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Development of Augmented Reality Media by Teachers in Sociology Learning

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Abstract

This study was motivated by the limited use of media and the lack of participation of students in learning sociology in introductory sociology material. Abstract and complex material requires a medium that can explain directly to students more clearly and realistically, from these problems, a medium that can support learning is needed, namely augmented reality. In this study, augmented reality technology is integrated using cards as a medium that can display audio and visual simultaneously. This research examines the development of augmented reality media in learning sociology which is monotonous and causes students to be passive in the learning process. The formulation of the problem in this study is how the process of developing augmented reality media in learning and how feasible the development of augmented reality media is. Augmented reality presents objects in the form of videos or images into the real world in 3D. Augmented reality visualizes abstract concepts, increases understanding of an object, and makes the material presented more interesting. This augmented reality-based learning media can improve students' ability to imagine the learning material taught by the teacher and make students not easily bored when learning in class. This research uses research and development with the ADDIE model adapted from Lee & Owens including (analyze, design, development, implementation and Evaluation). The subjects of this study were 5 students in class X. The data collection technique used in this study was a questionnaire. The results of development research in the form of augmented reality media show good results based on the results of media expert validation, teacher validation as a material expert, and student response questionnaires regarding the use of this media.

Keywords: Media Development, Augmented Reality, Sociology Learning

INTRODUCTION

The development of technology has in fact had a significant impact in the world of education, the function of technology in learning has three main functions, namely, technology as a tool, as a science, and as a means of obtaining unlimited information sources (Agustian & Salsabil, 2021). Learning media based on technology is very helpful for teachers in teaching and learning activities, especially to get the focus of students when learning is taking place, in supporting the industrial revolution 4.0 education in Indonesia is making an innovation so that learning materials can be conveyed properly (Astuti *et al.*, 2019), One of the developing media is augmented reality which can provide a representation of an imaginary world that is similar to reality.

Augmented reality is a virtual (digital) technology by displaying three-dimensional (3D) objects through a camera so that the objects seen seem real and display illustrations that are difficult to realize concretely (Untari *et al.*, 2022). The utilization of augmented reality technology in learning has a number of potentials in increasing learner participation, by using augmented reality learners can more easily understand complex material because they can see audiovisual representations of abstract concepts so that it not only creates an interesting and dynamic learning atmosphere, but also can support learners' understanding and absorption of the material being explained.

Learning media in the world of education has a very big role, so it needs to be harmonized with the times, learning objectives, and the characteristics of students (Narita, 2018). However, the learning media used is still limited to powerpoint, canva, and picture and picture and mind mapping. The use of this media is considered not effective and efficient enough in delivering material to students, especially material that has abstract and complex concepts such as

introductory sociology. The use of books, and lectures tend to make students passive and less interactive and too much writing and less provide an overview related to sociology material. This led to the innovation of media development by utilizing augmented reality technology that will provide a stimulus in increasing students' interest in learning in the classroom.

Based on the results of the needs analysis in interviews and observations conducted on the development of augmented reality media by teachers in sociology learning in class X SMA Santo Fransiskus Asisi Pontianak in June 2024 that there are limitations to learning media that make it difficult for students to understand the material presented by the teacher in class, students tend to be involved in personal activities outside of learning so that they do not pay attention to what the teacher is saying. In addition, learners often appear unfocused and daydreaming and show signs of fatigue such as sleepiness. This causes disruption in the learning process which ultimately impacts on the effectiveness of learning, therefore an innovation is needed that will maintain learner participation and concentration in learning.

Some studies are relevant to the research, namely first, by (Seviana *et al.*, 2022) with the findings of the need for further development to improve aspects that are still lacking with technological developments in the future, it is hoped that augmented reality media can be more sophisticated and able to fill the limitations that exist at this time so that learning can be more effective and increase learner involvement in learning in order to visualize difficult concepts more interactively. The study with the research has similarities in media products that are validated by media, material, and language experts, as well as getting positive responses from students and being able to increase learning effectiveness and motivation. However, this study shows that the use of augmented reality media is able to improve the quality of learning by providing a more interactive learning experience and motivating students, while the study, especially in the development of AR media on solar system planetary material, is only to overcome the limitations of existing learning media and increase the use of advanced technology in the future. Second, research by (Reinaldi & Hakim, 2020), the findings in this study show that learning has great potential in encouraging a more effective, interactive, and of course fun learning process for students, but there is still room to improve and add interactive features and training for teachers in utilizing technology to the fullest. These two studies conclude that augmented reality media is developed with valid and practical for use in the classroom, and each provides a simulation to engage students in the learning process to be more dynamic by combining the technology of printed aids such as books equipped with images and animations so that students will easily understand concepts that are difficult only with traditional methods. These two studies also provide differences, if Reinaldi's research focuses on the design of the development of augmented reality simulation media itself, and describes three important stages in the process involving flowchar, storyboard and prototype testing, while this study emphasizes the need to use augmented reality media as a solution to overcome the lack of effective learning media so as to combine physical print and technology based on smartphones to display augmneted reality simulations.

METHOD

This type of research is research and development (R&D), this development research is carried out by following the ADDIE flow, namely. Analyze, Design, Development, Implementation, and Evaluation (Sugiyono, 2016: 38). However, in this study it was only modified with 3 stages, namely analyze, design, and development. The method of data

collection used in this study is by filling out an open questionnaire for experts and a closed questionnaire for respondents. The product validation questionnaire is addressed to experts who are used as a reference and initial reference in this study to make improvements and revisions to product development, while the questionnaire given to respondents is used to assess media development products in classroom learning. The type of data used in this study is quantitative data, quantitative data obtained from the score of the questionnaire assessment of student and teacher respondents on the development product. The results of the assessment are then described using descriptive percentage techniques with assessment categories.

The data analysis technique used to assess the feasibility of augmented reality media by teachers in sociology learning is qualitative descriptive analysis. This analysis aims to describe events or facts directly based on the results obtained, there are four percentage criteria for the validation sheet used (Cholifah & Mlihasari, 2022).

Table 1. Expert Team Validation Criteria

Percentage	Figures	Description
76-100 %	4	Very valid
56-75 %	3	Valid
40-55 %	2	Invalid
0-39%	1	Very invalid

(Cholifah & Muslihasari, 2022)

The assessment of the feasibility level of learning media products has three criteria, namely feasible, feasible with revision notes, and not feasible. Data from teacher and learner questionnaires were analyzed using descriptive percentage techniques, by converting questionnaire scores into a percentage of product feasibility. The results of this analysis are a reference for revising learning media. Augmented reality media is considered feasible if it scores ≥ 61%, according to the research criteria (Arif *et al.,* 2022).

Tabel 2. Product Feasibility Criteria

Percentage	Qualification	Category
81% - 100 %	Very Feasible	No Revision
61% - 80%	Worth	Minor Revisions
< 60%	Not Feasible	

(Arif et al., 2022)

RESULTS AND DISCUSSION

1. Development Of Augmented Reality Media By Teacher In Sociology Learning In Class X SMA Santo Fransiskus Asisi Pontianak

The data used in this study were obtained from media expert validators, material expert validators, and questionnaires from students. The use of augmented reality technology in learning media can be combined with an inquiry learning model, which is proven to increase student interest in learning (Setiawaty *et al.,* 2024). Augmented reality-based learning creates a more interesting learning experience, increases imagination, and encourages students to explore new concepts (Madhankumar *et al.,* 2021).

Based on the results of research in accordance with the ADDIE model development steps modified into three stages, namely analyze, design, and development. This media contains material included in KD 3.1, namely understanding the history of the development of sociology. The development product uses augmented reality technology and is packaged using markers

presented in the form of cards. In this media there are cards in the form of images of the history of the development of sociology that have been installed markers and will display videos of the material that has been prepared.

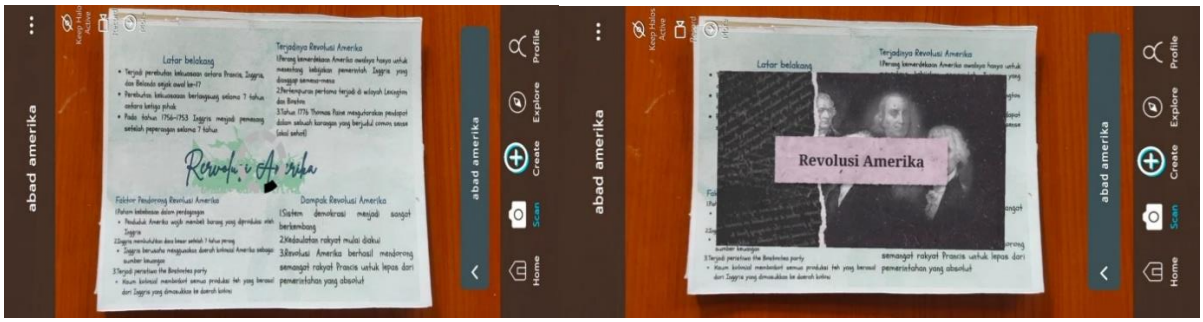

Figure 1. Augmented Reality Media Development Process

The design in the development of augmented reality media is carried out by the design stage, namely compiling the material in accordance with the lesson plan or teaching module, then making the material that is implemented in the form of cards by utilizing the help of Canva then printed and scanned in the Halo AR application. This is in line with (Rachim *et al.*, 2024) that the development of augmented reality in education can provide the potential to bring broad changes to the learning that is carried out, create a more interactive learning experience and of course have an impact on the learning activeness of students in accordance with the needs of the current digital era.

The augmented reality learning media that has been designed and developed is then validated by experts to obtain suggestions and recommendations from validators, as follows:

Table 3. Results Of Media Expert, Material Expert, And Language Expert Validation

Validator	Indicator	Percentage
Media Expert	Media Quality	86%
Material Expert	Material Quality	87%
	Language	93%

Based on the results of validation by media experts, the products developed are included in the very valid category with a total percentage of 86%. However, with a note of advice given by media experts, namely by improving the marker section and refining it again, the validation results obtained from the material expert assessment reached an average percentage of 87% which was included in the 76-100% interval. This shows that this media is included in a very valid category without revision from material experts, while the results of validation by linguists obtained a percentage of 93% and included in the 76-100% interval in the valid category without revision.

2. Feasibility of Augmented Reality Media by Teachers in Sociology Learning in Class X SMA Santo Fransiskus Asisi Pontianak

At this stage is the stage of testing augmented reality learning media that has been made, in addition to being tested, augmented reality media has been evaluated by validators in order to get improvements. Validation is carried out by 3 experts, namely media experts, material experts, and linguists, augmented reality encourages active interaction between students and subject matter. In accordance with the theory of constructivism developed by Jean Piaget and Lev Vygotsky, emphasizing that good learning will occur when learners are active in constructing their knowledge through experience. In this case, augmented reality provides space

for learners to be directly involved with the subject matter and encourages learners to construct knowledge in depth, by visualizing abstract concepts of introductory sociology material with audiovisuals, learners more easily understand and remember the material.

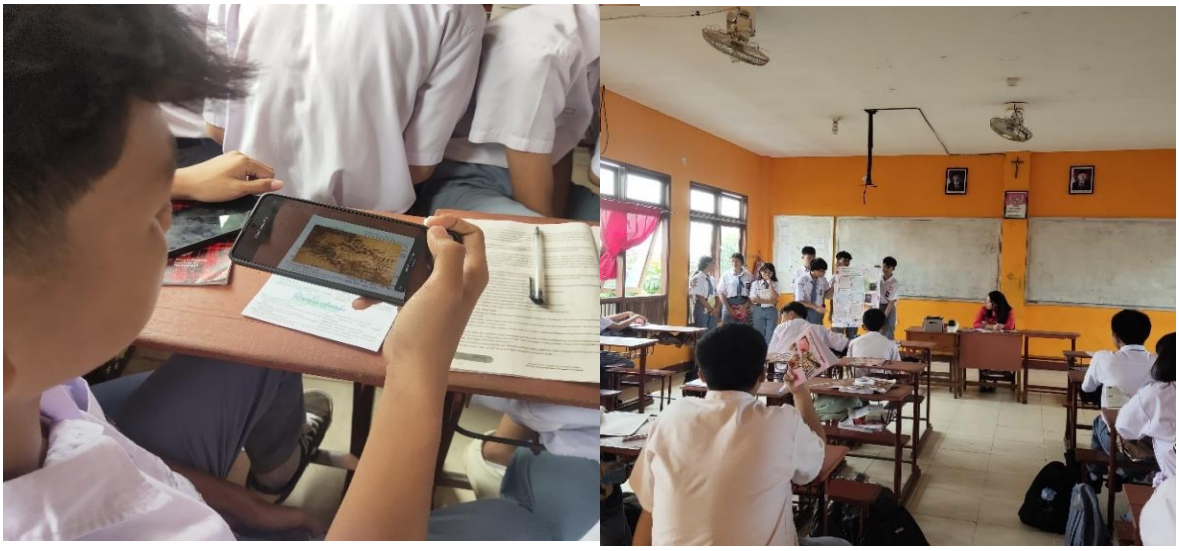

Figure 2. Augmented Reality Media Trial Stage

The results of the assessment of students' responses after using augmented reality learning media are as follows:

Table 4. Result Of Augmented Reality Media Assessment Questionnaire

No	Aspects Assessed	responden					Total Score
		H	SF	OC	VA	O	
1.	A1	4	4	3	3	4	18
2.	A2	3	4	4	2	4	17
3.	A3	4	4	3	3	4	17
4.	A4	4	4	3	4	4	19
5.	A5	4	3	4	4	1	15
6.	A6	4	4	4	3	1	16
7.	A7	4	4	4	3	4	19
		27	27	25	22	22	121
		96%	96%	89%	78%	78%	

96% +96%+89%+78% +78% = 87%

Keterangan:
A1 : The material is easy to understand
A2 : Sentences are easy to understand
A3 : Images and materials are appropriate
A4 : The program helps learners understand introductory sociology
A5 : Easy to install program
A6 : Easy to use program
A7 : Easy program helps learners understand the material

Based on the results of the assessment through a questionnaire with the value of each item calculated based on the comparison between the score obtained and the number of respondents (5) which is accumulated in the total percentage, so that it is known that the average student response above can be concluded that augmented reality media products in sociology learning are included in the category worth using. This media product has been validated by three experts, namely media experts, material experts, and linguists. The validation results showed an assessment of 86% from media experts, 87% from material experts, and 93% from linguists. In addition, the results of the learner response questionnaire indicated a feasibility level of 87%, which was categorized as very feasible. This shows that augmented reality media in sociology learning received positive responses from students.

Some indicators in learning activeness are as follows; first, students participate in the implementation of their learning tasks, second, students are ready to try and look for information needed in learning, third, students have the opportunity to use or apply the completion of tasks and problems given to them (Prasetyo & Abduh 2021) with the development of augmented reality-based learning media is expected to be able to create a more pleasant, interactive, and interesting learning atmosphere for students, especially in class X SMA Santo Fransiskus Asisi Pontianak. With a more conducive learning atmosphere, the motivation of students in participating in learning can increase significantly which will have a positive impact on the efficiency of the learning process, by actively involving students in the learning process, it will provide a stimulus to shape the direction of modern but still effective education.

CONCLUSION

The results of research on the development of augmented reality media by teachers in sociology learning at SMA Santo Franciscus Asisi pontianak can be concluded that this media is very feasible to use in learning, validation from three experts showed positive results with an assessment of 86% of media experts, 87% of material experts, and 93% language experts, besides that the results of the students' questionnaire showed a feasibility level of 87% which reached the excellent category.

The use of AR in sociology learning is proven to be able to create a more interactive, fun, and interesting learning atmosphere for students. The development of AR media is expected to increase student motivation and understanding of the material, as well as create a more effective and efficient learning process. Technology-based learning media such as AR also enriches the learning experience, allowing students to interact with sociological concepts more visually and dynamically.

SUGGESTIONS

Based on the results of the study, the development of augmented reality media can still be improved again, one of which is by adding interactive features to this media, giving simulation elements so that students can be involved in the learning process. besides that it is important for teachers to get training in using augmented reality technology effectively so that it can be maximally utilized in the classroom, to expand the positive impact of augmented reality media, its implementation can be expanded in other schools so that more students can enjoy more interactive and visual learning.

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