Development of KAREBU (cultural diversity card game) to enhance curiosity in fourth-grade elementary students

Etyka Rina Mahanani[1,A-D,F] (ID), Erif Ahdhianto[1*,A,D-F] (ID), Yohannes Kurniawan Barus[1,C,D,F] (ID)

[1] Primary School Teacher Education Study Program, Universitas Negeri Malang, Street of Semarang No. 5, 65145, Indonesia

*Corresponding author: Erif Ahdhianto; Primary School Teacher Education Study Program, Universitas Negeri Malang, Street of Semarang No. 5, 65145, Indonesia; email: erif.ahdhianto.fip@um.ac.id

ABSTRACT

Background: Learning media is one of the important components of education.

Objectives: The purpose of this research and development was to develop the KAREBU (Cultural Diversity Card) learning media to strengthen the curiosity character of fourth-grade students in the subject of Natural and Social Sciences with local cultural diversity material that is valid, practical, and effective.

Methods: Using the ADDIE model (Analysis, Design, Development, Implementation, Evaluation), this study developed KAREBU cards integrated with augmented reality (AR) technology. This research instrument is in the form of interviews, observations, and questionnaires given to instrument experts, material experts, media experts, and users, including teachers and students. Data collection stages were carried out through observation, interviews, needs questionnaires, validation questionnaires, practicality questionnaires, and curiosity questionnaires before and after using the media.

Results: The results showed that the KAREBU learning media met the valid, practical, and effective criteria. KAREBU media received a validity score from material experts of 3.72 with a valid category, a score from media experts of 4.91 with a very valid category, and a score from users of 4.73 with a very valid category. The KAREBU learning media received a practicality score from teachers of 4.49 with a convenient category and a practicality score from students of 98.5% with a convenient category. The level of media effectiveness in strengthening students' curiosity was obtained from the results of the questionnaire before and after using the media, which was calculated using the N-Gain Score test with a value of 0.76 and high effectiveness criteria.

Conclusions: Therefore, it was concluded that the KAREBU learning media effectively strengthens students' curiosity. Further studies could explore the long-term impacts of KAREBU on cross-cultural empathy.

Keywords: card, cultural diversity, curiosity, elementary students, instructional media.

INTRODUCTION

Learning cannot be separated from its various components. Learning is considered ideal when it encompasses all the necessary content and components. Learning is an activity created as a joint effort between teachers and students to achieve specific experiences or skills (Arfani, 2016). The occurrence of a learning process is indeed based on many factors, including curiosity. Curiosity is the desire to seek out or obtain specific information from the learning process, development, and lifelong adaptation (Raharja, Wibhawa, & Lukas, 2018). This curiosity can motivate individuals to continually seek new information, leading to increased knowledge and learning experiences. A high level of curiosity will provide a deeper learning experience for students (Rohmah et al., 2022). The significance of having a curious nature for students aligns with Trisna et al. (2023) view that curiosity can prevent students from becoming bored during learning because it guides them to remain active in exploring and studying more deeply (Stephani & Yolanda, 2021).

Learning cannot be separated from many components, such as teachers, students, facilities, materials, methods, media, and evaluation (Damayanti & Perdana, 2020). One crucial element of educational media that significantly influences the learning process. Media is a tool that facilitates the effective and efficient achievement of learning objectives (Nurfadhilah, 2021). Good learning media during lessons helps students comprehend the material more effectively. Good media should motivate students to learn, so applying engaging and appropriate learning media according to students' needs will foster high learning enthusiasm, making learning more meaningful. Media use in learning is important, as it aligns with Piaget's opinion that elementary school children are in the operational stage, where they can reason logically and concretely but still struggle with abstract concepts (Imanulhaq & Ichsan, 2022). Thus, using learning media can help improve understanding and attract students' attention to learning.

The existing learning process is not yet ideal, partly due to the lack of available learning components, specifically learning media. This issue is also present in the subject of Natural and Social Sciences (IPAS), particularly in the Social Studies subtopic. The deficiency in learning media used to explain Social Studies material has led to a lack of interest among students in this subject (Giwangsa, 2021). This problem aligns with findings at Public Elementary School 1 Sentul, where revealed limitations in using learning media. Material delivery relies solely on teacher and student handbooks, with the content being presented directly by the teacher. This approach has resulted in students' limited ability to explore knowledge, reducing their curiosity and willingness to ask questions and diminishing their interest in the subject matter. The lack of learning media makes lessons less engaging and causes students to become bored. Therefore, IPAS learning, particularly the Social Studies subtopic at Public Elementary School 1 Sentul, requires learning media that can stimulate students' curiosity. Appropriate learning media is needed to effectively explain the content for the local cultural diversity material in East Java Province.

Based on these issues, innovation in learning media is used to stimulate students' curiosity during lessons. Learning media in the form of games can attract students' interest in learning, thus stimulating them to seek information or answers, indirectly fostering their curiosity (Sahira & Suryanti, 2023). Learning media in form cards are chosen because they can be used as games, making students active in the learning process. This aligns with research by Prasetyaningtyas (2020), which found that

implementing learning methods using quartet card games effectively increased student engagement during lessons. This card media also has several advantages, such as being easy to carry, store, and create. Using learning media in the form of card games supported by presentation material in images provided through Assemblr edu, which is accessed via QR code, is an innovation linking technology and offering a new learning experience for students. Based on Puspitasari, Khotimah, & Ahdhianto (2022), using a QR Code is attractive and suitable for innovative learning media in this era of technological development because students can directly adapt to technology. This view is supported by research by Nina et al. (2023) on augmented reality-based flashcards for fourth-grade students to improve critical thinking skills. The results showed that these media were valid and effective for delivering material to students. Similarly, research by Rizky & Abdul (2018) titled "Development of Nusantara Card Media for Social Studies Learning in Fourth Grade on the Topic of Ethnic and Cultural Diversity" found that learning media in the form of card games effectively influenced students' curiosity. Based on previous research, card media can be used to deliver material and as a game to increase student engagement during lessons. From the review of the issues conducted, the researcher aims to develop a product titled "Development of KAREBU (Cultural Diversity Card) with a Content of Curiosity for the Cultural Diversity Material of East Java Province in Fourth Grade at Elementary School."

To position this study within the global education agenda, we emphasize how KAREBU, with its unique features, aligns with UNESCO's Sustainable Development Goal 4.7 (SDG 4.7), which advocates "education that promotes intercultural understanding and global citizenship" (UNESCO, 2021). While previous research on cultural diversity cards (e.g., Kartu Nusantara; Rohmah, Nuraini, & Linguistika, 2022) focused on the local Indonesian context, KAREBU integrates augmented reality (AR) technology-a novel approach that bridges traditional pedagogy with digital literacy. This addresses a critical gap in the implementation of SDG 4.7, especially in resource-constrained areas where AR-enhanced media is still under-explored (Qian & Clark, 2016).

Unlike cultural card games (e.g., Kartu Nusantara), KAREBU introduces three innovations that actively engage students. First is the Hybrid Learning Design: Combining physical cards with AR-enabled QR codes (via Assemblr Edu) to present 3D cultural artifacts, enhancing multisensory engagement (Rahman, Faisal, & Tho, 2023). The second is Curiosity-Driven Mechanics: Cards embed 'question clues' that require students to actively seek answers through the AR interface, operationalizing curiosity as a measurable outcome (Raharja et al., 2018). Third is cultural specificity, which focuses on the diversity of East Java, providing local content that is not present in generic tools while maintaining scalability for other regions.

This dual emphasis on technology integration and culturally grounded design sets KAREBU apart from previous media and offers a practical and scalable model for 21st-century global citizenship education, providing a sense of reassurance and confidence to educators, researchers, and stakeholders.

METHODS

Study Design and Participants

This research and development type is RnD uses the ADDIE model, which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation (Cahyadi, 2019). The ADDIE model is chosen because it has systematic steps. Data in this study include interviews, observations, and questionnaires. Interviews for gathering data are used for preliminary studies to identify issues to be researched and to gain deeper insights from respondents, usually conducted face-to-face (Sugiyono, 2018; Azis et al., 2020). Observations involve direct activities using the senses to gather necessary information (Maharani & Suniasih, 2022). Meanwhile, questionnaires are a data collection technique consisting of several questions and statements given to respondents to be filled out for research purposes (Arikunto, 2018).

Ethical approval statement

Formal Ethical Clearance This study was not reviewed by an institutional ethics committee because it was considered minimal risk and low-impact educational development research. However, the principle, teachers and guardians of involving students gave all the consent for the study. The participation was voluntary and all participants were explained about the study. The data was collected and processed anonymously and ethically in manner that protects the confediality and privacy of the participants.

Research Instruments

Interviews, observations, and needs assessment questionnaires are initial steps to identify potentials and problems. Subsequently, validity, practicality (response), and curiosity questionnaires are used to assess the effectiveness of the developed product. Through validity questionnaires, material experts, media experts, and users evaluate this media product's validity. The practicality of the learning media product is assessed by providing practicality questionnaires to users, including teachers and students. The validation results from experts and users serve as the basis for developing this media product. The procedure for collecting validation data from experts and users and the practicality response data from teachers uses a Likert scale of 1-5 with validity and practicality criteria (Sukardjo, 2012). This category uses questionary instrument validation, material validation, media validation, and the teacher as a user. The following criteria are used to determine the feasibility of the media (Sholeha, 2021). By employing the ADDIE model, this research systematically addresses the development and implementation of effective learning media, ensuring the final product meets educators' and students' needs and expectations.

Table 1. Media and Category Eligibility Criteria

Score Interval	Category
$X > 4{,}21$	Very good
$3{,}40 < X \leq 4{,}21$	Good
$2{,}60 < X \leq 3{,}40$	Currently
$1{,}79 < X \leq 2{,}60$	Low
$X \leq 1{,}79$	Very low

Data Analysis

The data obtained is analyzed using descriptive statistical data analysis techniques using Likert scale measurements.

Table 2. Rating Scale for Positive Statement

No	Category	Answer	Positive Score
1.	Strongly Agree	A	4
2.	Agree	B	3
3.	Doubtful	C	2
4.	Disagree	D	1

The table of feasibility criteria includes validation result conducted by material experts, media experts, and users, as well as the questionnaire response data from teachers as users. The assessment category is based on the questionnaire answers processed using the following formula:

$$X = \frac{\sum X}{n}$$

Explanation:

X = Average score

$\sum X$ = Total score

n = Number of aspects assessed

The student response results are processed using the Guttman scale with "yes" and "no" answer options. The Guttman scale is chosen to make it easier for students to determine their answers. The feasibility criteria on the Guttman scale are presented as a percentage. The following is the percentage criteria for student practicality used (Sugiyono, 2018).

Table 3. Particully Criteria

Percentage	Criteria
81 - 100%	Very Practical
61 - 80%	Practical
41 - 60%	Fair Practical
21 - 40%	Less Practical
0 - 20%	Not Practicial

The effectiveness of this media product was obtained from the results of a student curiosity questionnaire before and after using KAREBU media products. The questionnaire used is by the character indicators of curiosity and includes positive and negative statement items. Calculating positive and negative items uses the Guttman Scale with four scale criteria.

Table 4. Curiosity Questionnaire Grid

Variable		Indicator	Statement Items	
			Positive	Negative
	1.	Ask teachers or friends about lesson material	1, 2	4
	2.	Read and discuss sources outside the textbook according to the material	7, 10,	14
Curiosity	3.	Enthusiastic in the process of finding answers	6, 13	15
	4.	Ask each step of the activity	5	3
	5.	Demonstrate listening, speaking, reading and writing skills	9, 11, 12	8

This curiosity character questionnaire was given to students after and before using KAREBU learning media products. The results of the students' questionnaire

answers are given a score according to the statement items given. Positive score assessment starts from 4 to 1, and negative item assessment starts from 1 to 4. Information regarding the assessment criteria is explained in Table 5.

Table 5. Curiosity Questionnaire Scale

Criteria	Positive Item Score	Negative Item Score
SL (Always)	4	1
SR (Frequently)	3	2
JR (Rare)	2	3
TP (Never)	1	4

(Source: Sthephani & Yolanda, 2021)

The assessment of each item is based on the score weight; positive items get a high score range if the student always carries out the statement in the questionnaire, while negative items get a high score if the student never carries out activities according to the statement item. To see the results of the calculated questionnaire value, the curiosity questionnaire percentage calculation formula is used based on the opinion of Rukajat (2018).

$$P = \frac{F}{N} \; x \; 100\%$$

Information:
P = Percentage
F = The frequency of each response chosen by the respondent.
N = Total number of samples

The calculation results were then analyzed to specify the percentage of student curiosity. The criteria for student curiosity are presented in Table 6.

Table 6. Criteria for Curiosity Based on Quistionaires

Score Intervals	Criteria
X > 84 %	Very High
69% < X ≤ 84%	High
54% < X ≤ 69%	Moderate
39% < X ≤ 54%	Low
≤ 39 %	Very low

Then, the results of the questionnaires filled out by the students were calculated for their improvement using the N-Gain Score test. This effectiveness test involved 30 fourth-grade elementary school students. Here are the categories for N-Gain values (Nuriyah et al., 2022).

Tabel 7. N-Gain Category

N-Gain Score	Categori
N(g) < 0,3	Low
0,7 > N(g) ≥ 0,3	Moderate
N(g) ≥ 0,7	Tall

From the N-Gain scores, these values are classified according to each gain criterion and then converted into percentages. The categories for interpreting N-Gain effectiveness are shown in the following table (Sukarelawan et al., 2024).

Tabel 1. N-Gain Effectivenes Interpretation

Percentage (%)	Interpretation
≥ 76	Effective
56 – 75	Moderately Effective
40 – 55	Less Effective
< 40	Not Effective

RESULTS

The initial stage of this research involved conducting needs surveys, school observations, and interviews with teachers in related schools. The data for this research was collected at Public Elementary School 1 Sentul from the fourth-grade teachers and students. The result analysis questionnaire revealed that 93% of students had difficulty understanding cultural diversity topics in East Java, and all students needed the development of learning media for cultural diversity subjects in East Java Province. Interviews with teachers also indicated that the current teaching methods did not utilize learning media, which was reinforced by the needs analysis questionnaire showing that 90% of students felt bored during lessons. In the design stage, instructional media designs were created on Canva, and instruments were developed to test the developed media products' validity, practicality, and effectiveness. During the development phase, the media products were realized and validated by experts in instruments, subject matter, media, and users. This research resulted in the KAREBU instructional media product on cultural diversity topics in East Java Province, presented in the following Figure 1.
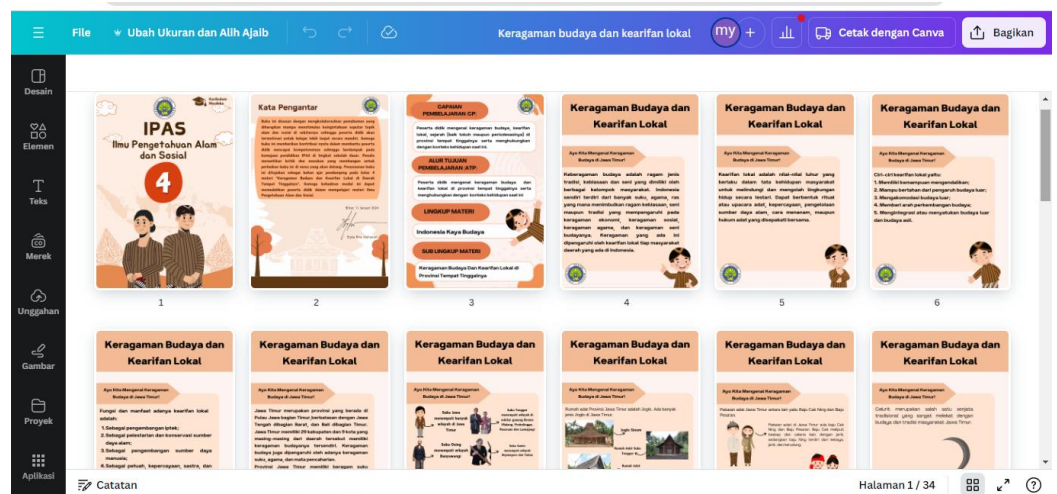

Figure 1. Material E-Book

This media is equipped with an e-book containing materials that will assist students in understanding cultural diversity topics in East Java. Additionally, cards containing question clues and answers are presented as images and text on the Assemblr Edu website.
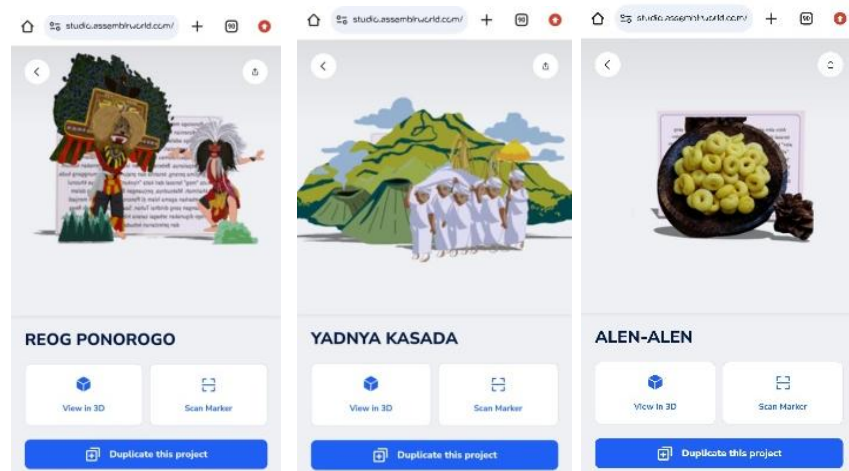

Figure 1. Scan Result AR in Assemblr Edu Website

Figure 2. KAREBU

The developed product was subsequently printed and validated by expert validators and users. After validation and assessment by subject matter experts, media specialists, and users, the validity results of the media product were obtained. These validity results are presented in Table 8.

Table 2. Validition Result

No	Validation	Value	Category
1.	Material expert	3,72	Good
2.	Media expert	4,91	Very Good
3.	User (teacher)	4,73	Very Good
	Rata-rata	**4,78**	**Very Good**

Based on Table 2, the validation results showed that KAREBU media met the criteria of excellent feasibility with an average score of 4.78. Material validators gave a score of 3.72 (good category), while media validators and users (teachers) gave scores above 4.5 (excellent category). This high consistency of assessment between validators indicates that the media is technically feasible and relevant to the classroom's learning needs. The difference in scores between material and media validators suggests a potential for improvement in the depth of content, while the design and usability aspects are already adequate. The validation results from each expert and user are presented as follows.

Table 3. Instrument Validation Result

Validation	Aspect	Score
Instrument expert	Instruction	18
	Contents	13
	Language accuracy	9
Total score		40
Value		4,44
Categori		**Very good**

Based on Table 3, the instrument validation score of 4.44 (outstanding category) indicates that the evaluation tool has met the eligibility standards. The instruction aspect received the highest score (18 points), followed by content completeness (13 points) and language accuracy (9 points). This confirms the research instrument's thoroughness in covering all the dimensions needed to measure media effectiveness. The result of material validation is written in Table 4.

Based on Table 4, with a score of 3.72 (good category), the material validation indicated that the East Javanese cultural content in KAREBU media is by the curriculum but requires improvement in the presentation of learning outcomes. Specifically, there is a need for a more explicit explanation of learning objectives in each material section to guide teachers' implementation. The material coverage score

(25 points), higher than the material content (16 points), implies that the structure is good, but the depth of content needs improvement.

Table 4. Material Validation Result

Validation	Aspect	Score
Material expert	Material coverage	25
	Material contents	16
Total score		41
Value		3,72
Categori		**Good**

Table 5. Media Validation Result

Validation	Aspect	Score
Media expert	Media	34
	Criteria, Function and Use of media	15
	Load of curiosity	10
Total score		59
Value		4,91
Categori		**Very good**

Based on Table 5, the media validator's near-perfect score (4.91) corroborates KAREBU's design excellence. The media aspect earned 34 points from components such as visual design and AR navigation, while media functionality earned 15 points. Noteworthy is the perfect score for the curiosity content (10 points), indicating that the media has effectively integrated elements that stimulate students' curiosity, providing reassurance about its effectiveness. The results of the validation by users are presented as follows.

Table 6. User Validation Result

Validation	Aspect	Score
User	Media	34
	Criteria, Function and Use of media	15
	Load of curiosity	10
	Material coverage	30
	Material contents	20
Total score		109
Value		4,73
Categori		**Very good**

Based on Table 6, the results from user validation indicate that the validity of the KAREBU learning media is excellent and can be used without revision. Moreover, the developed media introduces a new variation in learning that will enhance students' enthusiasm for learning.

At the implementation stage, it was conducted on both small and large scales. At this stage, the practicality and effectiveness of the developed media products were tested. Next, a practicality test is conducted to assess how practical the developed media product is in assisting students during learning. This practicality test is evaluated based on the response questionnaire results provided to the users, namely teachers and students. Results of the practicality test are presented in the following table. In the implementation stage, practicality and effectiveness tests of the media were conducted by users, and the evaluation phase funds were used to evaluate the results of the research and development efforts.

The evaluation of ADDIE development. During this evaluation stage, all the data obtained is analyzed. In this phase, validation results from subject matter experts, media experts, and student curiosity questionnaires before and after using

the media will also be used as evaluation material for the effectiveness of using the KAREBU learning media. Additionally, the character-strengthening questionnaire will be used to gauge students' curiosity. The final step of revising the learning media product will be carried out with this feedback. From the stages and series of processes involved in developing the learning media using the ADDIE development model, it is expected that the KAREBU learning media will be appropriate for use in the learning because it has undergone the entire development stages and has met the aspects of content validity, design, feasibility, practicality, and product effectiveness. The results of the product trials are presented in several tables according to the following criteria.

Table 7. Media Practically Result

No	User	Score	Categori
1.	Teacher	4,49	Very Good
2.	Student	98,5%	Very Good

From Table 7 above, the very high level of practicality from teachers (4.49) and students (98.5%) indicates that KAREBU is theoretically feasible and easily adopted in real classroom settings. The slightly lower scores of teachers than students may reflect teachers' consideration of aspects such as preparation time and integration with lesson plans. In contrast, the near-perfect scores reflect students' enthusiasm. Table 8 shows the students' results on the small-scale practicality test.

Table 8. Result of Student Small-Scale Partically Questionaire

Group	Aspect	Total Score of "Yes" answer
Small-Scale	Ease of Use of Media	100
	Media Attractivenes	
	Media Usefulness	
Percentage = 100/100 x 100%		100%
Describtion		Very Practical

Table 9. Result of Student Large-Scale Partically Questionaire

Group	Aspect	Total Score of "Yes" answer
Large-Scale	Ease of Use of Media	294
	Media Attractiveness	
	Media Usefulness	
Percentage = 294/300 x 100%		98%
Describtion		Very Practical

Based on Table 8 and Table 9, comparing the small (100% practicality) and large (98%) scale tests showed high consistency in students' acceptance of the media. The 2% difference may come from the variation in student characteristics in the larger group, but overall, it proves that KAREBU remains effective when implemented in various group sizes.

Based on Table 10 and Table 11, the increase in teachers' practicality score from 4.33 (small scale) to 4.66 (large scale) indicates that teachers are increasingly convinced of the media's usefulness after seeing a wider range of implementation. The attractiveness aspect of the media is consistently high (26-27 points). In comparison, the ease of use increased from 13 to 15 points, indicating that teachers feel more comfortable with the media after repeated usage experiences.

Effectiveness in developing this learning media product is used to assess how well the media can achieve the desired goals (Wira, 2021). The effectiveness of the developed media product is evaluated through a curiosity questionnaire given to

students before and after using the KAREBU media. The improvement in the effectiveness test results is measured using the N-Gain Score test, which determines the extent to which the media strengthens students' curiosity about the cultural diversity of East Java Province. The results of the effectiveness and N-Gain Score tests are presented in the following table.

Table 10. Result of Teacher Small-Scale Practicial

Indicator	Aspect	Score
Practically	Ease of Use of Media	13
	Media Attractivenes	27
	Media Usefulness	12
Total Score		52
Value		4,33
Category		Very Practical

Table 11. Result of Teacher Large-Scale Practicial

Indicator	Aspect	Score
Practically	Ease of Use of Media	15
	Media Attractivenesd	26
	Media Usefulness	15
Total Score		56
Value		4,66
Category		Very Practical

Table 12. Curiosity Quistionaire Result

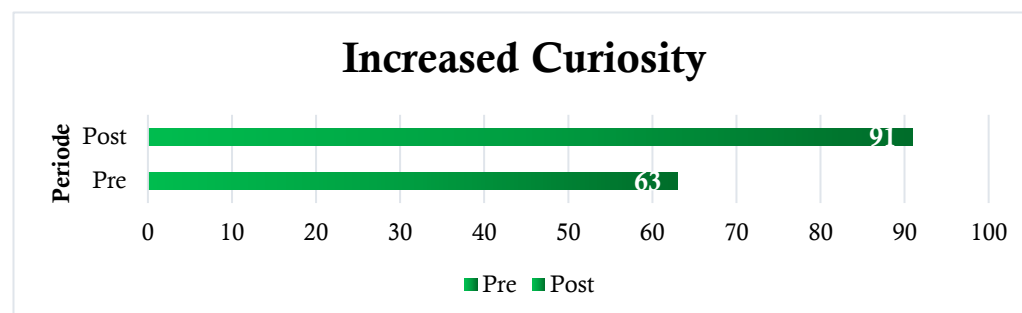| Data Type	Overall Answer (F)	Value (N)	Percentage (P)	Curiosity
Pre	1134	1800	63%	Moderate
Post	1648	1800	91%	Tall

Figure 4. Increased Curiosity

Based on Table 12, the significant increase from the moderate (63%) to very high (91%) category proves the positive impact of KAREBU on students' learning motivation. Figure 4 shows the 28% increase (63% → 91%), demonstrating the effectiveness of KAREBU. This substantial rise in student curiosity and engagement is genuinely intriguing. Curiosity is the desire to seek information about something one wants to learn through a method, namely by learning (Mardhiyana, 2017). An N-Gain test was conducted to determine how effective the KAREBU media product is in enhancing students' curiosity about the cultural diversity of East Java Province. The positive impact of KAREBU on student motivation is a promising sign of its potential in educational settings. The results of the N-Gain test for 30 students are presented in Table 13.

Based on Table 13, the n-Gain analysis showed that 73.3% of students (n=22) experienced high improvement (N-Gain ≥0.7), with an average of 0.82. Based on Figure 5, 73% of students (22/30) experienced significant improvement. The remaining students (26.7%) showed moderate improvement. The highest score was

achieved by APD and BPPW students (100%), while the lowest improvement remained in the moderate category (50%). This distribution indicates that KAREBU is effective for most students. However, it also suggests that a differentiated approach may be needed for slower-developing groups, highlighting the importance of our collective involvement in the decision-making process.

Table 13. N-Gain Score Result

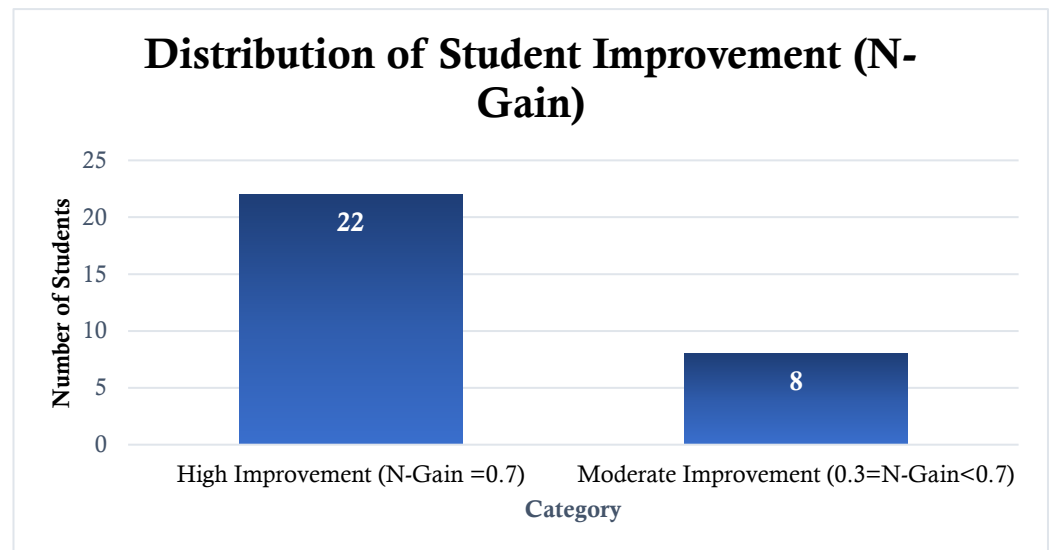| Category	Total number of students	% Students	Mean N-Gain
High Improvement (N-Gain ≥ 0.7)	22	73.3%	0.82
Moderate Improvement (0.3 ≤ N-Gain < 0.7)	8	26.7%	0.58
Total	**30**	**100%**	**0.76**

Figure 5. Distribution of Student Improvement (N-Gain)

DISCUSSION

The development of the KAREBU learning media using the ADDIE development model consists of analysis, Design, Development, Implementation, and Evaluation (Cahyadi, 2019). The ADDIE development model was chosen because it has systematic stages (Hidayat & Nizar, 2021) and is more suitable for developing products such as teaching materials, modules, learning models, strategies, and learning media (Putra, 2021). The developed KAREBU learning media has gone through validation by subject matter experts, media experts, and users. From the material validation results, there was a suggestion to write the learning achievements in the material book so that users can see the learning objectives contained within. In line with Wira's (2021) opinion, material validity testing aims to determine the accuracy and appropriateness of the learning material contained in the developed media. The media expert's results indicate that the developed media product is good but needs minor improvements, such as placing the developer's profile and uploading material to the flipbook. From the users' point of view, all aspects of media product validation are good. Users stated that the developed media product aligns with the learning objective of studying cultural diversity in East Java Province.

Additionally, using augmented reality presented in 3D, text (reading), and images on smartphones is an innovation in learning (Rahman et al., 2023). The results of the media practicality test obtained from user questionnaires, which included teachers

and students, were excellent. The results from large-scale and small-scale student responses indicated that the developed media product is efficient and can be used without revision. Students' responses to the use of KAREBU learning media included that they felt happy learning with KAREBU, the learning was fun and exciting, the clues given made students active in finding answers during the learning process, and the delivery of the material in the media was easy to grasp. This aligns with the constructivism theory, which recommends the active role of students, both physically and mentally, in the learning process (Masgumelar & Mustafa, 2021). The teacher response questionnaire stated that the developed media product is efficient because using KAREBU learning media is easy to carry out with a smartphone but requires teacher supervision.

Regarding the effectiveness of the media obtained from the student curiosity questionnaires before and after using the media product, it was found that the students' curiosity increased from moderate to high. The results of the N-Gain test also indicated that students' curiosity increased to a high level after using KAREBU media. In line with Solehudin et al.'s (2019) opinion, curiosity strongly encourages someone to continue exploring knowledge through direct or indirect learning. This indicates that using KAREBU media products effectively increases students' curiosity during the learning process.

Limitations of the study

While the study unequivocally demonstrates the power of KAREBU media in igniting students' curiosity, it is crucial to acknowledge certain limitations. The relatively brief intervention period (4 weeks) might not fully capture the long-term impact on cultural knowledge retention and curiosity development. Moreover, the reliance on AR technology via smartphones could pose challenges in schools with limited infrastructure or rural areas with inconsistent internet connectivity. Lastly, the study's focus on students in East Java necessitates further research to generalize the findings to other cultural contexts in Indonesia.

The findings of this study have significant practical implications for various stakeholders. KAREBU media offers an economical learning solution for teachers as it can be produced in printed format cheaply. At the same time, the AR feature is optional, so it can still be used in schools with limited facilities. This media can be integrated into social studies learning or extracurricular activities to enrich students' cultural understanding. For policymakers at the Ministry of Education, this study's results can be considered for developing guidelines for implementing culture-based media in the national curriculum, especially in areas with high ethnic diversity. In addition, teacher training in using AR technology for learning needs to be part of the professional development program. However, it is important to note that further studies are needed to test the adaptability of KAREBU across different cultural contexts in Indonesia. This will help to ensure its effectiveness and relevance in diverse educational settings. Exploring a combination of quantitative and qualitative methods can also provide a more holistic understanding of student engagement.

CONCLUSIONS

Research and development results show that the KAREBU (Cultural Diversity Cards) educational media for cultural diversity in East Java Province, Indonesia, focusing on fostering curiosity among fourth-grade elementary school students, has

achieved positive outcomes. The developed media product is validated, practical, and effective in enhancing students' curiosity regarding cultural diversity in East Java Province. Engaging educational media is crucial to motivate students to learn— media of cards designed as games can stimulate students' curiosity during the learning process.

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DATA AVAILABILITY

The data sets used and/or analyzed during the current study are available from the corresponding author on reasonable request. For ethical and privacy reasons, raw data (e.g., questionnaire responses) are not publicly available, but can be shared in an anonymized form for scientific use.

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CONFLICT OF INTEREST

The authors have no conflict of interest to disclose for this article.

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