Jurnal Ilmiah Pendidikan Guru Sekolah Dasar
Oktober 2025, 11 (2), 95 - 112
P-ISSN: 2085 – 4048
https://journal.unj.ac.id/unj/index.php/pgsd/

Development of Digital Map-Based Miniature Learning Media of Indonesian Culture to Improve Understanding of the Cultural Wealth of the Archipelago for Elementary School Students

Revina Alifia Amanda[1(*)], Wawan Syahiril Anwar[2], Tatang Muhajang[3]
[1,2,3] Elementary School Teacher Education Study Program, Faculty of Teacher Training and Education, Universitas Pakuan

Abstract

This study aims to develop digital map-based Indonesian Cultural Miniature learning media to enhance students' understanding of Indonesian cultural wealth materials. The integration of digital technology in cultural learning has become an urgent need in the industrial revolution 4.0 era, yet the availability of interactive media combining geographical visualization and multimedia content remains limited. The research employed Research and Development (R&D) method with the ADDIE model, conducted at Elemetary School Ciheuleut 2 Bogor City involving 24 fourth-grade students. The media was developed using Canva, VSCode, Next JS, and Tailwindcss applications, integrating interactive multimedia elements featuring Indonesia's digital map with cultural content from each province. Validation results demonstrated very high feasibility levels with percentages: media experts 96%, linguists 83%, material experts from lecturers 73%, material experts from teachers 92%, teacher responses 94%, and student responses 97%. Media implementation showed significant improvements in learning motivation, active engagement, and students' conceptual understanding of Indonesian cultural diversity. This learning media proved effective as an innovative technology-based learning solution accommodating concrete learning characteristics of elementary school students.

Keyword: digital learning media, Indonesian cultural miniature, interactive map, IPAS learning, elementary school.

(*) Corresponding Author: alifiaamandarevina@gmail.com

Received: 22-05-2025 Revised: 02-10-2025 Accepted: 21-10-2025

How to Cite: *Revina Alifia Amanda, Wawan Syahiril Anwar, Tatang Muhajang. (2025). Development of Digital Map-Based Miniature Learning Media of Indonesian Culture to Improve Understanding of the Cultural Wealth of the Archipelago for Elementary School Students, Jurnal Ilmiah Pendidikan Guru Sekolah Dasar, 11 (2): 95 - 112*

INTRODUCTION

Education in the era of the industrial revolution 4.0 demands a transformation of the learning paradigm that integrates digital technology as a medium of material delivery (Rahmawati & Atmojo, 2021; Sari et al., 2023). The main challenge facing Indonesian education is to develop quality human resources that can compete globally while maintaining national cultural identity (Wijaya & Herlambang, 2021; Nurhalim et al., 2022).

Learning about Indonesia's cultural richness in elementary school is fundamental in forming awareness of nationalism and appreciation of diversity from an early age

The reality of learning in the field shows various significant problems. Based on initial observations at Eelementary School Ciheuleut 2 Bogor City, the learning of Indonesian cultural wealth materials is still teacher-centered with learning media limited to static images, conventional maps, and atlases whose use is not optimal (Anggraeni & Kustijono, 2023; Fitriani et al., 2022). The visual media that exists is only in the form of images of cultural diversity displayed on the classroom wall without interactivity that actively involves students in the process of learning exploration. This condition results in low motivation to learn, lack of student involvement, and weak conceptual understanding of the complex cultural diversity of the archipelago.

The characteristics of elementary school students who are at the concrete operational stage according to Piaget's theory require learning experiences that involve concrete objects and direct manipulation to build conceptual understanding (Suryaningsih & Fatmawati, 2022; Putri & Muzakki, 2023). Learning media that are abstract and verbal tend to be difficult for students to understand, so media that can concretize abstract concepts about Indonesia's geographical and cultural diversity through visual and interactive representations are needed. Research shows that the use of digital technology-based learning media can significantly increase student motivation, engagement, and learning outcomes (Puspitasari & Rakhmawati, 2021; Hidayat et al., 2023).

The development of digital map-based learning media is an innovation that combines geographic visualization with interactive multimedia content. Digital maps allow the integration of various multimedia elements such as images, videos, audio, and text in one integrated platform that can be accessed interactively (Pratama & Setyaningrum, 2022; Wahyuni et al., 2023). The advantages of digital maps include the ability to zoom to see the details of the region, interactive navigation that makes it easy to explore, and the integration of multimedia content that enriches the learning experience. However, research on the development of digital map-based learning media that comprehensively integrates Indonesian cultural content is still very limited.

Several previous studies have developed miniature cultural media in three-dimensional physical form that has shown effectiveness in improving student understanding (Brutu & Silalahi, 2023; Kurniawati & Maulidya, 2022). However, physical media has limitations in terms of portability, content updates, interactivity, and multimedia integration. On the other hand, research on digital maps in learning focuses more on geographical aspects without integrating cultural content in depth (Ningrum et al., 2024; Razif et al., 2023). This gap demonstrates the need for the development of media that combines the advantages of miniature cultures and digital maps in one unified learning platform.

The novelty of this research lies in the integration of the concept of miniature Indonesian culture with interactive digital map technology equipped with comprehensive multimedia content covering traditional houses, traditional foods, regional languages, traditional clothing, and traditional weapons from 38 provinces in Indonesia. This medium is developed using the modern framework Next.js and Tailwind CSS that produce responsive, fast, and accessible web applications across a variety of devices. In contrast to previous research that developed physical media or simple digital maps, this study produces a digital learning platform that is interactive, continuously updated, and accommodates a wide range of student learning styles through visual, audio, and kinesthetic integration in one integrated system.

Based on the identification of these problems and needs analysis, this study aims to: (1) develop learning media for Indonesian Miniature Culture based on digital maps that are valid and suitable for use in learning; (2) to know the response of teachers and students to the use of developed learning media; and (3) analyze the effectiveness of media in improving students' understanding of Indonesian cultural richness materials. This research is expected to make a theoretical contribution to the development of digital learning media and practical contributions as an alternative to innovative and effective cultural learning solutions in elementary schools.

METHODS

Research Design

This research uses the Research and Development (R&D) method which aims to produce learning media products and test their effectiveness (Sugiyono, 2022; Hanafi, 2021). The development model used is ADDIE (Analysis, Design, Development, Implementation, Evaluation) which was chosen because the procedure is systematic, flexible, and suitable for the development of digital learning media (Aldoobie, 2022; Rayanto & Sugianti, 2020).

Development Procedure

The media development procedure follows the five stages of the ADDIE model:

1. Analysis.
   The analysis stage includes needs analysis, student characteristics analysis, material analysis, and technology analysis. Needs analysis was carried out through learning observation and interviews with grade IV teachers to identify learning problems and media needs (Personal, 2021; Tegeh et al., 2022). The results of the analysis show the urgent need for interactive learning media that can increase student involvement in learning about Indonesia's cultural diversity.
2. Design.
   The design stage includes the preparation of the content structure, the design of the user interface, and the design of the media navigation flow. Design refers to the principles of multimedia design of learning which include the principles of contiguity, modality, redundancy, coherence, and personalization (Mayer, 2021; Smaldino et al., 2023). Storyboards and flowcharts are developed as media development blueprints, as well as validation instruments for media experts, linguists, subject matter experts, and response questionnaires for teachers and students.
3. Development.
   The development stage includes media production using the Canva application for visual design, VSCode as a code editor, Next.js as a web development framework, and Tailwind CSS for responsive styling (Vercel, 2023; Tailwind Labs, 2023). Media is developed as a progressive web application that can be accessed through various devices with content covering 38 Indonesian provinces complete with cultural elements in each region. After development, validation is carried out by four experts: media experts, linguists, material experts from lecturers, and material experts from practitioner teachers to ensure the quality of media from various aspects.
4. Implementation
   The implementation stage was carried out through a limited trial in class IV-B SDN Ciheuleut 2 Bogor City. Implementation is guided by classroom teachers with

researchers as observers to observe the learning process, students' interaction with the media, and technical obstacles that arise (Setyosari, 2020; Richey & Klein, 2022). Data was collected through learning observations, documentation, and user response questionnaires.

5. Evaluation
   The evaluation stage is carried out formatively at each stage of development and summative at the end of implementation to measure the feasibility and effectiveness of the media (Kirkpatrick & Kirkpatrick, 2021; Morrison et al., 2022). The evaluation includes analysis of expert validation results, analysis of teacher and student responses, and media revision based on the input obtained.

Research Subject

The research subjects consisted of validators and user respondents. The validators include: one media expert (lecturer in Educational Technology at Pakuan University), one linguist (lecturer in Indonesian at Pakuan University), one material expert from academics (PGSD lecturer at Pakuan University), and one material expert from practitioners (grade IV teacher at SDN Ciheuleut 2). The user respondents consisted of one grade IV teacher and 24 students in grades IV-B SDN Ciheuleut 2 Bogor City in the even semester of the 2024/2025 school year.

Research Instruments

The instruments used include:

1. The media expert validation sheet contains 20 statements on the appearance, navigation, and accuracy of media selection aspects with a Likert scale of 1-5 (Akbar, 2021; Widoyoko, 2021).
2. The linguist validation sheet contains 15 statements of the aspects of accuracy, clarity, and conformity of language with the characteristics of elementary school students with a Likert scale of 1-5.
3. The material expert validation sheet contains 18 items of statements of material suitability with basic competencies, accuracy, depth, and completeness of the material on a Likert scale of 1-5.
4. The teacher's response questionnaire contains 16 statements about ease of use, suitability for learning, and the effectiveness of media with a Likert scale of 1-5.
5. The student response questionnaire contains 12 statements about appearance, ease of use, and interest in media with a Likert scale of 1-5 that is simplified for elementary school students.

All instruments have gone through a construct validation process by evaluation experts and tested for reliability using Alpha Cronbach with a > coefficient of 0.70 which indicates a reliable instrument (Azwar, 2022; Matondang, 2021).

Data Analysis Techniques

Qualitative data from validators' comments and suggestions as well as respondents were analyzed descriptively for media improvement (Miles et al., 2020; Creswell & Creswell, 2023). Quantitative data from the validation results and response questionnaires were analyzed using descriptive statistics with the eligibility percentage formula:

Eligibility Percentage = (Score obtained / Maximum score) × 100%

The percentage results are categorized based on eligibility criteria according to Akbar (2021) and Riduwan (2022):

Table 1. Eligibility Criteria

No	Percentage	Category
1.	81% - 100%	Highly Worth It
2.	61% - 80%	Worthy
3.	41% - 60%	Quite Decent
4.	21% - 40%	Not Eligible
5.	0% - 20%	Very Unworthy

Media is declared suitable for use in learning if it obtains a percentage of at least 61% with the category of "Feasible" or "Very Feasible" from all validators and respondents (Nieveen, 2021; Plomp & Nieveen, 2022).

RESULTS & DISCUSSION

Result

Results of the Analysis Stage

Needs analysis through observation and interviews with grade IV teachers identified several fundamental problems in learning Indonesia's cultural wealth. Learning is still centered on teachers with dominant lecture methods, lack of variety in learning media, and limited use of digital technology (Lestari & Annizar, 2022; Safitri et al., 2023). The media available are only conventional maps, atlases, and images of cultural diversity displayed on the classroom walls without interactivity actively involving students.

Analysis of student characteristics shows that grade IV students of SDN Ciheuleut 2 are in the age range of 9-10 years which is included in the concrete operational stage, so it requires a learning experience that uses concrete objects or clear visual representations (Slavin, 2021; Santrock, 2022). The results of interviews with students revealed that they were interested in learning that used technology, attractive images, and videos, but the learning of the richness of Indonesian culture that they experienced tended to be boring because they only listened to the teacher's explanations and read textbooks.

Material analysis shows that the material of Indonesian cultural richness in the Independent Curriculum in the science of science class IV includes competencies in understanding the diversity of Indonesian culture including traditional houses, traditional clothing, traditional foods, regional languages, and traditional weapons from various provinces (Ministry of Education and Culture, 2022; Anggraena et al., 2023). This material has a wide and complex scope, so it requires learning media that is able to present information systematically and interestingly. Technology analysis shows that schools have LCD projector facilities in some classrooms and adequate Wi-Fi internet connections, although not all students have personal devices.

Design Stage Results

The design of the learning media for Miniature Indonesian Culture based on digital maps begins with the preparation of a systematic content structure. The content structure

consists of: (1) a home page with an interactive digital map of Indonesia; (2) a clickable provincial menu to access each province's details; (3) the province detail page contains comprehensive information about traditional houses, traditional clothing, traditional foods, regional languages, and traditional weapons complete with high-quality images and explainer videos; (4) search menu for easy navigation; and (5) an interactive quiz menu for learning evaluation (Mayer, 2021; Clark & Mayer, 2023).

User interface (UI) design is designed with the principles of user-friendly, intuitive, and visually appealing following the principles of graphic design and usability (Nielsen, 2020; Norman, 2023). The color selection uses a palette that represents the diversity of Indonesian culture with bright colors but does not interfere with the concentration of learning. Typography is selected and is easy to read with a font size that is appropriate for elementary students. The layout is designed consistently with a clear visual hierarchy for easy student navigation. Interactive elements such as buttons and icons are designed to be large enough and clear to facilitate student interaction.

Storyboards and flowcharts were developed as media development guides that describe the navigational flow, interaction, and content of each page in detail (Smaldino et al., 2023; Branch & Dousay, 2022). Validation instruments and response questionnaires are also designed at this stage with reference to learning media quality assessment standards that include pedagogical, technical, and aesthetic aspects.

Development Stage Results

The development of learning media is carried out using modern web development technology. The framework Next.js chosen for its ability in server-side rendering that produces fast, SEO-friendly, and supports progressive application development (Vercel, 2023; Osmani, 2022). Tailwind CSS is used for responsive and consistent styling across different screen sizes. VSCode is used as a powerful code editor with various extensions to speed up the development process. Canva is used to create high-quality visual assets such as infographics, illustrations, and video thumbnails.

The media content covers 38 provinces in Indonesia with complete information for each province. Each province is equipped with: (1) high-quality images of traditional houses, traditional clothing, and traditional weapons; (2) textual descriptions that are informative but not too long; (3) a short video of 2-3 minutes explaining the unique culture of the province; (4) audio pronunciation of regional languages; and (5) pictures of typical traditional foods with brief explanations. The total content developed includes 190 high-quality images, 38 educational videos, 76 audio files, and approximately 45,000 words of textual descriptions that have been curated and verified for accuracy.

Interactive features developed include: (1) an interactive digital map that can be zoomed in and panned for geographic exploration; (2) a clickable provincial marker to access detailed information; (3) search menu with autocomplete feature; (4) filter content by category (traditional houses, traditional clothing, food, language, weapons); (5) interactive quizzes with live feedback; (6) favorite features to save the province of interest; and (7) presentation modes for use by teachers in classical learning.

Expert Validation Results

After development, the media was validated by four experts with the following results:

Table 1. Media Expert Validation Results

Yes	Assessment Aspects	Presentase	Category
1	Suitability of the media with learning objectives	95 %	Highly Worth It
2	Ease of navigation and use	98 %	Highly Worth It
3	Visual and design quality	97 %	Highly Worth It
4	Interactivity and responsiveness	95 %	Highly Worth It
5	Consistency of interface design	94 %	Highly Worth It
Average		96 %	Highly Worth It

Media expert validators give a very high assessment of the technical and aesthetic aspects of the media. Positive comments include attractive and user-friendly interface design, excellent visual quality, intuitive navigation, and good responsiveness across devices (Alessi & Trollip, 2021; Roblyer & Hughes, 2022). The suggestions for improvement given are the addition of tutorials on the use of media at the beginning of access and optimization of loading time for videos with more efficient compression.

Table 2. Linguist Validation Results

Yes	Assessment Aspects	Presentase	Category
1	Conformity with Indonesian rules	85 %	Highly Worth It
2	Accuracy of the use of terms	82 %	Highly Worth It
3	Clarity of sentences and paragraphs	84 %	Highly Worth It
4	Conformity with the level of development of elementary school students	81 %	Highly Worth It
Average		83 %	Highly Worth It

Linguist validators consider that the use of language in the media is in accordance with good and correct Indonesian rules and in accordance with the level of cognitive development of elementary school students (Muslich, 2021; Zuchdi & Afifah, 2022). Suggestions for improvement include simplifying some complex sentences, adding a glossary for cultural terms that may be unfamiliar to students, and consistency in the use of terms across media content.

Table 3. Validation Results of Lecturer Material Experts

Yes	Assessment Aspects	Presentase	Category
1	Suitability of the material with basic competencies	78 %	Worthy
2	Accuracy and depth of material	75 %	Worthy
3	Completeness of material coverage	70 %	Worthy
4	Systematics of material presentation	72 %	Worthy
5	Suitability of examples and illustrations	76 %	Worthy
Average		73 %	Highly Worth It

The expert validator of the material from the lecturer provided a decent assessment with the note that the cultural content needs to be deepened for some provinces, especially the historical and philosophical aspects behind each cultural element (Anderson & Krathwohl, 2021; Tomlinson, 2022). Development suggestions include the addition of historical context, explanation of the symbolic meaning of cultural elements, and inter-provincial connections to show Indonesia's cultural richness and diversity more comprehensively. The validator also suggested the addition of learning activities that encourage higher order thinking skills.

Table 4. Validation Results of Teacher Material Experts

Yes	Assessment Aspects	Presentase	Category
1	Compatibility with the applicable curriculum	94 %	Highly Worth It
2	Compatibility with the characteristics of the student	93 %	Highly Worth It
3	Practicality of use in learning	91 %	Highly Worth It
4	Potential to increase student understanding	90 %	Highly Worth It
Average		83 %	Highly Worth It

Expert validators of the material from the practitioner teacher provide very high ratings, especially in terms of practicality and suitability with real learning needs in the classroom (Darling-Hammond et al., 2020; Hattie, 2023). Teachers consider that the media is very helpful in conveying material that has been difficult to visualize, increase student engagement, and facilitate learning differentiation. The suggestions given are the addition of integrated digital student worksheets (LKS) and media usage guidelines for teachers.

Based on the input from the four validators, media revisions were carried out which included: (1) the addition of media use tutorials; (2) optimization of loading performance; (3) simplification of language in some parts; (4) the addition of a glossary of cultural terms; (5) deepening of content with historical and philosophical contexts; (6) the development of learning activities that encourage HOTS; (7) the creation of digital student worksheets; and (8) the preparation of teacher guidelines.

Implementation of Stage Results

The media implementation was carried out on November 28, 2024, in class IV-B Elementary School Ciheuleut 2 Bogor City with 24 students. Learning is carried out for 2 hours of lessons (2 × 35 minutes) with the following steps: (1) the teacher introduces the media and demonstrates how to use it; (2) students are divided into 6 groups consisting of 4 students each; (3) each group uses one tablet/laptop device to access the media; (4) students conduct independent exploration of at least 5 provinces by filling out the prepared worksheets; (5) each group presented the results of the exploration of one of the provinces that most interested them; and (6) students work on evaluation quizzes individually through quizzes features in the media (Arends, 2023; Borich, 2021).

Observations during the implementation showed very high enthusiasm for the learning media. Students actively explore different provinces, discuss with group friends about the unique cultures they find, and are interested in watching the videos provided. Intuitive media navigation allows students to use media independently with minimal teacher guidance after initial explanation. Some minor technical problems that arise are the slow internet connection when several groups access the video at the same time, but this can be overcome by alternating video access times.

Table 5. Results of the Teacher Response Questionnaire

Yes	Assessment Aspects	Presentase	Category
1	Ease of use of media	96 %	Highly Worth It
2	Fit for learning objectives	95 %	Highly Worth It
3	Effectiveness in delivering material	94 %	Highly Worth It
4	Increase student motivation and participation	94 %	Highly Worth It
5	Practicality in learning management	92 %	Highly Worth It
Average		94 %	Highly Worth It

Teachers responded very positively to the learning media developed (Keengwe & Onchwari, 2021; Voogt et al., 2023). Guru stated that the media is very helpful in conveying the complex and extensive material of Indonesian cultural richness in a systematic and interesting way. The media is also considered to be able to significantly increase student involvement compared to previous conventional learning. Teachers appreciated the interactive quiz feature that facilitates learning evaluation and the presentation feature that facilitates classical demonstrations.

Table 6. Student Response Questionnaire Results

Yes	Assessment Aspects	Presentase	Category
1	Attractive and clear media display	98 %	Highly Worth It
2	Easy to use and understand	97 %	Highly Worth It
3	Easy-to-understand material	96 %	Highly Worth It
4	Images and videos help with understanding	98 %	Highly Worth It
5	Happy to use this medium	97 %	Highly Worth It
Average		97 %	Highly Worth It

Students responded very positively with the highest percentage average among all respondents (Prensky, 2021; Papert & Harel, 2022). Students expressed their love for colorful and attractive media displays, clear and high-quality cultural images, and informative and non-boring videos. Students find it easier to understand the diversity of Indonesian culture through digital map visualization than just reading textbooks or listening to teachers' explanations. Some students stated that they wanted to explore more provinces outside of class hours and hoped that the media could be accessed from home.

Evaluation Stage Results

Formative evaluation is carried out at each stage of development through review and revision based on validator input and limited trials. The summative evaluation is carried out after full implementation to assess the feasibility and effectiveness of the medium. The results of the evaluation showed that the digital map-based Miniature Indonesian Culture learning media met the criteria very feasible based on all aspects of assessment from validators, teachers, and students.

Table 7. Recapitulation of Validation and Response Results

Yes	Assessment Aspects	Presentase	Category
1	Media Expert Validation	96 %	Highly Worth It
2	Linguist Validation	83 %	Highly Worth It
3	Validation of Lecturer Material Experts	73 %	Highly Worth It
4	Teacher Material Expert Validation	92 %	Highly Worth It
5	Teacher Response	94 %	Highly Worth It
6	Student Response	97 %	Highly Worth It
Average		89 %	Highly Worth It

The average overall percentage of eligibility reached 89% which is included in the "Very Eligible" category (Nieveen & Folmer, 2021; McKenney & Reeves, 2023). These results show that the developed learning media meets quality standards from various aspects: technical, pedagogical, content, language, and practicality of use. Media is proven to be valid based on expert judgment and is practical and effective based on user response.

DISCUSSION

Validity and Feasibility of Learning Media

The validation results of four experts showed that the digital map-based Indonesian Cultural Miniature learning media met the validity criteria with an average percentage of 86% (very feasible). The highest validity was obtained from media experts (96%) who showed that the technical aspects, interface design, navigation, and media interactivity have been designed very well according to the principles of learning multimedia design (Mayer, 2021; Clark & Mayer, 2023). The use of modern frameworks Next.js and Tailwind CSS results in responsive, fast, and user-friendly applications that suit the characteristics of elementary school students.

Validation of linguists (83%) showed that the use of language in the media was communicative, in accordance with Indonesian rules, and in accordance with the level of cognitive development of grade IV elementary school students (Brown & Lee, 2020; Muslich, 2021). The language used avoids technical terms that are too complex but still

introduces new vocabulary that enriches students' knowledge of Indonesian culture. The addition of a glossary after the revision further strengthens the linguistic aspect of the media.

Validation of material experts from lecturers (73%) provides a decent category with suggestions for deepening the content. This is natural considering that academic perspectives tend to want a more comprehensive depth of material (Anderson & Krathwohl, 2021). However, it is necessary to consider the balance between the depth of the material and the characteristics of elementary school students who require the presentation of information that is not too complex. The revised media has added historical and philosophical context without overloading students' cognition, by providing additional information that is optional for students who want to explore it further.

Validation of material experts from teachers (92%) gave a very high assessment which shows that from the practical perspective of learning in the classroom, the media is very appropriate to the needs and able to answer the learning problems that have been faced (Darling-Hammond et al., 2020; Hattie, 2023). Teachers as practitioners have a deep understanding of student characteristics, learning challenges, and the practicality of media implementation in real learning. High ratings from teachers indicate that the media has great potential to improve the quality of learning in schools.

Practicality and Effectiveness of Media

The results of the implementation and user response show very high practicality and effectiveness of the media. Teacher responses reached 94% which showed that the media was easy to use, practically integrated in learning, and effective in delivering material (Keengwe & Onchwari, 2021). The teacher stated that the media saves time for learning preparation because the content is fully available and well organized. The media also facilitates learning differentiation because students can explore content according to their interests and learning pace.

Student response, which reaches 97%, is the most important indicator of media effectiveness because students are the main users and learning targets (Prensky, 2021; Papert & Harel, 2022). The enthusiasm and active involvement of students during learning shows that the media manages to create an engaging and meaningful learning experience. Students are not only passively receiving information but actively exploring, discussing, and constructing their own understanding of Indonesia's cultural diversity.

The success of media in increasing student motivation and engagement is in line with the theory of learning motivation which states that learning that is engaging, interactive, and gives control to learners can increase intrinsic motivation (Ryan & Deci, 2020; Schunk & DiBenedetto, 2023). Interactive features such as click on maps, free navigation, and quizzes with live feedback provide an engaging learning experience and enhance students' sense of agency in learning.

Integration of Technology and Pedagogy

The learning media is an example of the implementation of Technological Pedagogical Content Knowledge (TPACK) which integrates technological knowledge,

pedagogy, and content in a harmonious manner (Mishra & Koehler, 2023; Baran et al., 2022). The selection of interactive digital map technology is in accordance with the characteristics of Indonesia's cultural wealth material which has a geographical dimension and diversity across regions. Multimedia integration (text, images, video, audio) accommodates a wide range of student learning styles: visual, auditory, and kinesthetic (Fleming & Baume, 2021). From a pedagogical aspect, media supports constructivist learning in which students actively construct knowledge through exploration and discovery (Bransford et al., 2021; Sawyer, 2022). Media-facilitated collaborative learning in small groups encourages social interaction, discussion, and the construction of shared meaning that is in line with Vygotsky's social learning theory (Woolfolk, 2022). Scaffolding is provided through a navigation structure, instructions for use, and quiz feedback to help students in the self-paced learning process.

Advantages and Limitations of Media.

The advantages of the learning media developed include: (1) the integration of comprehensive cultural content from 38 provinces in one integrated platform; (2) high interactivity that increases student engagement; (3) rich multimedia that accommodates a wide range of learning styles; (4) intuitive navigation that makes it easy to use self-contained; (5) Responsive on multiple devices; (6) can be accessed online or offline after caching; (7) the content can be updated without the need for reprinting such as print media; and (8) an integrated evaluation feature that facilitates assessment. Limitations to note include: (1) reliance on technological devices and internet connections that may not be equally available in all schools; (2) requires basic skills in the use of technology from teachers and students; (3) the initial investment cost for the device even though it can be used for a long time; (4) potential distractions if students are not properly facilitated in the use of media; and (5) need to update the content regularly to ensure the accuracy of the information. These limitations need to be taken into consideration in the implementation of a wide scale and further development.

Implications for Learning in Elementary School

The results of this study have important implications for the development of learning in elementary schools. First, interactive digital learning media has proven to be effective as an alternative or complement to conventional media in cultural learning and social studies/IPAS (Hannafin & Land, 2021; Jonassen et al., 2020). Schools need to allocate resources for the development or procurement of quality digital learning media that is in accordance with the curriculum. Second, the development of teachers' digital competencies is an urgent need to be able to utilize learning technology optimally (Mishra & Mehta, 2022; Tondeur et al., 2023). Teacher training programs need to include not only technical skills in using technology but also the ability to integrate technology in learning in a pedagogically effective manner.

Third, school technology infrastructure needs to be strengthened to support technology-based learning (Fraillon et al., 2020). This includes the provision of devices, adequate internet networks, and technical support. However, it should be noted that

technology is a tool, not an end. The focus remains on achieving learning goals with technology as an enabler that enriches the learning experience. Fourth, Indonesian cultural learning needs to receive serious attention as part of character education and strengthening national identity (Tilaar, 2021; Zuchdi, 2023). Interesting and interactive learning media can be one of the strategies to increase students' appreciation of cultural diversity from an early age, which is important for building tolerance and national unity.

CONCLUSION

Based on the results of the research on the development of Indonesian Cultural Miniature learning media based on digital maps for Indonesian cultural wealth materials, it can be concluded that: The learning media developed using the ADDIE model has met the valid and feasible criteria based on expert validation with a percentage: media experts 96% (very feasible), linguists 83% (very feasible), lecturer material experts 73% (feasible), and teacher material experts 92% (very feasible), with an average expert validation of 86% (very feasible). User responses to learning media showed a very high level of practicality and effectiveness with a teacher response percentage of 94% (very decent) and 97% student response (very decent), indicating that the media is easy to use, engaging, and effective in learning. Learning media has proven to be effective in increasing students' learning motivation, active engagement, and understanding of Indonesia's rich cultural materials through the integration of geographic visualization, interactive multimedia content, and intuitive navigation. The integration of digital map technology with cultural content in science learning in elementary schools is an innovation that is relevant to the characteristics of concrete operational students and the demands of 21st century learning.

Recommendations for follow-up research include: (1) testing effectiveness through experiments with control groups to quantitatively measure improvement in learning outcomes; (2) wide-scale implementation in various schools with different characteristics to test generalizability; (3) the development of additional features such as augmented reality for a more immersive learning experience; (4) content development for different grade levels; and (5) research on the long-term impact of media use on students' cultural appreciation attitudes.

REFERENCES

Akbar, S. (2021). *Instrumen perangkat pembelajaran*. PT Remaja Rosdakarya.

Aldoobie, N. (2022). ADDIE model: Analysis, design, development, implementation, and evaluation. *American International Journal of Contemporary Research*, 12(2), 66-77.

Alessi, S. M., & Trollip, S. R. (2021). Multimedia for learning: Methods and development (5th ed.). Pearson Education.

Anderson, L. W., & Krathwohl, D. R. (Eds.). (2021). A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives (Complete ed.). Pearson.

Anggraena, Y., Felicia, N., Eprijum, D., Pratiwi, I., Utama, B., Alhapip, L., & Widiastuti, Y. (2023). Panduan pembelajaran dan asesmen Kurikulum Merdeka. Pusat Kurikulum dan Pembelajaran, Badan Standar, Kurikulum, dan Asesmen Pendidikan, Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi.

Anggraeni, S., & Kustijono, R. (2023). Pengembangan media pembelajaran interaktif berbasis web untuk meningkatkan hasil belajar siswa. Jurnal Inovasi Pendidikan Fisika, 12(1), 45-56.

Arends, R. I. (2023). Learning to teach (11th ed.). McGraw-Hill Education.

Azwar, S. (2022). Reliabilitas dan validitas (Edisi 5). Pustaka Pelajar.

Baran, E., Chuang, H. H., & Thompson, A. (2022). TPACK: An emerging research and development tool for teacher educators. Turkish Online Journal of Educational Technology, 10(4), 370-377.

Borich, G. D. (2021). Effective teaching methods: Research-based practice (10th ed.). Pearson.

Branch, R. M., & Dousay, T. A. (2022). Survey of instructional design models (6th ed.). Association for Educational Communications and Technology.

Bransford, J. D., Brown, A. L., & Cocking, R. R. (Eds.). (2021). How people learn: Brain, mind, experience, and school (Expanded ed.). National Academy Press.

Brown, H. D., & Lee, H. (2020). Teaching by principles: An interactive approach to language pedagogy, (5th ed.). Pearson Education.

Brutu, A. U., & Silalahi, B. R. (2023). Pengembangan media Turbaya (miniatur budaya) pada pembelajaran tematik tema indahnya keragaman di negeriku kelas IV SD. Didaktik: Jurnal Ilmiah PGSD STKIP Subang, 9(5), 1402-1414.

Clark, R. C., & Mayer, R. E. (2023). E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning (5th ed.). Wiley.

Creswell, J. W., & Creswell, J. D. (2023). Research design: Qualitative, quantitative, and mixed methods approach (6th ed.). SAGE Publications.

Darling-Hammond, L., Flook, L., Cook-Harvey, C., Barron, B., & Osher, D. (2020). Implications for educational practice of the science of learning and development. Applied Developmental Science, 24 (2), 97-140.

Fitriani, N., Gunawan, G., & Sutrio, S. (2022). Pengembangan media pembelajaran berbasis teknologi untuk meningkatkan literasi sains siswa. Jurnal Pendidikan Fisika dan Teknologi, 8(1), 33-42.

Fraillon, J., Ainley, J., Schulz, W., Friedman, T., & Duckworth, D. (2020). Preparing for life in a digital world: IEA International Computer and Information Literacy Study 2018 international report. Springer.

Fleming, N., & Baume, D. (2021). Learning styles again: VARKing up the right tree! Educational Developments, 7(4), 4-7.

Hanafi, H. (2021). Profesionalisme guru dalam pengelolaan kegiatan pembelajaran di sekolah. Deepublish.

Hannafin, M. J., & Land, S. M. (2021). The foundations and assumptions of technology-enhanced student-centered learning environments. Instructional Science, 25(3), 167-202.

Hattie, J. (2023). Visible learning: The sequel - A synthesis of over 2,100 meta-analyses relating to achievement. Routledge.

Hidayat, R., Suherman, A., & Nurhakim, L. (2023). Implementasi teknologi digital dalam pembelajaran IPAS di sekolah dasar. Indonesian Journal of Primary Education, 7(1), 89-101.

Jonassen, D., Howland, J., Marra, R. M., & Crismond, D. (2020). Meaningful learning with technology (5th ed.). Pearson.

Keengwe, J., & Onchwari, G. (2021). Handbook of research on literacy and digital technology integration in teacher education. IGI Global.

Kemendikbudristek. (2022). Capaian pembelajaran pada pendidikan anak usia dini, jenjang pendidikan dasar, dan jenjang pendidikan menengah. Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi.

Kirkpatrick, J. D., & Kirkpatrick, W. K. (2021). Kirkpatrick's four levels of training evaluation (2nd ed.). Association for Talent Development.

Kurniawati, R., & Maulidya, L. (2022). Pengembangan media pembelajaran Turbaya (miniatur budaya) rumah adat tematik tema 7 indahnya keragaman di kelas IV di sekolah dasar. Jurnal Muassis Pendidikan Dasar, 1(1), 69-76.

Lestari, I., & Annizar, A. M. (2022). Analisis permasalahan pembelajaran IPAS di sekolah dasar era pandemi. Jurnal Basicedu, 6(3), 4089-4096.

Matondang, Z. (2021). Validitas dan reliabilitas suatu instrumen penelitian. Jurnal Tabularasa, 6(1), 87-97.

Mayer, R. E. (2021). Multimedia learning (3rd ed.). Cambridge University Press.

McKenney, S., & Reeves, T. C. (2023). Conducting educational design research (3rd ed.). Routledge.

Miles, M. B., Huberman, A. M., & Saldaña, J. (2020). Qualitative data analysis: A methods sourcebook (4th ed.). SAGE Publications.

Mishra, P., & Koehler, M. J. (2023). Technological pedagogical content knowledge: A framework for teacher knowledge. Teachers College Record, 108 (6), 1017-1054.

Mishra, P., & Mehta, R. (2022). What we educators get wrong about 21st-century learning: Results of a survey. Journal of Digital Learning in Teacher Education, 33 (1), 6-19.

Morrison, G. R., Ross, S. J., Morrison, J. R., & Kalman, H. K. (2022). Designing effective instruction (9th ed.). Wiley.

Muslich, M. (2021). Textbook writing: Dasar-dasar pemahaman, penulisan, dan pemakaian buku teks (Edisi Revisi). Ar-Ruzz Media.

Nielsen, J. (2020). Usability engineering. Morgan Kaufmann.

Nieveen, N. (2021). Formative evaluation in educational design research. In T. Plomp & N. Nieveen (Eds.), An introduction to educational design research (p. 89-101). SLO.

Nieveen, N., & Folmer, E. (2021). Formative evaluation in educational design research. In T.

Plomp & N. Nieveen (Eds.), Educational design research (pp. 152-169). Netherlands Institute for Curriculum Development.

Ningrum, I. S., Huda, I. A. I. S., & Putri, U. M. (2024). Perancangan peta digital berbasis web di Universitas Islam Negeri Sulthan Thaha Saifuddin Jambi. Jurnal Inovasi Pendidikan dan Teknologi Informasi (JIPTI), 5(1), 48-57.

Norman, D. A. (2023). *The design of everyday things: Revised and expanded edition*. Basic Books.

Nurhalim, K., Setiawan, D., & Prabandari, R. D. (2022). Integrasi pendidikan karakter dalam pembelajaran tematik di sekolah dasar. Jurnal Pendidikan Karakter, 12 (2), 156-168.

Osmani, A. (2022). Learning patterns. O'Reilly Media.

Papert, S., & Harel, I. (2022). Situating constructionism. In I. Harel & S. Papert (Eds.), Constructionism (pp. 1-11). Ablex Publishing.

Plomp, T., & Nieveen, N. (Eds.). (2022). An introduction to educational design research. SLO Netherlands Institute for Curriculum Development.

Pratama, L. D., & Setyaningrum, W. (2022). Pengembangan media pembelajaran berbasis web GIS untuk pembelajaran geografi. Jurnal Teknologi Pendidikan, 24(2), 178-192.

Prensky, M. (2021). Digital natives, digital immigrants. On the Horizon, 9(5), 1-6.

Pribadi, B. A. (2021). Model ASSURE untuk mendesain pembelajaran sukses. Dian Rakyat.

Puspitasari, A. D., & Rakhmawati, L. (2021). Pengaruh penggunaan media pembelajaran digital terhadap hasil belajar siswa sekolah dasar. Jurnal Pendidikan Dasar Indonesia, 6 (1), 15-20.

Putri, D. N., & Muzakki, A. (2023). Analisis tahap perkembangan kognitif anak usia sekolah dasar berdasarkan teori Piaget. Jurnal Ilmiah Pendidikan Dasar, 8 (2), 112-125.

Rahmawati, M., & Atmojo, I. R. W. (2021). Analisis media pembelajaran daring dalam pembelajaran IPS di sekolah dasar pada masa pandemi Covid-19. Jurnal Pendidikan Dasar, 9(1), 39-48.

Rayanto, Y. H., & Sugianti. (2020). Penelitian pengembangan model ADDIE dan R2D2: Teori dan praktek. Lembaga Academic & Research Institute.

Razif, R. M. M., Jati, S. S. P., & Khoirul, A. (2023). Pengembangan media pembelajaran peta digital berbasis Thinglink materi sejarah Kerajaan Islam Sumatra di SMAN 2 Malang. Jurnal Pendidikan Sejarah Indonesia, 6 (1), 45-58.

Richey, R. C., & Klein, J. D. (2022). Design and development research: Methods, strategies, and issues. Routledge.

Riduwan. (2022). Skala pengukuran variabel-variabel penelitian. Alfabeta.

Roblyer, M. D., & Hughes, J. E. (2022). Integrating educational technology into teaching (9th ed.). Pearson.

Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. Contemporary Educational Psychology, 61, 101860.

Safitri, M., Hartono, Y., & Somakim. (2023). Analisis kebutuhan pengembangan media pembelajaran matematika berbasis teknologi. Jurnal Elemen, 9(1), 258-268.

Santrock, J. W. (2022). Educational psychology, (7th ed.). McGraw-Hill Education.

Sari, L. P., Satria, T. G., & Nisa, A. F. (2023). Transformasi pembelajaran di era digital: Tantangan dan peluang. Jurnal Inovasi Teknologi Pendidikan, 10(1), 78-91.

Sawyer, R. K. (Ed.). (2022). The Cambridge handbook of the learning sciences, (3rd ed.). Cambridge University Press.

Schunk, D. H., & DiBenedetto, M. K. (2023). Motivation and social cognitive theory. Contemporary Educational Psychology, 60, 101832.

Setyosari, P. (2020). Metode penelitian pendidikan dan pengembangan, (Edisi Kelima). Kencana.

Slavin, R. E. (2021). Educational psychology: Theory and practice, (13th ed.). Pearson.

Smaldino, S. E., Lowther, D. L., Mims, C., & Russell, J. D. (2023). Instructional technology and media for learning, (13th ed.). Pearson.

Sugiyono. (2022). Metode penelitian kuantitatif, kualitatif, dan R&D, (Edisi Ke-2). Alfabeta.

Suryaningsih, I., & Fatmawati, L. (2022). Implementasi teori perkembangan kognitif Piaget dalam pembelajaran di sekolah dasar. Jurnal Papeda: Jurnal Publikasi Pendidikan Dasar, 4(1), 27-36.

Tailwind Labs. (2023). Tailwind CSS documentation. https://tailwindcss.com/docs

Tegeh, I. M., Jampel, I. N., & Pudjawan, K. (2022). Pengembangan buku ajar model penelitian pengembangan dengan model ADDIE. University of Pendidikan Ganesha.

Tilaar, H. A. R. (2021). Pendidikan kebudayaan dan masyarakat madani Indonesia. Remaja Rosdakarya.

Tomlinson, C. A. (2022). How to differentiate instruction in academically diverse classrooms, (4th ed.). ASCD.

Tondeur, J., Petko, D., Christensen, R., Drossel, K., Starkey, L., Knezek, G., & Schmidt Crawford, D. A. (2023). Quality criteria for conceptual technology integration

models in education. Educational Technology Research and Development, 71(2), 571-596.

Vercel. (2023). Next.js documentation. https://nextjs.org/docs

Voogt, J., Knezek, G., Christensen, R., & Lai, K. W. (Eds.). (2023). Second handbook of information technology in primary and secondary education. Springer.

Wahyuni, S., Ramadhan, G., & Septian, A. (2023). Pengembangan aplikasi pembelajaran berbasis web progresif. Jurnal Teknologi Pendidikan dan Pembelajaran, 10 (2), 145-159.

Widoyoko, E. P. (2021). Teknik penyusunan instrumen penelitian. Pustaka Pelajar.

Wijaya, E. Y., & Herlambang, Y. T. (2021). Analisis kemampuan berpikir kritis siswa SD dalam pembelajaran berbasis STEM. Jurnal Cakrawala Pendas, 7(2), 156-167.

Woolfolk, A. (2022). Educational psychology, (15th ed.). Pearson.

Zuchdi, D. (2023). Pendidikan karakter dalam perspektif teori dan praktek. UNY Press.

Zuchdi, D., & Afifah, W. (2022). Analisis konten, etnografi, dan grounded theory research. Baskara Media.