



Augmented Reality-Based Comic Media: A Metacognitive Approach to Enhance Cultural Literacy and Reading Engagement in Elementary Education

Ni Komang Desi Pratiwi^{1*}, Gede Wira Bayu² 

^{1,2} Pendidikan Dasar, Universitas Pendidikan Ganesha, Singaraja, Indonesia

ARTICLE INFO

Article history:

Received May 07, 2024

Accepted July 29, 2024

Available online August 25, 2024

Kata Kunci:

Komik Pembelajaran, Augmented Reality, Literasi Budaya, Reading Engagement

Keywords:

Learning Comics, Augmented Reality, Cultural Literacy, Reading Engagement



This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.

Copyright © 2024 by Author. Published by Universitas Pendidikan Ganesha.

ABSTRAK

Penurunan keterlibatan siswa dalam membaca dan rendahnya literasi budaya menjadi masalah yang perlu diatasi dalam pembelajaran di kelas IV Sekolah Dasar. Penelitian ini bertujuan untuk mengembangkan media komik pembelajaran berbasis Augmented Reality (AR) yang mengangkat keragaman budaya Bali, dengan fokus pada pembelajaran metakognitif untuk meningkatkan literasi budaya dan keterlibatan membaca (reading engagement) siswa. Penelitian ini juga menganalisis validitas isi media, respons siswa terhadap media, dan efektivitas media terhadap peningkatan literasi budaya dan keterlibatan membaca. Penelitian ini menggunakan model ADDIE dengan subjek media komik berbasis AR dan objek penelitian meliputi validitas, kepraktisan, serta efektivitas media. Teknik pengumpulan data dilakukan melalui pemberian lembar kuesioner kepada siswa dan wawancara dengan wali kelas. Analisis validitas isi instrumen kuesioner diuji dengan menggunakan rumus CVR dan penelitian ini menggunakan teknik uji-t berkorelasi berbantuan aplikasi SPSS. Hasil penelitian menunjukkan bahwa media komik pembelajaran berbasis AR memiliki tingkat validitas yang tinggi, mencakup validitas materi, media, dan desain instruksional. Respons siswa terhadap kepraktisan media sangat baik, serta media ini terbukti secara signifikan efektif dalam meningkatkan literasi budaya dan keterlibatan membaca siswa. Hasil uji statistik menunjukkan nilai signifikansi (sig.) untuk literasi budaya dan keterlibatan membaca masing-masing $<0,001$, dengan nilai $F_{hitung} > F_{tabel}$, yang mengindikasikan bahwa H_0 ditolak dan H_1 diterima. Dapat disimpulkan bahwa, inovasi media komik berbasis AR dapat mendukung proses pembelajaran dan membantu guru dalam menyampaikan materi pembelajaran dengan lebih menarik dan efektif, serta dapat meningkatkan literasi budaya dan keterlibatan membaca siswa. Penelitian ini berimplikasi pada peningkatan ketersediaan media pembelajaran yang lebih beragam dan berbasis teknologi.

ABSTRACT

Declining reading engagement and low cultural literacy are key issues in 4th grade of elementary school. This study aims to develop an Augmented Reality (AR)-based comic learning media that highlights the cultural diversity of Bali, focusing on metacognitive learning to enhance students' cultural literacy and reading engagement. The study also analyzes the media's content validity, students' responses to the media, and the media's effectiveness in improving cultural literacy and reading engagement. This research employs the ADDIE model, with the AR-based comic media as the subject, and the research object covering the validity, practicality, and effectiveness of the media. Data was collected via student questionnaires and teacher interviews, with validity tested using the CVR formula and analysis conducted via a correlated t-test in SPSS. The results indicate that the AR-based comic learning media has a high level of validity, covering content validity, media validity, and instructional design. Students found the media practical and highly effective in boosting cultural literacy and reading engagement. Statistical test results show significance values (sig.) for cultural literacy and reading engagement of <0.001 , with $F_{calculated} > F_{table}$, indicating that the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. It can be concluded that, AR-based comic media innovation can support the learning process and help teachers in delivering learning materials more interestingly and effectively, and can increase cultural literacy and student reading engagement. This study has implications for increasing the availability of more diverse and technology-based learning media.

1. INTRODUCTION

Pancasila education is the ideological education of the Indonesian nation which aims to form good citizens, citizens of the country who are able to understand their rights and obligations towards the state, are able to love their homeland, and have an Indonesian national spirit. Other studies state that *Pancasila* education is an important element in the formation of the character of the Indonesian nation (Nur et al.,

*Corresponding author.

E-mail addresses: desi.pratiwi@undiksha.ac.id (Ni Komang Desi Pratiwi)

2023; Akhyar & Dewi, 2022). *Pancasila* education is very important to be instilled in elementary school students, this is because elementary school students are experiencing concrete operational development, namely students experience a period of logical and concrete thinking, so that by providing *Pancasila* education, memory will develop more easily and can give rise to better thinking (Putri et al., 2024; Akhyar & Dewi, 2022). *Pancasila* education teaches students many things, one of which is culture. That way, *Pancasila* education will increase the cultural literacy possessed by students. Cultural literacy is the ability possessed by individuals to understand that their national identity is related to Indonesian culture. Previous research states that cultural literacy is very necessary in education, in order to maintain the sustainability of national culture, other research states that cultural literacy can create the next generation who have a soul and character in accordance with the values of the nation's culture (Iskandar et al., 2024; Saepudin et al., 2018). In the context of elementary school education, cultural literacy becomes very important because at this stage students are in the phase of developing an initial understanding of the student's identity and the world around them, other studies also mention that cultural and civic literacy are important things that must be mastered in the 21st century (Iskandar et al., 2024; Safitri & Ramadan, 2022).

Cultural literacy is influenced by how much students enjoy reading books on cultural themes, therefore reading engagement is important to students' cultural literacy skills. In several other studies, OECD states that reading engagement refers to motivational attributes and characteristics of students' reading behavior and is defined as motivation to read which consists of a set of affective and behavioral characteristics, such as interest and enjoyment in reading, and diverse and frequent reading practices (Sari & Suryandaru, 2023; Ho & Lau, 2018). However, it is unfortunate that many students are not directly involved in learning activities in the classroom. This is because the learning process in the classroom often uses the *caramah* method, so that students do not have the space and freedom to explore their own knowledge. Therefore, reading engagement is still a special concern in the world of education.

With the low reading engagement students in schools, then it also has an impact on the literacy possessed by students, one of which is cultural literacy. Cultural literacy in education is low not only due to low reading engagement in schools, low cultural literacy is also caused by the increasingly intense globalization lately. Globalization is internationalization, universalization, liberalization and westernization of the life of the nation. Previous research stated that learning related to cultural literacy that is interesting for students is needed so that the learning process will be fun and effective, other research also states that learning that is interesting for students can make learning effective (Ainulmilla & Oktiningrum, 2021; Wulandari, 2020). In an effort to create an effective learning process, learning media can be utilized in delivering material, because learning media is one of the means that can be used to improve learning in the classroom (Wulandari et al., 2023; Wahid, 2018).

Based on the results of observations and interviews conducted with the homeroom teachers of grade IV in elementary schools in the Patih Jelantik Cluster Three, it was found that there were still students who were less active in the learning process in class, especially in terms of reading engagement, and the lack of use of learning media in the classroom causes students to feel bored with the learning process being carried out. On average, schools more often use the learning process with the lecture method, so that the lack of student enthusiasm to follow learning in the classroom is caused by monotonous learning.

Based on the interview, it was also conveyed that on average schools have facilities and infrastructure that already support the use of digital learning media. On average schools already have chromebooks and LCDs, but these devices are more often used during ANBK. This problem is a point that causes low cultural literacy and reading engagement of students in class IV of the Jelantik Patih Tiga cluster. Therefore, a document study was conducted on the cultural literacy and reading engagement of students, which can be seen from filling out the questionnaire and tests of class IV students. This was done to support the results of observations that had been carried out in the Jelantik Patih Tiga Cluster. The test results of class IV students in the Jelantik Patih Cluster can be presented in Table 1 and Table 2.

Table 1. The Results of the Cultural Literacy Ability Test of Grade IV Students of Group Three, Patih Jelantik

School Name	Class	KKM	Number of Students	Students who Achieving KKM		Students Who Have Not Achieving KKM	
				Student	%	Student	KKM
Public Elementary School 2 Menyali	IV	72	17	4	23.50%	13	76.50%
State Elementary School 3 Menyali	IV	72	24	8	33.30%	16	66.70%
Sawan 2nd State Elementary School	IV	72	20	6	30%	14	70%

School Name	Class	KKM	Number of Students	Students who Achieving KKM		Students Who Have Not Achieving KKM	
				Student	%	Student	KKM
Sawan 3rd State Elementary School	IV	72	9	5	55.60%	4	44.40%
Average			70	23	32.90%	47	67.10%

Table 2. The Questionnaire Results Reading Engagement Students of Class IV Group Three of Patih Jelantik

School Name	Class/ Number of Students	Category			
		Very Often	Often	Seldom	Never
Public Elementary School 2 Menyali	IV/17 Students	3	3	4	6
State Elementary School 3 Menyali	IV/24 Students	5	7	6	6
Sawan 2nd State Elementary School	IV/20 Students	4	7	4	5
Sawan 3rd State Elementary School	IV/9 Students	1	3	2	3
Percentage		47.1%		52.9%	

Referring to [Table 1](#), most of the cultural literacy ability tests of grade IV students in learning Balinese cultural diversity material are still relatively low with a percentage of 67.1% of students not reaching the minimum score. Not only that, the results of the questionnaire related to reading engagement shown in [Table 2](#) also show less than satisfactory results, which are known that the average number of students in the low category reaches 52.9%, which means that students' reading engagement in the learning process is still very low. One of the things that can be done to improve students' reading engagement in the learning process is to provide varied learning activities. One of the learning processes that can be used by teachers is metacognitive-based learning. Learning with metacognitive strategies can direct students to understand how to learn, understand their abilities and learning modalities, and understand the best learning strategies for effective learning ([Soimbala & Mulyatna, 2019](#); [Khoiriah, 2015](#)). In order to support the success of the metacognitive learning process, it is necessary to have learning media that can support the learning process, such as digital media. With the existence of digital media, the learning process in the classroom will be the right learning process.

The right learning process will help students be enthusiastic in the ongoing learning. Therefore, changing the monotonous learning process into metacognitive learning with the help of appropriate, innovative, and creative learning media in the learning process can be the right solution. Learning media is defined as a means to convey information or messages in the learning process ([Anshori, 2018](#); [Istiqlal, 2018](#)). Learning media plays an important role in supporting the learning process ([Dewantara et al., 2021](#); [Nur & Wathon, 2018](#)). The use of learning media in the learning process can arouse new desires and interests for students. Learning media is not only a tool to convey messages, but also as a stimulus to stimulate students' thoughts and learning motivation ([Nurhidayati et al., 2023](#); [Rahma, 2019](#)). Learning media can simplify problems, especially in conveying things that are new and foreign to students ([Magdalena et al., 2021](#); [Supriyono, 2018](#)). One of the media that will be developed is augmented reality-based learning comics to improve students' cultural literacy and reading engagement skills. This research is relevant to be conducted because there are already several experts who have conducted similar research. Digital comic learning media is very effective for elementary school students ([Juneli et al., 2022](#); [Kibtiyah, 2022](#); [Meirisa, 2022](#)). Several other studies have also developed augmented reality-based media that are practical and superior for use ([Oktaviana & Jasril, 2023](#); [Wibowo et al., 2022](#)). The storyline in the comic and the available images can attract the attention of students or readers ([Wibowo & Koeswanti, 2021](#); [Maghfirah & Herowati, 2017](#)).

Based on the description that has been presented, it is deemed necessary to develop media that can support the learning process in order to improve students' cultural literacy skills and reading engagement in the learning process in the classroom. Therefore, this study aims to develop Augmented Reality (AR)-based learning comic media that highlight Balinese cultural diversity, with a focus on metacognitive learning to improve students' cultural literacy and reading engagement. The media developed is a comic media combined with sophisticated Augmented Reality technology. The AR innovation in this comic is in the form of animated videos containing material related to the culture in Bali, especially in Buleleng Regency. With discussion topics related to culture accompanied by animated videos containing cultural content, it is hoped that students' cultural literacy skills and reading engagement will increase.

2. METHOD

This research is a research on the development of learning comic media based on augmented reality of Balinese cultural diversity for grade IV Elementary Schools. Based on this, the learning method used in this development research is the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). The stages in the ADDIE method have a systematic process so that they can produce products that are ready to use and meet the product development testing standards (Mukti, 2019; Sugihartini & Yudianta, 2018). This research model is used because this research model is most appropriate for the research conducted, which is a development research, so ADDIE is very appropriate for this research. In the ADDIE model there are steps that will be passed. The first stage is analysis with 3 points that need to be analyzed, according to the problems found. The first point is an analysis of needs related to students in the learning process in the classroom, which was conducted on Saturday, April 22, 2024. Based on the results of an interview with Mrs. Meli Udayana as a class IV teacher at SD Negeri 2 Menyali, which showed that the learning process had not used learning media to support the teaching and learning process, so that students' interest in learning was reduced. Therefore, SD Negeri 2 Menyali still needs learning media in order to attract students' attention in the learning process, and make it easier for teachers to provide material.

The second point is that SD Negeri 2 Menyali uses 2 curricula, namely the independent curriculum and the 2013 curriculum. For grade IV in the school using the independent curriculum. The third point, media analysis is used by analyzing, giving questionnaires and collecting references related to AR media that is to be developed in order to have a clear purpose. The second stage is the design stage. The design stage in this study begins with determining the material to be used, namely the Social and Cultural Diversity material in the *Pancasila* Education content, and making designs according to student competencies. Furthermore, the design stage of the form of media to be developed is AR-based learning comic media. After that, a consultation was carried out with the supervising lecturer to get constructive input and suggestions that would later become a reference for improving the media.

Next is the development stage, namely the media begins to be developed and conducts validity tests together with material experts, media experts, instructional design experts and practitioners. After the development stage is complete, it is continued with the implementation stage, namely the media will be implemented to students, and effectiveness tests will be conducted together with students. In addition, during the implementation of each stage, it is always accompanied by an evaluation to ensure continuous improvement. The subject of this study is AR-based learning comic media on *Pancasila* Education material. Meanwhile, the object of this study is the validity, practicality, and effectiveness of AR-based learning comic media on Balinese cultural diversity. This development research uses a one group pretest-posttest design. The use of design will find out more accurately the results of the treatment given, because a comparison will be made between before the treatment was given (treatment) and after the treatment was given (treatment). This stage will be carried out by giving a pretest which is then continued with the provision of a posttest. The method of data collection and effectiveness uses a questionnaire sheet containing several statements that have been made. The instrument grid used can be presented in Table 3, Table 4, Table 5, Table 6, Table 7, and Table 8.

Table 3. The Media Expert Instrument Grid

Component	Indicator	Item Number	Number of Items
Text	Conformity of text type and size.	1	1
	Clarity of text in each dialogue.	2	1
	Match the color of the text to the background comic writing and images.	3	1
Picture	Clarity of 2D images in AR media.	4	1
	Image creativity.	5	1
	The accuracy of the images supports the dialogue discussed.	6	1
	The suitability of comic media image placement.	7	1
Animation	Animation quality in AR media.	8	1
	Suitability of the animation used.	9	1
Video	Video quality on animated videos.	10	1
	Clarity of sound on video.	11	1
	Suitability of the video to the learning material.	12	1
	The attractiveness of the video used.	13	1
Audio	Suitability of music and sound effects used.	14	1
Number of Items			14

Table 4. The Instructional Design Expert Instrument Grid

Component	Indicator	Item Number	Number of Items
Accuracy	Suitability of media to learning objectives.	1	1
	Suitability of the material to learning objectives.	2	1
	Packaging the material in a sequential manner.	3	1
Clarity	The language used.	4	1
	Clarity of description and discussion.	5	1
	Clarity of content provided.	6	1
Impact on students	Makes it easier to understand the material.	7	1
Number of Items			7

Table 5. The Material Expert Instrument Grid

Component	Indicator	Item Number	Number of Items
Design learning	Suitability of the material presented with learning indicators.	1, 2	2
	Suitability of the material concept to the media used.	3, 4	2
	Depth and completeness of the material.	5, 6	2
	Ease of understanding the material.	7, 8	2
	Systematic, coherent, logical and clear flow	9, 10	2
Number of Items			10

Table 6. The Student Response Instrument Grid

Component	Indicator	Item Number	Number of Items
AR-based learning comic display	AR-based comic display Overall .	1	1
	Writing in the media.	2	1
	Images in comics.	3	1
	Animation in video.	4	1
	The sound in the animated video is in harmony with the background sound.	5	1
	Color display in media.	6	1
The quality of the content of the material educational comics AR based	Materials are appropriate to the surrounding environment.	7	1
	Comic Operation	Ease of using media.	8
AR based learning	Repeated use.	9	1
Number of Items			9

Table 7. The Cultural Literacy Instrument Grid

Component	Indicator	Item Number	Number of Items
Accepting and appreciating culture	Love for products from local culture.	1	1
	Knowing the surrounding culture.	2	1
Care about cultural components	Interest in studying Culture.	3	1
	Interest in preserving local culture	4	1
Able to appreciate and understand cultural diversity	Interest in promoting products local culture.	5	1
Number of Items			5

Table 8. The Instrument Grid Reading Engagement

Component	Indicator	Item Number	Number of Items
Reading frequency	The amount of time per day spent reading.	1	1
Reading variations	Reading frequency in one week.	2	1
Interaction with reading content	Recognizing the many types of books read by students.	3	1
Motivation to read	Acknowledge participation in reading forum discussions.	4	1
Emotional responses to reading	Recognizing students' reading purposes.	5	1
	Recognizing who the students' reading sources are.	6	1
	Recognizing the level of student satisfaction in reading books.	7	1
	Recognize feelings experienced during or after reading a book.	8	1
Number of Items			8

The validity of the content of the effectiveness test instrument was tested by 4 experts (judges). The analysis of the validity of the content of the questionnaire instrument was tested using the CVR formula. After the instrument was suitable for use for data collection, it was continued with data collection in the field. The data that had been obtained was analyzed using quantitative data.

3. RESULT AND DISCUSSION

Result

This development research produces AR-based learning comic media for Balinese cultural diversity. This development research goes through 5 stages, namely analysis, design, development, implementation, and evaluation. The first stage is analysis, which is carried out in class 4 of schools located in the three Patih Jelantik clusters consisting of student needs analysis, curriculum analysis and analysis related to the AR media to be developed. The results of the analysis carried out showed that class 4 students who had very low science literacy skills, namely only 32.9% of students achieved KKM and 67.1% of students did not achieve KKM. In addition, in reading engagement it is known that the average student is in the low category with 52.9% of students being inactive in class.

The second stage is design. At this stage, researchers began to design AR-based learning comic media. This learning comic will be in a concrete form combined with digital media in the form of audio visuals. In this comic, there will be an animated video of Balinese cultural diversity material. The video in the comic will appear when students scan the image provided in the comic, so that students can learn and learn about several Balinese cultures, especially those in Buleleng Regency. The creation of this media combines the Canva application for content creation, Capcut for video editing, and Assembler Edu as an AR development website in the comic. Some parts of the results of the AR-based learning comic media design can be seen in [Figure 1](#).

The third stage is development, which at this stage in addition to developing the media completely, is continued with product validity testing together with material experts, constructional design, and media. Validity testing will be carried out by filling out the validation sheet and product practicality sheet. The results of media validity can be seen in [Table 9](#), [Table 10](#), and [Table 11](#).

Based on the results of the media content validity test together with experts, it is known that the results of the material expert test reached 0.95 with high validity criteria, the results of the instructional design test reached a score of 0.94 with a high validity category, and the results of the media expert validity test reached a score of 0.96 with high validity criteria. And the practicality test carried out with grade IV students at SD Negeri 4 Menyali reached a score of 94% with a very good category.



Figure 1. AR-Based Learning Comic Media Design

Table 9. The Material Expert Validity Results

Item	Expert				S1	S2	S3	S4	Σs	V	Note
	I	II	III	IV							
Items 1-10	39	37	40	38	29	27	30	28	114	0.95	Tall

Table 10. The Instructional Design Expert Validity Results

Item	Expert				S1	S2	S3	S4	Σs	V	Note
	I	II	III	IV							
Items 1-7	26	27	28	26	19	20	21	19	79	0.94	Tall

Table 11. The Media Expert Validity Results

Item	Expert				S1	S2	S3	S4	Σs	V	Note
	I	II	III	IV							
Items 1-14	55	52	56	54	41	38	42	40	161	0.96	Tall

The fourth stage is the implementation carried out by implementing the media carried out to grade IV students at SD Negeri 2 Menyali. Not only using media, at this stage the media effectiveness test was carried out starting with the pretest and posttest. The effectiveness test was carried out using the t-test with the help of the SPSS application. The results of the effectiveness test can be presented in Table 12, Table 13, Table 14, Table 15, Table 16 and Table 17.

Table 12. The Results of Cultural Literacy Normality Test

	Kolmogorov-Smirnov			Shapiro Wilk		
	Statistics	Df	Sig.	Statistics	df	Sig.
Cultural Literacy Pretest	0.176	17	0.167	0.948	17	0.425
Cultural Literacy Posttest	0.243	17	0.009	0.904	17	0.079

Table 13. The Reading Engagement Normality Test Results

	Kolmogorov-Smirnova			Shapiro Wilk		
	Statistics	Df	Sig.	Statistics	df	Sig.
Reading Engagement Pretest	0.151	17	0.200	0.923	17	0.169
Posttest Reading Engagement	0.197	17	0.077	0.923	17	0.168

Table 14. The Results of Cultural Literacy Homogeneity Test

		Levene Statistics	df1	df2	Sig.
Cultural Literacy Combined Score	Based on Mean	1.949	1	32	0.172
	Based on Median	1.675	1	32	0.205
	Based on Median and with adjusted df	1.675	1	28.651	0.206
	Based on trimmed mean	1.962	1	32	0.171

Table 15. Results of Cultural Literacy Homogeneity Test

		Levene Statistics	df1	df2	Sig.
Reading Engagement	Based on Mean	0.037	1	32	0.849
Composite Score	Based on Median	0.033	1	32	0.858
	Based on Median and with adjusted df	0.033	1	29.212	0.858
	Based on trimmed mean	0.037	1	32	0.849

Table 16.The Cultural Literacy t-test Results

	Paired Samples Test						Significance			
	Paired Differences					t	df	One-Sided p	Two-Sided p	
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference						
Lower	Upper									
Pair 1	Before treatment - After treatment	-9.706	2.085	0.506	-10.778	-8.634	-19.197	16	<0.001	<0.001

Table 17. t-test Results Reading Engagement

	Paired Samples Test						Significance			
	Paired Differences					t	df	One-Sided p	Two-Sided p	
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference						
Lower	Upper									
Pair 1	Before treatment - After treatment	-12.353	1.902	0.461	-13.331	-11.375	-26.778	16	<0.001	<0.001

Based on the data in Table 16, the sig. value (2-tailed) displayed in the table Two Sided shows <0.001. This shows that the F_{count} value $> F_{table}$ so that it can be concluded that H_0 is rejected and H_1 is accepted. Therefore, there is a significant difference in Cultural Literacy of fourth grade elementary school students before and after participating in *Pancasila* Education learning using AR-Based Learning Comics of Balinese Cultural Diversity. In addition, based on the data obtained, the sig. (2-tailed) value displayed in the Two-Sided table shows <0.001. This shows that the F_{count} value $> F_{table}$ so that it can be concluded that H_0 is rejected and H_1 is accepted. Therefore, there is a significant difference in Reading Engagement of fourth grade elementary school students before and after participating in *Pancasila* Education learning using AR-Based Learning Comics of Balinese Cultural Diversity. Based on these results, it can be concluded that the use of AR-based learning comic media is effective in improving the science process skills of fourth grade elementary school students.

Discussion

This community service research aims to produce educational comic media. This educational comic is certainly different from the previously existing educational comics. This educational comic media was developed by combining it with sophisticated AR technology. This media is very suitable for fourth grade students because this media contains cultural diversity material that is in accordance with the student's material in class. The development of this media began with analyzing the needs of class students at school, then the media was developed according to the characteristics of the students.

The media that has been developed is then evaluated by measuring the level of validity, practicality and effectiveness of the media using a questionnaire instrument. The content test of the effectiveness instrument was tested by 4 experts using the CVR formula to process data. And the media content test used the Aiken validity formula. Based on the results of the media content validity test together with the experts, it is known that the results of the material expert test reached 0.95 with high validity criteria, the results of the instructional design test reached a score of 0.94 with a high validity category, and the results of the media expert validity test reached a score of 0.96 with high validity criteria. And the practicality test carried out with grade IV students at SD Negeri 4 Menyali reached a score of 94% with a very good category. This shows that the content of the AR-based learning comic media in terms of material, design and media is very interesting and is expected to attract students' interest.

The material is presented in a concise, clear and easy-to-understand format. In addition, this learning comic media includes videos that can be accessed using sophisticated AR technology. This is in line with previous research that developed augmented reality (AR) learning media for learning in elementary schools (Usmaedi et al., 2020; Mukti, 2019). The results of the two previous studies showed that the AR media developed was feasible and easy to use. The difference between the development research conducted by the researcher and this study is that the media developed by the researcher is in the form of a comic book that can be scanned with the help of augmented reality, while the previous study developed an augmented reality-based application.

After the validation process has been carried out with experts, a practicality test was then carried out with fourth grade students at SD Negeri 2 Menyali. The assessment results of 17 students as media users showed a practicality score of 93.62% with a very good predicate. After going through the validity and practicality tests and making improvements to the AR-based learning comic media, an effectiveness test was then carried out on fourth grade students at SD Negeri 2 Menyali. The effectiveness test was carried out using a questionnaire sheet related to Cultural literacy and student reading engagement in class.

After conducting the effectiveness test, then the student questionnaire sheet will be assessed using the correlated t-test technique assisted by the SPSS application. The results of the analysis show that the results of students' cultural literacy in sig. (2-tailed) are shown in the Two-Sided table, where the resulting figure shows <0.001 . This shows the $F_{\text{count value}} > F_{\text{table}}$ so that it can be concluded that H_0 is rejected and H_1 is accepted. So there is a significant difference in the Cultural Literacy of grade IV elementary school students before and after participating in *Pancasila* Education learning using AR-Based Learning Comics on Balinese Cultural Diversity.

Meanwhile, the results reading engagement students in sig.(2-tailed) is shown in the Two-Sided table, where the resulting figure shows <0.001 . This shows the $F_{\text{count value}} > F_{\text{table}}$ so that it can be concluded that H_0 is rejected and H_1 is accepted. So there is a significant difference in the Reading Engagement of grade IV elementary school students before and after participating in *Pancasila* Education learning using AR-Based Learning Comics Balinese Cultural Diversity. Based on these results, it can be concluded that the use of AR-based learning comic media is effective in improving the science process skills of grade IV elementary school students.

This AR-based learning comic media for grade IV elementary school students combines concrete media and digital media so that it is interesting for students. Media that is only A5 in size and not heavy will make it easier for students to carry this media anywhere, and is studied both at school and at home. When this AR-based learning comic media is implemented, not only students will feel the impact of learning, but teachers will also feel the impact.

The impact felt by students is that AR-based learning comic media can help them in the learning process, make them more active, facilitate understanding of the material, and optimize the acquisition of cultural skills. In addition, this media increases reading involvement (reading engagement) and attract students' interest in participating in learning because of its more interesting presentation. For teachers, AR-based learning comic media can help teachers in delivering learning materials in different ways and make the learning process more interesting, so that students are more enthusiastic and interested in participating in learning in the classroom.

AR-based comic media innovation proven effective in improving students' cultural literacy and reading engagement skills in grade IV. The results of this study can support the learning process and help teachers in delivering learning materials more interestingly and effectively, and can improve students' cultural literacy and reading engagement. This study has implications for increasing the availability of more diverse and technology-based learning media. The limitation of this study is that the development carried out only raises the diversity of Balinese culture, so it may not necessarily be applied relevantly in the context of other regional cultures. Thus, subsequent research can develop similar media with different cultures.

4. CONCLUSION

Overall, the results of this development research conclude that the use of AR-based learning comic media innovation in the classroom learning process has proven effective in improving cultural literacy and reading engagement skills of students in grade IV. This media is a combination of concrete media and digital media in which this media will be in the form of comics containing videos that can be scanned by students. The validity of the media, materials, and instructional design is considered very high, while the level of student response reaches a very good predicate. The results of the correlated t-test show high significance for both cultural literacy and reading engagement. This shows that AR-based learning comic media is able to improve cultural literacy and reading engagement of grade IV students in Elementary Schools.

5. REFERENCES

- Ainulmila, L. I., & Oktiningrum, W. (2021). Pengembangan Media Interaktif Powerpoint untuk Meningkatkan Literasi Budaya dan Kewargaan Di Sekolah Dasar. *Jurnal Pedagogik Pendidikan Dasar*, 8(2), 67–79. <https://doi.org/10.17509/jppd.v8i2.39441>.
- Akhyar, S. M., & Dewi, D. A. (2022). Pengajaran Pendidikan Pancasila Di Sekolah Dasar Guna Mempertahankan Ideologi Pancasila Di Era Globalisasi. *Jurnal Kewarganegaraan*, 6(1), 1541–1546. <https://doi.org/10.31316/jk.v6i1.2772>.
- Anshori, S. (2018). Pemanfaatan Teknologi Informasi Dan Komunikasi Sebagai Media Pembelajaran. *Civic-Culture: Jurnal Ilmu Pendidikan PKn Dan Sosial Budaya*, 2(1), 88–100. Retrieved from <https://core.ac.uk/download/pdf/297668739.pdf>.
- Dewantara, A. H., B, A., & Harnida, H. (2021). Kreativitas guru dalam memanfaatkan media berbasis IT ditinjau dari gaya belajar siswa. *AL-GURFAH: Journal of Primary Education*, 1(1), 15–28. Retrieved from <https://ejournal.iain-bone.ac.id/index.php/algurfah/article/view/1039>.
- Ho, E. S. C., & Lau, K. (2018). Reading engagement and reading literacy performance: effective policy and practices at home and in school. *Journal of Research in Reading*, 41(4). <https://doi.org/10.1111/1467-9817.12246>.
- Iskandar, M. F., Dewi, D. A., & Hayat, R. S. (2024). Pentingnya Literasi Budaya dalam Pendidikan Anak SD: Sebuah Kajian Literatur. *Indo-MathEdu Intellectuals Journal*, 5(1), 785–794. <https://doi.org/10.54373/imeij.v5i1.723>.
- Istiqlal, A. (2018). Manfaat media pembelajaran dalam proses belajar dan mengajar mahasiswa di perguruan tinggi. *Jurnal Kepemimpinan Dan Pengurusan Sekolah*, 3(2), 139–144. Retrieved from <https://ejournal.stkip-pessel.ac.id/index.php/kp/article/view/280>.
- Juneli, J. A., Sujana, A., & Julia, J. (2022). Pengembangan Media Pembelajaran Komik Digital Pada Penguasaan Konsep Peserta Didik Sd Kelas V. *Primary: Jurnal Pendidikan Guru Sekolah Dasar*, 11(4), 1093. <https://doi.org/10.33578/jpfkip.v11i4.9070>.
- Khoiriah, T. (2015). Strategi Pembelajaran Metakognitif Terhadap Hasil Belajar Siswa Pada Konsep Sistem Pencernaan Pada Manusia. *Urnal Pengajaran Matematika Dan Ilmu Pengetahuan Alam*, 20(2), 177–180. <https://doi.org/10.18269/jpmipa.v20i2.581>.
- Kibtiyah, A. M. (2022). Pengembangan Komik Digital Berbasis Flipbook Untuk Siswa Kelas V Sekolah Dasar di Kecamatan Pati Kabupaten Pati. *Jurnal Ilmiah Wahana Pendidikan*, 8(18), 57–65. <https://doi.org/10.5281/zenodo.7133944>.
- Magdalena, I., Shodikoh, A. F., Pebrianti, A. R., Jannah, A. W., & Susilawati, I. (2021). Pentingnya Media Pembelajaran Untuk Meningkatkan Minat Belajar Siswa SDN Meruya Selatan 06 Pagi. *EDISI : Jurnal Edukasi Dan Sains*, 3(2), 312–325. Retrieved from <https://ejournal.stitpn.ac.id/index.php/edisi/article/download/1373/958>.
- Maghfirah, F., & Herowati, H. (2017). Pengembangan media komik strip sains â€œ pemanasan Globalâ€œ untuk meningkatkan motivasi membaca siswa kelas VII SMPN 2 Sumenep. *LENSA (Lentera Sains): Jurnal Pendidikan IPA*, 7(2), 76–84. <https://doi.org/10.24929/lensa.v7i2.24>.
- Meirisa, S. (2022). Pengembangan Komik Sebagai Media Pembelajaran Tema Sehat Itu Penting di Kelas V Sekolah Dasar. *Jurnal Educatio FKIP UNMA*, 8(3), 800–807. <https://doi.org/10.31949/educatio.v8i3.2538>.
- Mukti, F. D. (2019). Pengembangan Media Pembelajaran Augmented Reality (AR) di Kelas V MI Wahid Hasyim. *Jurnal Pendidikan Teknologi Dan Kejuruan*, 13(2), 299–322. <https://doi.org/10.23887/jptk-undiksha.v13i2.8525>.
- Nur, L., & Wathon, A. (2018). Peran Media Pembelajaran Speaker Terhadap Minat Belajar Siswa. *Sistim Informasi Manajemen*, 1(1), 48–63. Retrieved from <https://oj.lapamu.com/index.php/sim/article/view/39>.
- Nur, R. A. P., Truvadi, L. A., Agustina, R. T., & Salam, I. F. B. (2023). Peran Pendidikan Pancasila dalam Membentuk Karakter Bangsa Indonesia: Tinjauan dan Implikasi. *ADVANCES in Social Humanities Research*, 1(4), 501–510. <https://doi.org/10.46799/adv.v1i4.54>.
- Nurhidayati, V., Ramadani, F., Melisa, F., & Putri, D. A. E. (2023). Penerapan media pembelajaran terhadap motivasi siswa. *Jurnal Binagogik*, 10(2), 99–106. Retrieved from <https://pdfs.semanticscholar.org/ecec/38c3173ce576f934c33b9702ca9921f668f0.pdf>.
- Oktaviana, R., & Jasril, I. R. (2023). Pengembangan Media Pembelajaran Menggunakan AR Assemblr Edu Pada Mata Pelajaran Penerapan Rangkaian Elektronika. *Jurnal Vocational Teknik Elektronika Dan Informatika*, 11(2), 178–186. Retrieved from <http://ejournal.unp.ac.id/index.php/voteknika>.
- Putri, P. Z. A., Dewi, K. D. S., Yudiantini, L. P. S., & Dewi, N. P. C. P. (2024). Pengembangan Perangkat Ajar Dengan Berbantuan Media Pembelajaran Interaktif Mata Pelajaran Pendidikan Pancasila Kelas V Sekolah Dasar. *Jurnal Pendidikan Ilmiah Transformatif*, 8(11). Retrieved from

- <https://oaj.jurnalhst.com/index.php/jpit/article/view/5853>.
- Rahma, F. I. (2019). Media Pembelajaran: kajian terhadap Langkah-langkah Pemilihan Media dan Implementasinya dalam Pembelajaran bagi Anak Sekolah Dasar. *Pancawahana: Jurnal Studi Islam*, 14(2), 87–99. Retrieved from <https://ejournal.kopertais4.or.id/tapalkuda/index.php/pwahana/article/view/3608>.
- Saepudin, E., Damayani, N. A., & Rusmana, A. (2018). Model literasi budaya masyarakat Tatar Karang di Kecamatan Cipatujah Kabupaten Tasikmalaya. *Berkala Ilmu Perpustakaan Dan Informasi*, 14(1), 1–10. <https://doi.org/10.22146/bip.33315>.
- Safitri, S., & Ramadan, Z. H. (2022). Implementasi Literasi Budaya dan Kewargaan di Sekolah Dasar. *Mimbar Ilmu*, 27(1), 109–116. <https://doi.org/10.23887/mi.v27i1.45034>.
- Sari, A. Y., & Suryandaru, A. R. (2023). Meningkatkan Budaya Literasi Membaca Anak Dan Penataan Sekolah Tkm Darul Hikmah Sedati-Sidoarjo. *Journal Community Service Consortium*, 3(1). <https://doi.org/10.37715/consortium.v3i1.3718>.
- Soinbala, H., & Mulyatna, F. (2019). Penerapan Strategi Pembelajaran Metakognitif Dalam Meningkatkan Pemahaman Konsep Matematika. *De Fermat: Jurnal Pendidikan Matematika*, 2(1), 46–56. <https://doi.org/10.36277/deferemat.v2i1.39>.
- Sugihartini, N., & Yudiana, K. (2018). ADDIE sebagai model pengembangan media instruksional edukatif (MIE) mata kuliah kurikulum dan pengajaran. *Jurnal Pendidikan Teknologi Dan Kejuruan*, 15(2). <https://doi.org/10.23887/jptk-undiksha.v15i2.14892>.
- Supriyono, S. (2018). Pentingnya media pembelajaran untuk meningkatkan minat belajar siswa SD. *Edustream: Jurnal Pendidikan Dasar*, 2(1), 43–48. <https://doi.org/10.26740/eds.v2n1.p43-48>.
- Usmaedi, Fatmawati, P. Y., & Karisman, A. (2020). Pengembangan media pembelajaran berbasis teknologi aplikasi augmented reality dalam meningkatkan proses pengajaran siswa sekolah dasar. *Jurnal Educatio FKIP UNMA*, 6(2), 489–499. <https://doi.org/10.31949/educatio.v6i2.595>.
- Wahid, A. (2018). Pentingnya Media Pembelajaran Dalam Meningkatkan Prestasi Belajar. *Istiqra: Jurnal Pendidikan Dan Pemikiran Islam*, 5(2). Retrieved from <https://www.jurnal.umpar.ac.id/index.php/istiqra/article/view/461>.
- Wibowo, S. A., & Koeswanti, H. D. (2021). Pengembangan Media Pembelajaran Berbasis Komik untuk Meningkatkan Karakter Kemandirian Belajar Siswa Sekolah Dasar. *Jurnal Basicedu*, 5(6), 5100–5111. <https://doi.org/10.31004/basicedu.v5i6.1600>.
- Wibowo, V. R., Putri, K. E., & Mukmin, B. A. (2022). Pengembangan Media Pembelajaran Berbasis Augmented Reality pada Materi Penggolongan Hewan Kelas V Sekolah Dasar. *PTK Jurnal Tindakan Kelas*, 3(1). <https://doi.org/10.53624/ptk.v3i1.119>.
- Wulandari, A. P., Salsabila, A. A., Cahyani, K., Nurazizah, T. S., & Ulfiah, Z. (2023). Pentingnya Media Pembelajaran dalam Proses Belajar Mengajar. *Journal on Education*, 5(2), 3928–3936. <https://doi.org/10.31004/joe.v5i2.1074>.
- Wulandari, S. (2020). Media Pembelajaran Interaktif Untuk Meningkatkan Minat Siswa Belajar Matematika Di SMP 1 Bukit Sundi. *Indonesian Journal of Technology, Informatics and Science (IJTIS)*, 1(2), 43–48. <https://doi.org/10.24176/ijtis.v1i2.4891>.