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Development of Augmented Reality (AR)-Based Flash Card Media in Science Learning for Fifth Grade Elementary School Students

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Abstract

Education is a very valuable basic need for humans through education humans can prepare their lives in the future better. This study aims to develop a valid, practical, and effective Augmented Reality-based Flash Card media for fifth-grade science learning at SDN 3 Lubuklinggau. This study is a Research and Development study using the ADDIE development model. The subjects of the study were fifth-grade students at SDN 3 Lubuklinggau. Data collection techniques included observation, interviews, questionnaires, tests, and documentation. The results of the study showed that based on the validity analysis of Augmented Reality-based Flash Card media for cultural heritage in Indonesia using Aiken's V, the language validator scored 0.88, the media validator scored 0.94, and the material validator scored 0.92, meeting the validity criteria. Practicality assessments by teachers and students found that Augmented Reality-based Flash Card media met the criteria of being very practical with an average score of 81.75%. Furthermore, the effectiveness assessment produced an average N-Gain score of 0.72, categorized as high. This study concludes that Augmented Reality-based Flash Card media has proven valid, practical, and effective, making it suitable for use in Chapter 7 of Indonesian Cultural Heritage for fifth-grade students at SDN 3 Lubuklinggau.

Keywords AR, Development, Elementary School, Flash Card Media, Science.

INTRODUCTION

Education is a fundamental need that is very valuable for human beings through education that human beings can prepare their lives in the future better. With education, students can develop the potential that exists in them to become human beings who have faith in God Almighty, have noble character, are healthy, knowledgeable, creative, independent, and become democratic and responsible citizens. Valen and Egok (2020:182) argue that education is a very important part of human life, because with education human beings can live according to their goals and functions as human beings. Education has a vision to create a generation that is knowledgeable, characterful, and competent to face future challenges.

Through this vision, education can be directed to achieve desired goals and create a better future for individuals and society. To achieve this goal, a learning process is needed.

Learning is a process of interaction between educators and students. This activity aims to help students understand the material taught by educators. This can be seen from the learning carried out in the school environment or other guidance institutions. Isman (Budiastuti, et al., 2021:40) stated that learning objectives must be chosen and determined carefully to create a meaningful learning process. This means that it is clear that learning is an important foundation in guiding students. One of the things that influences this learning is in the learning of IPAS.

Learning is the concept to teach students so that they can gain knowledge. In science learning at the elementary school (SD) level, it is directed at improving skills in analyzing and understanding interrelated social and natural concepts. This can be seen from students' skills in observing and analyzing interactions between humans and the environment around the school. Farhan, et al., (2025:282) stated that the purpose of learning IPAS is for students to develop in accordance with the profile of Pancasila students and foster interest and curiosity so that students are excited to study the phenomena around humans, understand the universe and its relationship with human life. This means that it is clear that social studies learning trains students to understand natural and social concepts.

Based on the results of observations and interviews conducted by researchers at SD Negeri 3 Lubuklinggau on October 4, 2025, through an initial analysis of classroom teachers, information was obtained that the curriculum used in grade V is the Independent Curriculum. In addition, several problems were found in the learning process, namely the lack of innovation in the learning media used by teachers. Teachers still use package books and non-digital learning media so that learning tends to be monotonous. Based on the analysis of student characteristics, this condition causes students to easily feel bored during the learning process and some students have difficulty in understanding the concepts of the material taught by the teacher.

The results of interviews with teachers and principals show that schools have made efforts to provide learning support facilities, but the use of digital media has not run optimally. Teachers are still dominant in using lecture methods that are considered efficient, but are not yet fully able to attract students' attention to the maximum. Meanwhile, the results of interviews with students showed that students were more interested in learning media that had an attractive, colorful, illustrative, and easy-to-understand appearance so that it could help them in the learning process.

Based on the problems and needs analysis that has been carried out, teachers expect solutions in the form of learning media that are interesting and in accordance with the characteristics of students to be used in the learning process. On the other hand, students need learning media that are visual, colorful, and easy to understand so that the learning process becomes more fun and meaningful. Therefore, it can be concluded that schools, teachers, and students alike need more interesting and interactive learning media innovations to make the learning process more effective. One alternative that suits these needs is the development of Augmented Reality (AR)-based Flash Card media.

Flash Cards are card-shaped learning media that has two sides and is used for learning and memorizing, and is equipped with various information and images. Susilawati (2021:75) argues that Flash Cards are a type of visual media that contains images that are equipped with words or sentences that can be used in learning to read in the beginning. In its use, Flash Cards have the benefit of improving student learning outcomes because they are able to create a fun learning atmosphere and increase student learning concentration. The specialty of the product developed in this study is the Flash Card media which is attractively designed and equipped with Augmented Reality (AR) technology.

Augmented Reality (AR) is one of the technologies that combines virtual objects with real objects. One of the fields that utilizes AR technology is the field of education, which is a learning tool so that students can understand the material more easily. Pujakesuma et al. (2022:5882) stated that Augmented Reality (AR) can be used to display objects in three dimensions so that it can provide real visualization without compromising the student learning experience. Through AR technology, students not only understand concepts theoretically, but are also able to see the application of these concepts in a more concrete way.

The Augmented Reality (AR)-based Flash Card learning media developed in this study is designed with attractive images, writing, and colors. This media is adapted to the learning material so that it is easy to use and understand by students. Augmented Reality (AR) technology in this learning media contains images and explanations of material that can be scanned using a mobile phone so that it displays interesting and interactive three-dimensional objects.

This research is supported by previous research conducted by Khoirunnisa, et al (2024) entitled Development of Augmented Reality-based Flash Card Media in Solar System Materials for Grade V Students of SDN Sumberdiren 01 Garum. The results of the study showed high validity. In the "Valid" category, media experts got a percentage score of 75%, material experts got a score of 95%, and language experts got a score of 85.7%. Based on these findings, Augmented Reality (AR)-based Flash Card Media was declared to be very valid, very practical, and feasible to be used in science science learning activities for Grade V elementary school students. (AR) in the learning of IPAS students in grade V of SD Negeri 3 Lubuklinggau".

METHODS

The concept of the development model used by the researcher for augmented reality (AR)-based flash card media in IPAS learning that the researcher has created using the ADDIE development model. Knowledge and understanding of the development model also provides guidelines for the design of learning media that will be developed in the form of flash card media, in determining the choice of the model must be in accordance with the characteristics of the learning that will be carried out later. This section describes how research is conducted, research design, data collection techniques, instrument development, and data analysis techniques.

The subject of this research is grade V students of SD Negeri 3 Lubuklinggau which is used as a guideline in developing augmented reality (AR)-based flash card media . In addition to students, the researcher also involved grade V teachers of SD Negeri 3

Lubuklinggau as educators who play a role in the learning process in the classroom and as parties who provide assessments on the use of learning media. In this subject, it was tested by three expert validators, namely, material experts, linguists, and media experts, then the student trial subjects were carried out using a one-to-one trial stage consisting of 3 people, a small group trial consisting of 6 students, and an effectiveness test consisting of 37 students in class V of SD Negeri 3 Lubuklinggau. The data collection techniques used by the researcher in the development of augmented reality (AR)-based flash card media in science science learning at SD Negeri 3 Lubuklinggau are: Amhket, interview, observation, documentation.

RESULTS AND DISCUSSION

The results of this study produced an augmented realty (AR)-based flash card media product for grade V students. The data obtained is analyzed to obtain information from research results and research results reports. The development of augmented realty-based (AR)-based flash card media uses the ADDIE (Analysis, Design, Development, Implementation, Evaluation) model. Based on the results of the description above, an assessment product in the form of flash card media was obtained. In addition to aiming to produce flash card media, this study also aims to determine the validity, practicality and effectiveness of flash card media. Flash card media was developed using the ADDIE development model. The results of data analysis from this study are a description of the results of data analysis that have been carried out to test the feasibility of the flash card media that has been developed by the author. The results of the media analysis are presented as follows:

Flash Card Media Validation

The validator provides an assessment, namely in the form of suggestions and input on flash card media to find out the shortcomings of the developed product. Linguists do not give advice because it is in accordance with the Indonesian language. The media experts' suggestions are (a) the addition of backsound (b) animated images to original photos (c) the addition of local wisdom to the media. For material experts, they do not give suggestions or criticism because they are in accordance with the material.

The product developed by the author despite the shortcomings but the validator assessed for the overall that the flash card media was valid for use in grade V of Elementary School. Based on the results of the analysis of the three validators, flash card media is valid and worthy of being tested in elementary schools with improvements as provided by the validator. Based on the overall assessment of the validity of flash card media, the assessment of flash card media was adjusted to Aiken's v table, so the flash card media was categorized as valid to be used in the learning process. And after the validation questionnaire sheet by the three validators showed that the flash card media valid to be used during the learning process with an average score of 0.91 which is included in the interpretation of Aiken's validation v > 0.80 with high description.

Practicality of Flash Card Media

The flash card media has been validated and revised according to the suggestions and inputs from the three experts, then the flash card media was tested to one to one consisting of 3 students, a small group consisting of 6 students, a field test involving 1 class consisting of 30 students, and grade V teachers of SDN 3 Lubuklinggau to find out the practicality of flash card

media. First, students learn using flash card media , then students are asked to fill out instrument sheets to find out the practicality of the flash card media that students have learned. Students are required to fill out a questionnaire with a checklish (√) on each "Yes" and "No" question. The teacher's practicality in the assessment of the questionnaire contains 10 questions by giving a checklish (√) mark on the score. In the results of the practicality, the teacher obtained very practical criteria so that it can be concluded overall that flash card media is very active in use. The results of the analysis of the practicality of flash card media obtained a calculation of criteria with a very practical category with an average percentage of one to one 70%, small group 80%, field test 83% and teachers have an average score of 94%. So it can be concluded that "Very Practical" flash card media is used during the learning process.

Effectiveness of Media Flash Card

In the effectiveness test using pre-test and post-test questions. The questions given by the researcher amounted to 20 questions in the form of multiple choices. The author conducted an effectiveness test on grade V students of SDN 3 Lubuklinggau with a total of 20 students. From the results of the data analysis calculated the level of student effectiveness is categorized as High. Based on the N-Gain value of 0.72 which is included in the "High" category. The results of this study showed an increase in the average score of pre-test and post-test. So it can be concluded that flash card media on student learning outcomes has effectiveness in the category of "Effective".

CONCLUSION

Based on the results of research and development, the following conclusions can be drawn: the results of the test of the validity of flash card media on Cultural Heritage materials were carried out by 3 experts, namely: linguists, media experts, material experts. by providing instruments in the form of validation questionnaires. From the results of the calculation using the Aiken's V formula, the entire 3rd validation questionnaire of experts was obtained with the validity criterion of "High" which can be seen from linguists in the language statements used in the media using flash cards that are easy to understand, media experts on the statement of animated images used in the media using flash card mediaand material experts on the statement of suitability of the material with the learning objectives.

The results of the flash card media practicality test on Cultural Heritage materials developed were obtained from the results of filling out questionnaires from the one to one test, small group test, field test, and teacher practicality test obtained a very practical level of practicality which can be seen from the one to one test on this media statement makes students excited, small group on the statement using flash card media Facilitate students in learning and test the teacher's practicality in statements using flash card media makes it easier to convey material so that it can be concluded that flash card media is stated to be very practical and can be used during the learning process.

The results of the test of the effectiveness of flash card media on Cultural Heritage materials developed can be seen from the results of the pre-test and post-test with an average value of N-Gain obtained the category of "High" which can be seen before the application of flash card media , students often leave class, feel bored quickly because they only use textbooks and students do not pay attention to different teachers when they have been applied

Flash card media students are more active in asking questions, not leaving class often, and calmer during the learning process. So it can be concluded that the use of learning media is very effective during the learning process and helps students in understanding the material. Therefore, it can be concluded that the flash card media based on augmented reality cultural heritage materials in grade V students of SD Negeri 3 Lubuklinggau is valid, practical, and effective, and meets the requirements for good use in the learning process.

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