

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

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### Abstract

Learning in its concept is to teach students to acquire knowledge. In the learning of science at the elementary school level (SD) is directed at improving skills in analyzing and understanding interrelated social and natural concepts. This study aims to develop a valid, practical, and effective Flash Card media based on Augmented Reality in learning science class V SDN 3 Lubuklinggau. This type of research is Research and Development with the ADDIE development model. The subjects of this study were students of class V SDN 3 Lubuklinggau. Data collection techniques used observation, interviews, questionnaires, tests and documentation. Based on the results of the validity analysis of the Flash Card media based on Augmented Reality cultural heritage material in Indonesia using Aiken's V shows an assessment of the language validator of 0.88, the media validator of 0.94, and the material validator of 0.92 meeting the validity criteria. Analysis of the assessment of the teacher and student practicality sheets obtained that the Flash Card media based on Augmented Reality meets the criteria of very practical with an average score of 81.75%. Then the effectiveness assessment analysis obtained an average N-Gain score of 0.72 with a high category. Based on the results of the study, it can be concluded that the Augmented Reality-based Flash Card media is proven to be valid, practical, and effective so that it is suitable for use in the material of Chapter 7 Cultural Heritage in Indonesia for class V of SDN 3 Lubuklinggau.

### Keywords

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



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## INTRODUCTION

Education is a fundamental and invaluable human need. Through education, people can better prepare for their future lives. Through education, students can develop their potential to become individuals who are faithful and devoted to God Almighty, possess noble character, are healthy, knowledgeable, creative, independent, and become democratic and responsible citizens. Valen and Ekok (2020:182) argue that education is a crucial part of human life because it enables humans to live in accordance with their purpose and function as human beings. Education has a vision of creating a generation with knowledge, character, and competence to

face future challenges. Through this vision, education can be directed toward achieving desired goals and creating a better future for individuals and society. To achieve these goals, a learning process is necessary.

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 in learning conducted in schools or other guidance institutions. Isman (Budiastuti et al., 2021:40) states that learning objectives must be carefully selected and defined to create a meaningful learning process. This clearly demonstrates that learning is a crucial foundation for guiding students. One factor influencing this learning is in science and natural sciences (IPS) learning.

The concept of learning is to teach students to acquire knowledge. In elementary school, IPS learning is directed at improving skills in analyzing and understanding interrelated social and natural concepts. This can be seen in students' skills in observing and analyzing interactions between humans and the environment around the school. Farhan et al. (2025:282) state that the goal of IPS learning is to enable students to develop according to the Pancasila student profile and foster interest and curiosity, encouraging them to study phenomena around them and understand the universe and its relationship to human life. This clearly demonstrates that IPS 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 initial analysis of the class V class, the first information was obtained that the tool used in class V was the class V class. dedeka. Several problems were also found in the learning process, namely the lack of innovation in the learning media used by teachers, because teachers use textbooks and non-digital learning media. Based on the analysis of student characteristics, these problems make students easily bored during the lesson and there are some students who have difficulty understanding the learning concepts used by teachers in teaching. The results of interviews with teachers and the principal, it is known that the school has made efforts to provide learning support facilities, but the use of digital media has not been optimal. Teachers still predominantly use the lecture method, although efficient, it does not fully attract students' attention. The results of student interviews obtained information that students are more interested in learning media that has an attractive appearance, is colorful, illustrated, and easy to understand to help students in the learning process.

Based on the problems above and the needs analysis conducted by the researcher in this problem, teachers expect a solution to be provided, such as interesting learning media that suits the characteristics of students that can be used in the learning process. On the other hand, students need visual, colorful, and easy-to-understand learning media so that the learning process becomes more enjoyable and meaningful. Therefore, it can be concluded that schools, teachers, and students all need innovations in learning media that are more interesting and interactive so that the learning process becomes more effective. One alternative that suits these needs is the Development of Flash Card Media based on Augmented Reality (AR) which is effective for use in the learning process.

Susilawati (2021:75) argues that Flash Cards are a type of visual media containing images accompanied by words or sentences that can be used in early reading instruction. Flash Cards

are beneficial in their use for improving student learning outcomes by creating a fun learning atmosphere and increasing student concentration. The unique feature of the product being developed is the Flash Card media, which is a card-shaped media that is attractively designed and equipped with various Augmented Reality (AR) technologies.

Augmented Reality (AR) is a technology that combines virtual objects with real objects. One of the fields that uses this technology (AR) is in the field of education, used as a learning aid to better understand learning. 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 visuals without reducing students' practical experience. Through Augmented Reality (AR), students not only master concepts theoretically, but are also able to apply them in real life. The Flash Card learning media based on Augmented Reality (AR) created for this study was designed with attractive images, writing, and colors. This media was adapted to the material so that it was easy to use and understand by students. Augmented Reality (AR) in learning media created containing images and explanations about the material studied by students that can be scanned through a mobile phone to appear 3-dimensional images.

This research is supported by previous research conducted by Khoirunnisa, et al. (2024) entitled Development of Flash Card Media based on Augmented Reality on Solar System Material for Fifth Grade Students of SDN Sumberdiren 01 Garum. The results of the study showed high validity. In the "Valid" category, media experts obtained a percentage score of 75%, material experts obtained a score of 95%, and language experts obtained a score of 85.7%. Based on these findings, Augmented Reality (AR) based Flash Card Media is declared very valid, very practical, and suitable for use in science learning activities for fifth grade elementary school students. Based on the problem analysis and literature review above, the researcher decided to set the title "Development of augmented reality (AR) based flash card media in science learning for fifth grade students of SD Negeri 3 Lubuklinggau".

## **METHODS**

The development model concept used by the researcher for the augmented reality (AR)-based flashcard media in science learning, which the researcher created, utilizes the ADDIE development model. Knowledge and understanding of the development model also provide guidance for designers of learning media to be developed, such as flashcards. The choice of model must be appropriate to the characteristics of the learning environment. This section explains how the research was conducted, the research design, data collection techniques, instrument development, and data analysis techniques.

The subjects of this study were fifth-grade students at SD Negeri 3 Lubuklinggau, who served as the guideline for developing the augmented reality (AR)-based flashcard media. In addition to the students, the researcher also involved the fifth-grade teachers of SD Negeri 3 Lubuklinggau as educators who play a role in the classroom learning process and who assessed the use of the learning media. This subject was piloted by three expert validators: a material expert, a language expert, and a media expert. The student trials were conducted using one-on-one trials with three students, small group trials with six students, and an effectiveness test with 37 fifth-grade students at SD Negeri 3 Lubuklinggau. The data collection techniques used by researchers in developing augmented reality (AR) based flash card media

in science learning at SD Negeri 3 Lubuklinggau are: questionnaires, interviews, observations, documentation.

## **FINDINGS AND DISCUSSION**

The results of this study resulted in a flash card media product based on augmented reality (AR) for fifth-grade students. This research was conducted in stages according to the development model discussed in the previous chapter, and the results are presented. The data obtained were analyzed to obtain information from the research findings and a research report. The development of this AR-based flash card media used the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). Based on the results described above, an assessment product was obtained in the form of flash cards. In addition to producing flash cards, this study also aimed to determine the validity, practicality, and effectiveness of the flash cards. The flash cards were developed using the ADDIE development model. The results of the data analysis from this study describe the results of the data analysis conducted to test the feasibility of the flash cards developed by the author. The results of the media analysis are presented as follows:

### **Flash Card Media Validation**

The validator provided an assessment, in the form of suggestions and input on the flash cards to identify any shortcomings in the developed product. The linguist did not provide any suggestions because it was already in accordance with the Indonesian language. The media experts' suggestions included (a) adding background music, (b) replacing animated images with original photos, and (c) incorporating local wisdom into the media. The material experts did not provide any suggestions or criticisms, as they were already in line with the material.

Despite its shortcomings, the validators assessed the flashcards as a valid medium for use in fifth-grade elementary schools. Based on the analysis by the three validators, the flashcards were valid and worthy of being tested in elementary schools with improvements as recommended by the validators. Based on the overall validity assessment, the flashcards were assessed according to the Aiken's  $v$  table, thus categorizing them as valid for use in the learning process. The validation questionnaire by the three validators indicated that the flashcards were valid for use in the learning process, with an average score of 0.91, which falls within the interpretation of Aiken's  $v > 0.80$ , indicating a high level of validity.

### **Practicality of Flash Cards**

The flash cards were validated and revised based on the suggestions and input from the three experts. They were then piloted with one-on-one sessions with three students, small groups of six students, and a field test involving a class of 30 students and a fifth-grade teacher at SDN 3 Lubuklinggau to determine their practicality. Students first learned how to use flash cards, then were asked to complete an instrument sheet to determine the practicality of the flash cards they had learned. Students were asked to complete a questionnaire by checking (√) each "Yes" and "No" question. The practicality of the 10-question questionnaire was assessed by teachers, who were given a checkmark (√) for their scores. The practicality results were categorized as very practical, thus concluding that the flash cards were very practical. The practicality analysis of flashcards yielded a theoretically very practical score, with an average

one-to-one percentage of 70%, small group participation of 80%, and field testing of 83%, with teachers receiving an average score of 94%. Therefore, it can be concluded that flashcards are "very practical" for use during the learning process.

#### Effectiveness of Flashcards

The effectiveness test used pre-test and post-test questions. The researcher administered 20 multiple-choice questions. The author conducted the effectiveness test on 20 fifth-grade students at SDN 3 Lubuklinggau. The data analysis calculated the effectiveness level for students, categorized as High. The N-Gain value was 0.72, which is considered "High." The results of this study indicate an increase in the average pre-test and post-test scores. Therefore, it can be concluded that flashcards have an "Effective" effect on student learning outcomes.

#### CONCLUSION

Based on the research and development results, the following conclusions can be drawn: The validity test for flashcard media on Cultural Heritage material was conducted by three experts: a linguist, a media expert, and a material expert. The instrument used was a validation questionnaire. Calculations using Aiken's V formula resulted in the validation questionnaires from all three experts achieving "High" validity. The linguist stated that the language used in the flashcard media was easy to understand, the media expert stated that the animated images used in the flashcard media were appropriate, and the material expert stated that the material was appropriate to the learning objectives.

The results of the practicality test of the flashcard media for the Cultural Heritage material developed were obtained from the questionnaires completed in one-to-one tests, small group tests, field tests, and teacher practicality tests. The practicality level was very practical, as evidenced by the one-to-one test, which stated that this media made students enthusiastic, the small group test, which stated that using flashcards facilitated students' learning, and the teacher practicality test, which stated that using flashcards facilitated the delivery of material. Therefore, it can be concluded that flashcards are very practical and can be used during the learning process.

The effectiveness test of the flashcard media for the Cultural Heritage material developed can be seen from the pre-test and post-test results, with an average N-Gain score of "High." This can be seen from the fact that before the flashcard media was implemented, students often left the classroom, felt bored easily due to only using textbooks, and did not pay attention to the teacher. However, after the flashcard media was implemented, students were more active in asking questions, left the classroom less often, and were calmer during the learning process. Therefore, it can be concluded that the use of this learning media is very effective during the learning process and helps students understand the material. So, it can be concluded that the augmented reality-based flash card media for cultural heritage material for fifth grade students of SD Negeri 3 Lubuklinggau is valid, practical, and effective, fulfilling the requirements for use in the learning process.

## REFERENCES

- Adha, M. J., Aryani, Z., Ardi, R. S., & Husni, Y. (2025). Peningkatan Hasil Belajar Ilmu Pengetahuan Alam dan Sosial (IPAS) Menggunakan Model Pembelajaran Kooperatif Tipe Jigsaw di Kelas V SD Negeri 133/III Pondok Siguang. *Gudang Jurnal Multidisiplin Ilmu*, 3(1), 325-331.
- Ali, M. M. (2022). Metodologi penelitian kuantitatif dan penerapannya dalam penelitian. *JPIB: Jurnal Penelitian Ibnu Rusyd*, 1(2), 1-5.
- Budiastuti, P., Soenarto, S., Muchlas., & Ramadhan, W. H. (2021) Analisis Tujuan Pembelajaran dan Kompetensi Dasar di Sekolah Menengah Kejuruan. *Jurnal Edukasi Elektro*, 40 (2).
- Copleston, F. (1974). *A HISTORY OF PHILOSOPHY Modern Philosophy: From the French Revolution to (First, Vol. IX)*. New York: DOUBLEDAY.
- deLaplante, K. (2008). Philosophy of Ecology: Overview. In *Encyclopedia of Ecology* (pp. 2709–2715). <https://doi.org/10.1016/B978-008045405-4.00247-0>
- Farhan, M., Taofik., Soleh, A. D., (2025) Penerapan Media Pembelajaran Berbasis *Augmented Reality* Pada Siswa Kelas V Sekolah Dasar. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, 5(1), 282.
- Hayudinna, H. G., & Muzkiyah, A. (2024). Analisis kemampuan bernalar kritis pada pembelajaran Ilmu Pendidikan Alam dan Sosial (IPAS) dalam Kurikulum Merdeka di sekolah dasar. *Jurnal Basicedu*, 8(3), 2438-2447.
- Hidayat, F., & Muhamad, N. (2021). *Model Addie (Analysis, Design, Development, Implementation and Evaluation) Dalam Pembelajaran Pendidikan Agama Islam Addie (Analysis, Design, Development, Implementation and Evaluation) Model in Islamic Education Learning*. *J. Inov. Pendidik. Agama Islam*, 1(1), 28-37.
- Khoirunnisa, S., Fatih. M., Wafa, K. (2024) Pengembangan Media *Flashcard* Berbasis *Augmented Reality* Pada Siswa Kelas V SD N Sumberdiren 01 Garum. *AL MADRASAH: Jurnal Ilmiah Pendidikan*, 8(4), 1812-1823.
- Krijnen, T., & Verboord, M. (2016). TV genres' moral value: The moral reflection of segmented TV audiences. *The Social Science Journal*, 53(4), 417–426. <https://doi.org/10.1016/j.soscij.2016.04.004>
- Matulesy, E. R., & Kilian, V. (2023). Statistika Deskriptif Implementasi Program Imunisasi Dasar Lengkap di Wilayah Kerja Dinas Kesehatan Manokwari Tahun 2022. *Jurnal Pendidikan dan Konseling (JPDK)*, 5(1), 3492-3499.
- Novianti, I. (2024). Peningkatan Hasil Belajar IPAS melalui Model Pembelajaran Kooperatif Tipe Jigsaw pada Siswa Kelas V SDN Putat Jaya IV Surabaya. *RISOMA: Jurnal Riset Sosial Humaniora Dan Pendidikan*, 2(5), 158-169.
- Prayogo, M. S., Ramadhan, F. A., & Shaliha, D. M. A. (2024). Penerapan Pembelajaran Ilmu Pengetahuan Alam dan Ilmu Pengetahuan Sosial Berbasis Kurikulum Merdeka di Madrasah Ibtidaiyah. *JESE: Journal of Elementary School Education*, 1(01), 40-49.
- Ritonga, A. P., Andini, N. P., & Iklmah, L. (2022). Pengembangan bahan ajaran media. *Jurnal Multidisiplin Dehasen (MUDE)*, 1(3), 343-348.
- Susilawati (2021). Pengaruh Media *Flashcard* Terhadap Perbendaharaan Kata Peserta Didik Kelas 1 Sekolah Dasar. *Tunas: Jurnal Pendidikan Dasar*, 7(1), 75.
- Syahid, I. M., Istiqomah, N. A., & Azwary, K. (2024). Model ADDIE dan ASSURE dalam pengembangan media pembelajaran. *Journal of International Multidisciplinary Research*, 2(5).

- Syaifudin, S. (2020). *Validitas dan Reliabilitas Instrumen Penilaian Pada Mata Pelajaran Bahasa Arab*. *Cross-border*, 3(2), 106-118.
- Tabrani, T. (2023). Perbedaan antara penelitian Kualitatif (Naturalistik) dan Penelitian Kuantitatif (Ilmiah) dalam berbagai aspek. *Jurnal Pendidikan Dan Konseling (JPDK)*, 5(2), 318-327.
- Ummah, K. K., & Mustika, D. (2024). Analisis Penggunaan Media Pembelajaran Pada Muatan IPAS di Kelas IV Sekolah Dasar. *Didaktika: Jurnal Kependidikan*, 13(2), 1573-1582.
- Valen, A., & Ekok, A. S. (2020). Peningkatan Hasil Belajar IPS Melalui Model Student Team Achievement Division Siswa Kelas IV SD Negeri 82 Bengkulu. *INVENTA: Jurnal Pendidikan Guru Sekolah Dasar*, 4(2), 181-189.
- Waruwu, M. (2024). Pendekatan penelitian kualitatif: Konsep, prosedur, kelebihan dan peran di bidang pendidikan. *Afeksi: Jurnal Penelitian Dan Evaluasi Pendidikan*, 5(2), 198-211.
- Zamsiswaya, Z., Syawaluddin, S., & Syahrizul, S. (2024). Pengembangan Model ADDIE (Analisis, Design, Development, Implementation, Evaluation). *Jurnal Pendidikan Tambusai*, 8(3), 4636346369.