

Enhancing Digital Literacy in Social Studies through Augmented Reality Media

Rizal Akbar Darmawan*, Ade Budhi Salira, Yeni Kurniawati, Dina Siti Logayah, Riko Arrasyid

Universitas Pendidikan Indonesia, Bandung, Indonesia
Correspondence: E-mail: rizalakbardarmawan@upi.edu

ABSTRACT

Digital literacy is an aspect of education that plays an important role in sharpening the quality of human resources, which lies in the potential and formation of learning experiences. This research has an innovative form of interactive learning in the classroom by presenting augmented reality media as an alternative social studies learning media to increase digital literacy in students to improve students' digital literacy. Augmented reality media can help students learn interactively in digital literacy by creating the impression of 3D objects. The method used is quasi-experimental with a nonequivalent control group design. The results of the data analysis showed that there were differences in students' digital literacy skills before and after being given augmented reality-based interactive learning media treatment in experimental classes in social studies learning ($0.000 < 0.05$), there were differences in students' digital literacy skills between before and after treatment PopUp Book media in the control class in social studies learning ($0.000 < 0.05$).

ARTICLE INFO

Article History:

Submitted/Received :13 Feb 2024

First Revised :15 Mar 2024

Accepted :21 Mei

First Available Online 20 Jun 2024:

Publication Date : 30 June 2024

Keyword:

Augmented reality,
Digital Literacy,
Social Studies Learning.

1. INTRODUCTION

Technological developments are increasingly sophisticated, so the lives of the millennial generation are surrounded by technology that gives birth to the digital literacy era. Digital literacy is the ability to use technology and information from digital devices effectively and efficiently in various contexts such as academics, careers, and everyday life. Digital literacy comes from the computer and information literacy sections, so it is related to the ability to access, understand and expand information (Andriana, 2022; Ahmad, et al., 2022). Technology development provides many benefits and facilitates the work and daily activities of the community. Technological advances produce modernity characterized by economic growth, social mobility, cultural expansion or expansion to education.

Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious and spiritual strength, self-control, personality, intelligence, noble character, and skills possessed by students. The use of technology can improve the support of learning media. Therefore, educators are required to understand technology to apply it to the learning system for students (Ashari, et al., 2019; Dewi, 2021). Technology can affect the quality of education.

Technology is closely related to education. Technology becomes part of learning, namely as a learning medium. A country needs to continue to follow the development of world information technology because it will also affect the quality of learning. Here is the role of educational technology in providing innovations in contemporary methods, media or curriculum. Educational technology is mandatory in understanding the development of the existing era, both in science and technology (Science and Technology) or culture. For this reason, an educational technologist must be innovative and visionary to design education to prepare students for the future as quality HR (Human Resources).

Augmented reality is a merger of real and virtual objects in the real environment, runs interactively in real-time, and there is integration between objects in three dimensions. That is, virtual objects are integrated with the real world. The merging of real and virtual objects is possible with appropriate display technologies, interactivity is possible through certain input devices, and good integration requires effective tracking. This will certainly be relevant when viewed from the background form of the current problem. Inserting it will make learning more interactive and motivating for students and help the learning process improve and be more conducive (Fajar, et al., 2021; Hafzah, et al., 2020; Hidayat, et., 2020).

Augmented reality technology can be applied to support learning materials to make them more interesting and interactive. The application of Augmented reality to learning materials can provide a more detailed picture of the material and be presented with a display in the form of 3D animation. In the era of rapid development of information technology, the application of AR in various fields has become an alternative form. AR is information technology that combines 2D or 3D objects developed with computer applications into a real environment similar to the reality around the user in real time (Ketut, 2022; Kurniawati, et al., 2022). Augmented reality allows users using applications to see the real environment by using displays in the form of virtual objects.

Augmented reality makes an aid able to help teachers and students in the learning process. The presence of 3-dimensional visualization will make it easier for students to carry out the knowledge transfer process so that students can understand directly the form of implementation that is intertwined when the learning process takes place in addition to helping in the learning process and student interest in learning because AR itself has entertainment aspects that can increase students' interest in learning and playing and project

it in real and involve interaction. Students in the learning process will attract more attention, and learning can also be (Ningsih and Abadi, 2018).

2. METHODS

This study uses a quantitative approach with quasi-experimental methods. The quasi-experimental method is a development of a nonequivalent control group design. This design has a control group and also has an experimental group. Both groups were tested to see a difference using different treatments. The control class uses the PopUp Book method, and the Experiment class uses Augmented Reality. Quasi-experimental research is one type of experimental research close to real experiments. Quasi-experimentation is a research method used to look for the effect of certain treatments on others under controlled conditions.

The place and time of this learning research is at SMPN 51 Bandung, located in Bandung, West Java, Rancasari District. The subjects of the learning research were junior high school students of class VII, totalling 33 control classes VII-3, and experimental classes as many as 34 with a total of 67 students.

3. RESULTS AND DISCUSSION

3.1. Digital Literacy Skills There is a Difference Between Before and After Digital Literacy Actions of Students in Experimental Classes

Augmented reality as a merger of real and virtual objects in the real environment, runs interactively in real time, and there is integration between objects in three dimensions, that is, virtual objects are integrated in the real world. The merging of real and virtual objects is possible with appropriate display technologies, interactivity is possible through certain input devices, and good integration requires effective tracking (Prianggar and Sujatmiko, 2020; Rahayu, et al., 2022; Riskiono and Susanro, 2020).

The ability to read, write, and the ability of individuals to process information. Digital deals with numbers in a particular numbering system. Literacy is usually combined with other syllables to indicate ability in a particular field. The meaning of the word digital literacy is the ability to read, write, process information in a certain numbering system. Digital literacy is the ability to use technology and information from digital devices effectively and efficiently in various contexts such as academics, careers, and everyday life. Digital literacy comes from the computer literacy and information literacy sections so that it is related to the ability to access, understand and expand information.

Tabel 1 Hypothesis Testing Differences in Digital Literacy between Initial Measurement (Pre-test) and Final Measurement (Post-test) of the Experimental Class

		Paired Samples Test					t	d	Sig.
		Mea	Std.	Std.	95% Confidence		f	(2-	
		n	Deviati	Error	Interval of the			tailed	
			on	Mean	Difference)	
					Lower	Upper			
Pair 1	Pre Test- Post Test	-30.471	19.900	3.413	-37.414	-23.527	-8.928	33	.000

Based on the table above, there are results of hypothesis testing using a parametric paired sample t-test regarding measurement data before (pre-test) and after (post-test) the application of augmented reality treatment in the experimental class. The resulting significance value is $0.000 < 0.05$, so H_0 is rejected and H_a is accepted. So it can be concluded that there is a difference in students' learning interest between before and after being given augmented reality-based interactive learning media treatment in the experimental class in social studies learning. Apart from that, the results of hypothesis 1 testing are also complemented by a comparison of the calculated t and t table values with the following basis for decision making:

- If the calculated t value $>$ t table, then H_0 is rejected and H_a is accepted
- If the calculated t value $<$ t table, then H_0 is accepted and H_a is rejected

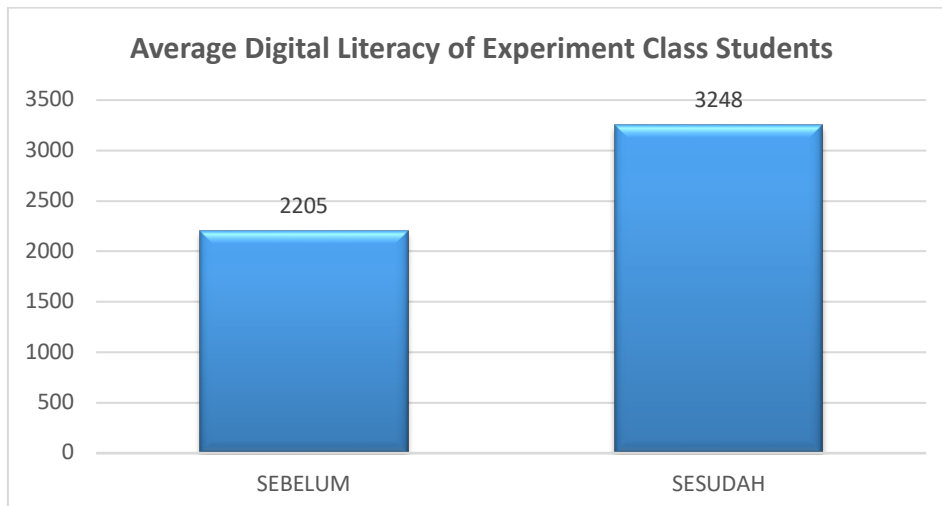
It is known that the calculated t value is 8.928 and the degrees of freedom (df) value is 33, so the relevant table t value is 1.696. So, the comparison of t count and t table can be presented in the form of the following curve:

Figure 1 Interpretation of hypotheses based on t count



Based on the curve above, it is found that the calculated t value falls in the area of rejection of H_0 or acceptance of H_a . This can be seen from the calculated t value of $8.928 >$ t table 1.695, which means that H_0 is rejected and H_a is accepted. It can be concluded that there is a difference in students' learning interest between before and after being given augmented reality-based interactive learning media treatment in the experimental class in social studies learning. Thus, the results of hypothesis 1 test show Sig. (2-tailed) $<$ 0.05 and t count $>$ t table which both get H_0 rejection or H_a acceptance.

Graph 1 Graph of the Difference in Digital Literacy between Before and After being given augmented reality treatment in the Experimental Class



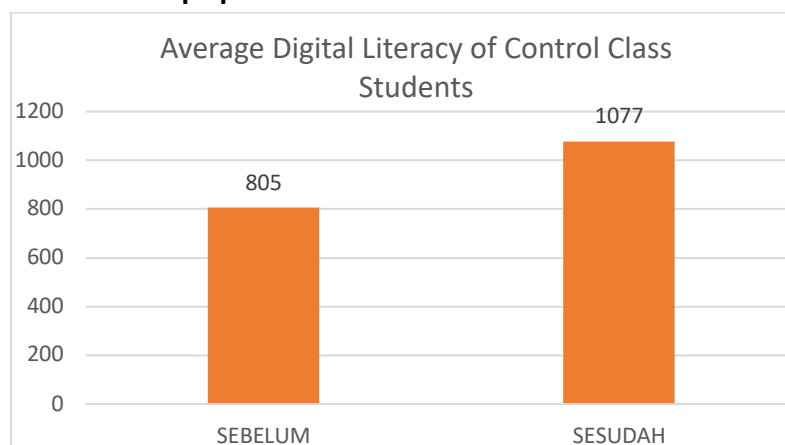
In this graph, the initial (pre-test) and final (post-test) measurements obtained an average value which tended to increase, namely the initial measurement results (pre-test) before the implementation of augmented reality media obtained an average value of 2205 with percentage of 40% and increased to 3248 with a percentage of 60% in the final measurement results of augmented reality media applied in social studies learning. The use of augmented reality media stimulates students to be active and responsive because they feel interested in the learning presentation combined with digital-based animation media. The main characteristics of junior high school students are known as part of the digital native generation, namely a generation that is capable of digital literacy and is oriented towards flexible and adaptive work. The use of augmented reality media in social studies learning can facilitate the younger generation, namely the digital native generation, with educational technology that combines the use of digital devices such as laptops, cellphones and internet networks in accessing learning media that prioritizes visual, audio and audio-visual displays to stimulate student interaction. in the learning process. For this reason, augmented reality media is suitable for simplifying complex learning material, especially social studies learning which is often characterized as rote learning, so that augmented reality media can stimulate students' interest in studying social studies with attractive, creative and powerful presentations.

3.2. Differences in Digital Literacy of Students between Before and After being given treatment in the Control Class

Digital literacy is the skill of creating and sharing opportunities that often arise and are different, combining, communicating what is understood about when and how to access information technology tools to achieve a goal. Based on the definition above, it can be concluded that digital literacy is defined as the skills of reading, writing, loading/accessing/using technology to obtain information (Pratiwi, et al., 2021; Silvana and Darmawan, 2021).

In the discussion section of the research results, we will describe a number of findings according to the results of data processing that has been carried out previously to determine the differences in students' learning interest between the experimental class that was given augmented reality media treatment and the control class that was given the PopUp Book comparison treatment in social studies learning.

Grafik 2 Grafik Perbedaan Literasi Digital antara Sebelum dan Sesudah diberikan treatment PopUp Book Pada Kelas Kontrol



Based on the diagram above, the use of conventional PopUp Book media has an influence on students' interest in learning according to the average gain in the initial measurement (pre-test) of 805 with a percentage of 43% and increasing to an average of 1077 with a percentage of 57% during the final measurement (post-test). In conclusion, it is explained that PopUp Books are effectively used in the learning process to increase students' Digital Literacy in social studies learning. PopUp Book has a more familiar technical use because the tools and features are easy to operate in creating slide material with various multimedia components.

Using PopUp Book learning media in the learning process can create a pleasant learning atmosphere, make it easier for students to receive material, and simplify material points in a concrete way to increase interest in learning.

3.3 Differences in Students' Digital Literacy after being given treatment between the Experimental Class and the Control Class

Based on the results of research that has been conducted and observing groups of students in the experimental class who use augmented reality media and groups of students in the control class who do not use this media, it is very likely that there will be differences in digital literacy abilities between the two groups after implementing augmented reality. The group of students in the experimental class has the opportunity to learn using augmented reality technology, which can present learning content in a more interesting and interactive way. In this case, they could have a different learning experience to a control group that did not use augmented reality. (Noor, 2018; Pinem, et al., 2022). Augmented reality allows students to see and experience digital literacy concepts more concretely. These visualizations and real experiences can help students better understand learning material and apply it in the context of digital literacy. With augmented reality, students in experimental classes can learn through direct experiences enhanced by technology. They can participate in cybersecurity simulations, interact with digital objects in the real world, or overcome other digital literacy challenges. This can improve their understanding and help recognize real-world situations related to digital literacy. The use of augmented reality technology in learning may increase student motivation and engagement in the learning process. Students who are more motivated will tend to be more focused and participate more actively in learning, which in turn can influence the improvement of their digital literacy skills (Yani, et al., 2019; Arrasyid, et al., 2019)

With the application of augmented reality media to the digital literacy of students in the experimental class compared to the control class, there are differences in digital literacy abilities between students before and after the action of applying augmented reality media. The group of students in the experimental class, which used augmented reality media, showed a more significant increase in digital literacy skills compared to the group of students in the control class who did not use this media. The application of augmented reality media provides a more interesting learning experience, better visualization of concepts, and experience-based learning that strengthens students' understanding of digital literacy. Apart from that, the use of augmented reality technology can also increase student motivation and involvement in learning.

4. CONCLUSION

Based on the results of hypothesis analysis of the final measurement (post-test) of interest in learning between experimental class and control class students using parametric tests with the assistance of IBM SPSS Statistics version 26, a significance value of $0.00 < 0.05$ was obtained, which means that H_0 is rejected and H_a accepted. It can be concluded that there is a significant difference in students' digital literacy after being given treatment in the experimental class which uses interactive learning media based on augmented reality and the control class which uses PopUp Book media in social studies learning. Basically, the Digital Literacy of students in the experimental class and control class increased before and after being given treatment. Learning media is part of external (extrinsic) factors that influence a small part of digital literacy and refers to students' interest in easily carrying out literacy with the help of media as a means of transferring knowledge. In this way, there is a different treatment as it is known that there are differences in digital literacy abilities in the experimental class and the control class in using augmented reality media with Pop Up Books. So, there are differences in digital literacy abilities in the experimental class and the control class in using augmented reality media with Pop Up Books.

5. REFERENCES

- Aditama, P. W., Adnyana, I. N. W., & Ariningsih, K. A. (2019, February). Augmented reality dalam multimedia pembelajaran. In SENADA (Seminar Nasional Manajemen, Desain dan Aplikasi Bisnis Teknologi) (Vol. 2, pp. 176-182).
- Andriani, W. (2022). Reaktualisasi Kurikulum pada Abad Ke-21. *Jurnal Dimensi Pendidikan dan Pembelajaran*, 10(1), 72-77.
- Ahmad, I., Samsugi, S., & Irawan, Y. (2022). Penerapan Augmented Reality Pada Anatomi Tubuh Manusia Untuk Mendukung Pembelajaran Titik Titik Bekam Pengobatan Alternatif. *Jurnal Teknoinfo*, 16(1), 46-53.
- Asari, A., Kurniawan, T., Ansor, S., & Putra, A. B. N. R. (2019). Kompetensi literasi digital bagi guru dan pelajar di lingkungan sekolah kabupaten Malang. *BIBLIOTIKA: Jurnal Kajian Perpustakaan Dan Informasi*, 3(2), 98-104.
- Dewi, C. (2021). Penguatan Literasi Digital melalui Pembelajaran Social Studies Berbasis E-learning pada Siswa Sekolah Dasar. *Jurnal Pendidikan: Teori, Penelitian, dan Pengembangan*, 6(10), 1602-1608.
- Fajar, A., Putra, A. D. And Surahman, A. (2021). Aplikasi Pengenalan Perangkat Keras Komputer Berbasis Android Menggunakan Augmented reality (AR), 2(2), Pp. 24-31
- Hafzah, N., Amalia, K. P., Lestari, E., Annisa, N., Adiatmi, U., & Saifuddin, M. F. (2020). Meta-Analisis Efektivitas Penggunaan Media Pembelajaran Digital Dalam Peningkatan Hasil dan Minat Belajar Biologi Peserta Didik di Era Revolusi Industri 4.0:(Meta-analysis Effectiveness of the use of Digital Learning Media in Increasing The Results and Interest in Biology Learning Students in The Era of The Industrial Revolution 4.0). *Biodik*, 6(4), 541-549.
- Hidayat, H., Mulyani, H., Nurhasanah, S. D., Khairunnisa, W., & Sholihah, Z. (2020). Peranan Teknologi Dan Media Pembelajaran Bagi Siswa Sekolah Dasar Di Dalam Pembelajaran

- Pendidikan Kewarganegaraan. *Jurnal Pendidikan Kewarganegaraan Undiksha*, 8(2), 2-3. <https://ejournal.undiksha.ac.id/index.php/jjpp>
- Ketut Bali Sastrawan, K. H. P. (2020). Urgensi Pendidikan Humanisme Dalam Bingkai A Whole Person. *Haridracarya. Jurnal Pendidikan Agama Hindu*, 1(1), 151-156.
- Kurniawati, N., Sofarini, A., Handayani, T., Kamilah, A., & Mulyana, A. (2022). Pelatihan Penggunaan Virtual Reality dalam Pengajaran Kosakata Bahasa Inggris Pada Guru Sekolah Dasar Di Kecamatan Cipanas. *Abdimas Siliwangi*, 5(2), 387-399.
- Ningsih, N. L. P. R., Darsana, I. W., & Abadi, I. B. G. S. (2018). Korelasi Antara Minat Belajar dengan Hasil Belajar IPS. *Mimbar PGSD Undiksha*, 6(3), 202–209.
- Noor, T. (2018). Rumusan Tujuan Pendidikan Nasional Pasal 3 Undang-Undang Sistem Pendidikan Nasional No 20 Tahun 2003. *Wahana Karya Ilmiah Pendidikan*, 2(1), 123-144.
- Pinem, S., Rosit, M., & Djuniarto, E. (2022). Pemberdayaan Virtual reality Untuk Meningkatkan Literasi Digital Guru SMP Negeri 8 Jakarta. *Jurnal Pengabdian kepada Masyarakat Nusantara*, 3(2), 682-690.
- Pratiwi, D. E., Utami, T. M., Korneliya, B., Rafiadzkay, M. Z., & Aini, S. Q. (2021). Tingkat Literasi Digital Mahasiswa Jurusan Matematika Universitas Negeri Semarang Pada Pembelajaran Daring. *Journal of Education and Technology*, 1(1), 30-36.
- Pringgar, R. F., & Sujatmiko, B. (2020). Penelitian Kepustakaan (Library Research) Modul Pembelajaran Berbasis Augmented Reality Pada Pembelajaran Siswa. *IT-Edu: Jurnal Information Technology and Education*, 5(01), 317-329.
- Rahayu, R., Iskandar, S., & Abidin, Y. (2022). Inovasi Pembelajaran Abad 21 Dan Penerapannya Di Indonesia Restu Rahayu 1, Sofyan Iskandar 2, Yunus Abidin 3. *Jurnal Basicedu*, 6(2), 2099-2104.
- Riskiono, S. D. And Susanto, T. (2020). Augmentedreality Sebagai Media Pembelajaran Hewan Purbakala', 8(1), Pp. 8-18.
- Sari, K. Etal. (2020). Pengembangan Kompetensi Guru SMKN 1 Labang Bangkalan Melalui Pembuatan Media Pembelajaran Augmentedreality Dengan Metaverse An Improvementon Competenceof SMKN 1 Labang Bangkalan Educatorsby Creating Augmented reality Learning Media Usingmetaverse, 4(1), pp. 52-59.
- Setyawan, B., & Fatirul, A. N. (2019). Augmented reality dalam pembelajaran IPA bagi siswa SD. *Kwangsan*, 7(1), 286912.
- Silvana, H., & Darmawan, C. (2018). Pendidikan literasi digital di kalangan usia muda di kota bandung. *Pedagogia*, 16(2), 146-156.
- Yani, A., Ruhimat, M., & Mulyadi, A. (2019). TPACK Venn Diagram: Measuring the Balance of Implementation of Learning Models in Entering the Industry 4.0 era (Study on Geography Learning in 2013 Curriculum). *Jurnal Pendidikan Ilmu Sosial*, 28(2), 172-183.
- Arrasyid, R., Setiawan, I., & Sugandi, D. (2019). Developing learning media based on Geographic Information System for geography subject in senior high schools. *Jurnal Pendidikan Ilmu Sosial*, 28(1), 1-7.