalah pembelajaran yang masih berpusat pada media buku tesktual, tidak melibatkan integrasi media digital berbasis visualisasi, sehingga siswa menganggap pembelajaran IPS tidak berkenaan dengan kehidupan. Metode penelitian ini menggunakan desain tindakan kelas pada siswa kelas VIII-A SMPN 1 Garut. Teknik pengumpulan data untuk mengukur pemahaman siswa melalui tes sebelum dan sesudah pembelajaran, serta melalui non tes dengan observasi dan wawancara untuk melihat perubahan setiap siklus. Hasil penelitian ini menunjukan bahwa setelah pembelajaran siklus I rata-rata pemahaman siswa yaitu 77.73, siklus II 78.90, dan siklus III 83.43, dapat dikategorikan pemahaman siswa meningkat. Sejalan dengan hasil observasi dan wawancara bahwa terdapat perubahan yang positif dari pemahaman siswa terhadap materi IPS melalui media AR yang ditunjukan dengan respon antsusias siswa dalam pembelajaran menjadi lebih aktif dan interaktif.

Kata kunci*: penerapan media; Augmented Reality; pemahaman IPS*

INTRODUCTION

Social studies learning as wrong one eye an important lesson because it emphasizes on students' understanding skills to instill social life values and guide students to be active. Ideal social studies learning in discussing concepts in each learning material requires teachers to play a role in combining material with environmental conditions that can provide real understanding to students (Ronny & Mahendra, 2023) . However, the problem that still occurs is that students tend not to pay attention during the learning process. Learning takes place and causes a lack of understanding of the subject matter. The process of delivering learning materials to teachers is limited and the visualization of images from the material being delivered is less than optimal, making students' understanding less concrete. Teachers also consider digital media to be very important to support the delivery of material, but the reality, so far still focused on books package which are available in school (Gümbür & Avaroğulları, 2020). This triggers a lack of enthusiasm among students in social studies learning, so that students quickly get bored and participate less in the learning process (Tajudeen et al., 2018) .

Based on those problems above, it raises an urgency regarding the lack of student understanding in social studies learning. Factually, it was found from the results of student exams in social studies learning that had not fully achieved the optimal criteria according to the minimum learning completion achievement standard (Airlanda, 2021) . This is in line with the realization in the field that students still have difficulties in understanding social studies learning, so it needs to be concretized with the help of interactive media, which is proven by the test scores of students in class VIII A SMPN 1 Garut which have not yet reached the completion criteria. This requires new integration in the learning media used by teachers, especially when viewed from the development of the industrial revolution 4.0 era as part of globalization, where the world of education demands that the education curriculum must be in accordance with digital dynamics, the internet of things, artificial intelligence, and digital-based learning media during the learning process (Hendriyani et al., 2019), (Gümbür & Avaroğulları, 2020) .

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The learning process requires new innovations, especially in the use of technology and media development. Technology as a means that allows the creation of the necessary learning environment where the learning process can be realized interactively (Darojat et al., 2022) . One of the uses of technology in the world of education is through augmented reality (AR) media. AR media has the potential to combine real and virtual objects which are then poured into three-dimensional animations to create pseudo-reality and projected in real time. (Rofi et al., 2023). In line with Edgar Dale's cone of experience theory developed in 1996 in (Machado, 2020) that a person's learning understanding is obtained through experience and visual (concrete) sensory vision, through the reality that exists in a person's living environment .

The use of AR media in learning can provide relevant image visualizations that can facilitate students' understanding to capture learning materials. The realization of AR media can be utilized by raising social studies material, especially about local cultural diversity that is visualized in 3 dimensions for students . The role of AR media as one of the interactive learning process tools, in explaining images and meanings in learning materials in real terms (Sari et al., 2023). The realization of social studies learning in improving students' understanding integrated through AR media as an application that combines the real world with the virtual world in 2D or 3D which is projected in a real environment at the same time *(* Salmiyanti et al., 2023) . Based on this statement, it is reiterated that AR media needs to be applied as an effort to train students' understanding in the learning process through students' high-level thinking skills such as problem solving, being active in learning, and students' ability to collaborate during learning (Alshafeey et al., 2019) .

The learning process by implementing AR media, as an effort to provide learning about the realization of the values contained in each concept of learning material and can be accessed directly by students (Yusup et al., 2023). This plays a role in visual explanations related to the concept of learning material that can be explained more clearly to students. In addition, AR media plays a role in helping students absorb learning materials well (Saripudin et al., 2022) . In line with the

statement from (Dolan et al., 2019) that the way to explain the lesson material using AR media is a way that really helps teachers in delivering the material effectively to students. In addition, as a way for teachers to save words and time, so that the explanation of the material is more student-centered which can provide students' interest in exploring the material presented, and make it easier for students to understand better, arouse interest in learning, eliminate misunderstandings, and the information conveyed will be more consistently received by students (Hjorth & Hinton, 2019) . Therefore, student understanding can increase with the collaboration between the teacher and the learning tools used, so that it can be accepted and understood well by students regarding a concept of the material that has been delivered.

Thus, reviewing the explanation, the researcher conducted a study on the implementation of AR media in improving students' understanding in social studies learning which aims to encourage increased student understanding through the integration of digital-based media. This can facilitate students' understanding in social studies learning with local cultural diversity material, and can connect the material learned with everyday life so that the understanding conveyed is more implicit.

METHOD

The research design uses classroom action research as a research activity in the context of the class carried out to solve learning problems faced by students and teachers, improve the quality and learning outcomes and try new things in learning in order to improve the quality and learning outcomes, in classroom action research directly involved in the implementation of these activities (Millah et al., 2023), (Creswell, 2016) . This classroom action research is carried out in the form of a process based on (cycle). Each cycle consists of stages (phases), namely planning, action, observation, and reflection. The subjects in this study were students of class VIII-A SMPN 1 Garut with a total of 30 students.

The instrument used to measure student understanding is a test with a pretest and posttest in the learning cycle, then also collected through non-test instruments

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with observation and interviews to strengthen the description of the test instrument, so that the development of student learning activities can be seen more deeply (Miller, 2019) . The data analysis technique from the test instrument was carried out using an independent t-test to see the comparison of the increase between the tests before and after learning each cycle (Stockemer et al., 2019) . Furthermore, the data analysis technique for non-tests was analyzed through data reduction, data presentation and data verification. This was done to obtain optimal data and data validity to see the comparison of improvements and factual descriptions during the implementation of each cycle of action in learning.

The indicators in this research instrument in measuring student understanding include (1) students' ability to explain concepts in social studies material; (2) students' ability to analyze concepts in social studies material; (3) students' ability to connect social studies concepts with everyday life; and (4) learning media used by teachers to support improving student understanding in social studies learning.

RESULTS AND DISCUSSION

Analysis Description of Cycle I

Based on the results of research on students of class VIII-A at SMPN 1 Garut which can be identified to measure the improvement of students' understanding in social studies learning, which refers to indicators of students' understanding including: the ability to explain/answer material concepts, students' ability to analyze material concepts, students' ability to connect material concepts with everyday life and the suitability of learning media used by teachers to support the improvement of students' understanding. The following are the results of the analysis by cycle I test:

Table 1 Results of Independent Sample T-Test Analysis Cycle I

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	pretest_cycle1	72.6667	30	5.33261	.97360
	posttest_cycle1	77.7333	30	4.56322	.83313

Based on the output table of paired samples statistics, it is known that the average value of the students' pretest results in cycle I is 72.66, while the posttest value in cycle I is 77.73. The pretest and posttest results in cycle I are different, but if referring to the provisions of the standard passing score for social studies subjects for grade VIII, it must reach 80. The taking of the category of improvement in learning is in line with the statement from (Creswell, 2016) that the results of the analysis of the average understanding of students before and after learning in each cycle can be categorized as not increasing when the results of the measurement of students' understanding tests do not meet the minimum completion criteria required by educational institutions.

Furthermore, it was analyzed from the results of observations and interviews in the cycle 1 learning actions carried out by the teacher, it was not yet apparent that students understood the material on the diversity of local cultures and there was no integration of interactive visualization learning media for students. The results of this analysis are in line with the statement from (Murfiah et al., 2022) that social studies learning has dimensions in students' understanding embedded in it, so that it can be explored as one of the materials or media to study the meaning of life.

It was found that overall for student activities in the learning process there were still several obstacles, in the implementation of student learning they were less able to be conditioned and were still passive during the learning process. In line with the results of the interview that the informant from the student (AH) *"I don't know too much about the material on local cultural diversity"*. Furthermore, the opinion of (DV) *"I don't really understand anything related to local culture or traditions in the surrounding environment, because I tend to see foreign cultures that are always found in social media"*. The results of the quantitative and qualitative analysis, found the main problem that students still did not seem enthusiastic and active in participating in learning, because they still felt confused with the material and media presented. Based on these findings, improvements were made to the next action adjusted to the findings reviewed from the results of the previous action test and non-test, so that in the next cycle of action it is hoped that improvements will be found that were obstacles in the previous cycle.

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Analysis Description of Cycle II

The findings of the obstacles from cycle I were improved in cycle II, as for the results of the quantitative analysis in measuring student understanding. The indicators include the ability to explain/answer material concepts, students' ability to analyze material concepts, students' ability to connect material concepts with everyday life, and the suitability of learning media used by teachers to support improving student understanding.

The interpretation of the test measurements that have been carried out in cycle II is interpreted as follows:

Table 2 Results of Independent Sample T-Test Analysis Cycle II

One Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
pretest_cycleII	30	76.1000	3.61367	.65976
posttest_cycleII	30	78.9000	3.88054	.70849

Based on the output table of paired samples statistics, it is known that the average value of students' pretest results in cycle II is 76.10, while the posttest value in cycle II is 78.90. The pretest and posttest results in cycle II are different, but if referring to the provisions of the standard passing grade for social studies subjects for grade VIII, they have not met the standard, because they can be categorized as passing social studies subjects if the student's score reaches 80. In line with the statement from (Juwita, 2022) obtained the minimum average passing grade that has been determined in each subject. In line with the statement from (Arsyad et al., 2024) that student understanding has increased quite a bit because a good learning process will produce good learning outcomes for students.

The results of the data analysis were then identified from the results of observations and interviews in the cycle II action, the observer found positive changes in students in terms of student understanding, especially in the material on local cultural diversity, although there were still some notes that students had not fully understood, obstacles to the implementation of student discussions were that students were not fully active in participating in learning and there were students who were less focused, this could be a reference for improvement in the learning

action process in the next cycle. This was identified from the response of students as informants (SR) *"I have begun to understand the important meaning of the values of local cultural traditions in the surrounding environment, although I have not optimally understood the local cultures that exist".* Furthermore, the response from (KA) *"it turns out that in Garut there are many local cultures that exist and are even more meaningful than foreign cultures, so I want to learn more".* The problems that were still found were that there were still students who were not active and less focused, so they were fixed in the next cycle, there obstacles became study material for the teacher to analyze in learning in the next cycle.

Analysis Description of Cycle III

The results of observations in cycle I and II actions were reviewed and then improved in the next action to see an increase in student understanding in social studies learning, especially cultural diversity material through AR media that can meet the minimum completion value in IIPS learning. The following can be interpreted as the results of the test data analysis in cycle III which are adjusted to the improvements in the findings in the previous cycle:

Table 3 Results of Analysis of Independent Sample T-Test Cycle III

One Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
pretest_cycleIII	30	75.1333	4.96702	.90685
posttest_cycleIII	30	83.4333	4.12464	.75305

Based on the output table of paired samples statistics, it is known that the average value of students' pretest results in cycle III is 75.13, while the posttest value in cycle III is 83.43. The pretest and posttest results in cycle III are compared and the average posttest value in the cycle action has reached the minimum completion criteria in social studies learning and is >80. This is in line with the statement from (Hidayat, 2020) which states that learning prioritizes the concept of minimal material mastery which is measured using minimum completion criteria by students which is then referred to as competency-based learning and mastery learning.

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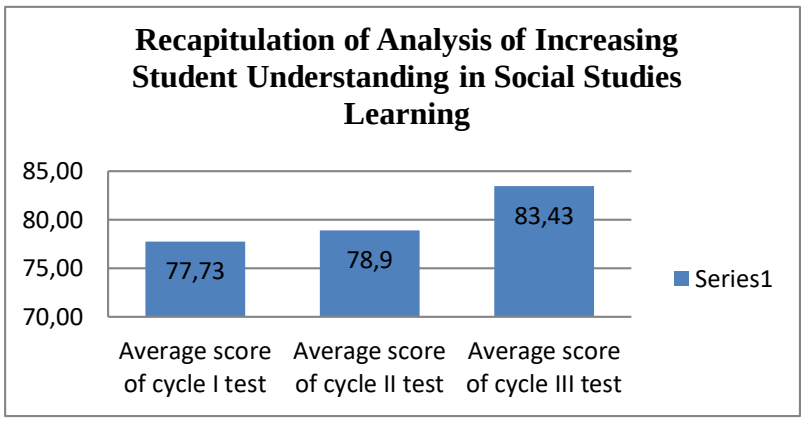
Based on the results of the test measurements in cycle III, there was an increase in students' understanding in social studies learning through AR media, especially on the topic of local cultural diversity. The taking of the category of increased understanding is in line with the statement from (Rukmi et al., 2023) that the achievement of increased student understanding of learning can be reviewed based on values that have exceded the minimum completeness.

The following can be interpreted through the graph of the results of the analysis of increased student understanding in social studies learning from the percentage of test instruments for each cycle:



Picture 1 Recapitulation of the percentage of analysis results for cycles I, II and III

The results of the quantitative analysis of the graph above starting from cycles I, II and III clearly show that there is a high increase in student understanding in cycle III. This is in line with the analysis of observations and interviews that have been carried out that observers found positive changes in students in terms of understanding local culture through AR media which is optimal and felt to be better than cycles I and II. This is analyzed from observation activities on students, that the learning implies the meaning of good understanding for students as indicated by all students showing good changes in knowledge and showing growth in understanding in the concept of social studies material on the topic of local cultural diversity. Relevant to the statement from (Setyawan, 2019) that the development of cognitive stages experienced by students, AR technology can be prioritized in

learning, especially in teaching abstract concepts. AR media has unique capabilities that can influence student learning experience .

In line with the results of the analysis, it is also described from the results of student responses in interview activities, the responses from students are analyzed from the statement (NV) "*I feel happy in learning and understanding the local culture of my own region, it turns out that its meaning is very related to life"*. Furthermore, the statement from (HL) *"I am more interested and understand the learning material on cultural diversity through AR media and in it the culture in the surrounding environment is introduced"*. Therefore, students begin to have an understanding of the concept of the material studied in IPS, especially from the topic of cultural diversity, the results of measuring student understanding according to the predetermined indicators in the form of interpretation of test data with a average value of 83.43, if adjusted to the categorization of the success of increasing student understanding, it is in the high category. Relevant to the statement of the use of this interactive media, students tend to be more actively involved in the learning process, AR media offers an interesting visual and tactical experience (Kamal et al., 2024) .

Based on the results of data analysis that have been carried out both through tests and non-tests, there is a good increase in students' understanding in social studies learning, starting from the indicators of explaining, analyzing and connecting with their lives optimally increasing. This increase was identified through 3 cycles through the implementation of AR learning media. The relevance between learning devices used by teachers is in line, one of which is in the media used can encourage students to have an applicative understanding of learning materials that are related to everyday life (Wiyanarti, 2020) . The use of technology in the world of education is by utilizing AR technology as an important element in supporting student attraction in learning, so that it can lead to increased student understanding of learning materials. (Darojat et al., 2022) (Adawiyah & Prihandini, 2023) .

The transformation of technology in social studies education does not mean indoctrinating the values contained therein, but rather studying them logically,

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critically, and analytically so that students are able to solve the problems they face in real terms (Keil et al., 2021) . Understanding of local culture in students needs to be encouraged through collaboration within the elements of educational units, so that every culture or tradition in their area can be analyzed by students to find its meaning, and ultimately can renew understanding for students (Orben, 2020) . Based on this, being able to foster understanding greatly supports a person's success in dealing with various problems (Desyandri, 2018). Social studies learning with cultural diversity material is very important as a person's ability to understand and apply culture as the identity of the local community which makes it unique compared to other communities (Sumaludin, 2022).

Thus, it can provide a deeper understanding to students in studying the conditions of the social environment in relation to the diversity of local cultures in their area. AR learning media can provide concrete actualization and visualize concepts from social studies materials. The support of this media can provide students with an understanding of the material being studied, then provide motivation for students to learn interactively.

CONCLUSION

Based on the results of the research that has been done, it can be concluded that in the action cycle 1 of class VIII-A students of SMPN 1 Garut there has been no significant difference in increasing understanding of social studies learning with cultural diversity material through AR media from the test analysis that has not met the minimum completion criteria in social studies learning or non-test. The problem finding is that students are still less enthusiastic in learning. Furthermore, improvements were made in cycle II that from the test analysis found positive changes in students in the aspect of understanding local culture, although it has not reached the minimum completion criteria value, non-test found there were notes on obstacles to implementing learning that there were still passive students when participating in learning. Furthermore, it was improved in the action cycle III, the overall results of the test showed a good and optimal increase according to the minimum completion criteria value. Furthermore, non-test, a good increase in

students' understanding of local cultural diversity material through AR media was identified from students' enthusiasm in understanding local culture in their area. Therefore, the results of data analysis of cycles I, II and III showed a significant increase in cycle III with the results of the test analysis percentage of 83.43 and were in the category of increasing with high significance. The results of this study also provide suggestions for further research which is expected to be able to explore more deeply the efforts to encourage student understanding in social studies learning.

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