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DEVELOPMENT OF DIGITAL SOCIAL STUDIES LEARNING MATERIALS BASED ON DAYAK DEAH LOCAL WISDOM TO INCREASE ENVIRONMENTAL AWARENESS

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ABSTRACT

This study aims to develop digital Social Studies (IPS) learning materials based on the local wisdom of the Dayak Deah community, particularly the Tawas Jaa tradition, and to examine their feasibility and effectiveness in enhancing junior high school students' environmental awareness. The novelty of this study lies in the integration of the ecological values embedded in the Tawas Jaa tradition of the Dayak Deah community into Social Studies learning materials in the form of a digital storybook, which has not previously been developed within local wisdom based Social Studies learning. The study employed a Research and Development (R&D) approach using the 4D development model, which consists of the stages of define, design, develop, and disseminate. The research subjects included 27 seventh-grade students of SMPN 2 Upau as the experimental group and 25 students as the control group. Data were collected through observation, questionnaires, and environmental awareness tests, and were analyzed using descriptive and inferential statistics. The results indicate that in the define stage, students' environmental awareness was still predominantly reflected in the knowledge dimension, while the attitude and behavioral dimensions remained at moderate to low levels. The design stage produced a prototype of a digital storybook that contextually integrates the ecological values of the Tawas Jaa tradition into Social Studies learning. In the develop stage, expert validation showed a very high level of feasibility with an average score of 85%. The limited trial results indicated very positive student responses, with an average score of 84% in terms of usability, attractiveness, and usefulness. The paired sample t-test analysis revealed a significant difference between the pre-test and post-test scores of the experimental group ($p < 0.05$), with a greater improvement compared to the control group. The study concludes that the digital Social Studies learning materials based on the Dayak Deah Tawas Jaa tradition meet the criteria of validity, practicality, and effectiveness in improving students' environmental awareness. These findings suggest that integrating local wisdom into digital learning media can significantly contribute to strengthening environmental awareness in Social Studies learning.

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INTRODUCTION

Environmental awareness in the context of education does not only revolve around basic knowledge about the environment. Studies have shown that environmental awareness has a broader dimension, including knowledge, attitudes, and values, as well as an individual's willingness to act and take responsibility for the environment ([Immaniar et al., 2019](#); [Jumriani et al., 2021](#)). Thus, environmental awareness can be understood as a multidimensional construct that integrates cognitive, affective, and behavioral aspects. While one may understand the concept of environmental conservation, that understanding is not always followed by a commitment to apply it in daily life. This condition suggests that environmental knowledge is necessary but not yet sufficient to form pro-environmental behavior. Therefore, environmental education needs to target not only the cognitive aspect, but also the affective domain and behavior of students in a balanced and sustainable manner ([Andriani et al., 2023](#); [Chen et al., 2025](#)).

In its implementation, environmental awareness becomes very relevant and integrated into materials and discussions in social studies learning. This is because social studies substantively studies the interaction between humans and their natural and social environment. The integration of environmental issues in the curriculum and social studies learning has been proven to increase students' knowledge and foster an attitude of caring for the environment ([Fatmawati et al., 2022](#); [Untung et al., 2022](#); [Zannah & Ayatusa'adah, 2023](#)). In addition, research on formal environmental programs in schools, such as the Adiwiyata program, shows that students involved in such programs tend to have a better level of environmental awareness, especially in the aspects of knowledge and habits related to environmental care behaviors ([Wahyuni et al., 2023](#)). However, these achievements are generally still focused on structural habituation and compliance with school rules.

A number of studies have revealed that the increase in environmental understanding in students has not been completely proportional to consistent behavior changes. Students' environmental awareness is often stuck at the level of conceptual understanding and formal routines. The environmental care behavior shown by students tends to be temporary and situational, arises when there is certain supervision or regulation, and has not developed into part of the student's personal awareness or identity ([Hamson et al., 2025](#); [Yusuf et al., 2022](#)). This condition confirms the gap between the environmental knowledge that students have and the actual actions they take outside the context of formal learning ([Baron et al., 2022](#)). Temuan This is in line with research from [Cahyani et al. \(2025\)](#) which shows that there is no significant

relationship between environmental knowledge and student attitudes and behaviors, thus strengthening the phenomenon of *knowledge behavior gap* in environmental literacy. This makes it clear that there are weak conditions in the process of internalizing environmental values in learning.

Di sisi lain, pembelajaran yang mengintegrasikan kearifan lokal terbukti mampu meningkatkan makna dan relevansi materi ajar. Pendekatan berbasis kearifan lokal memungkinkan peserta didik memahami konsep pembelajaran melalui pengalaman budaya dan sosial yang dekat dengan kehidupan mereka. Kearifan lokal tidak hanya berfungsi sebagai konteks budaya, tetapi juga sebagai sumber nilai yang dapat memperkuat pembentukan sikap dan karakter, termasuk sikap peduli lingkungan (Murtono, 2024; Nadilla et al., 2024; Syaharuddin et al., 2025). Through local wisdom, students are invited to understand the interrelationship between traditional values, community living practices, and contemporary environmental issues (Abbas, 2023; Dwianto et al., 2017; Jumriani et al., 2021). However, most research still focuses on improving understanding and learning outcomes, while the role of local wisdom in encouraging the internalization of environmental values to shape students' real actions has not been explored in depth (Haerullah et al., 2023; Handy et al., 2021). The description corroborates the researcher's findings, especially in the context of developing digital teaching materials that simultaneously integrate the value of local wisdom and the formation of environmental behavior.

Along with the development of technology and the characteristics of today's students, learning demands a more interactive and digital-based approach. The development of the times also demands the world of education to continue to innovate through learning that is relevant to the needs of students. The use of digital media in social studies learning is considered to have great potential to present material in a contextual, visual, and meaningful way (Nugraha, 2025).

Digital-based education allows local wisdom values to be presented in a more attractive and relevant way for students, while encouraging active student involvement in the learning process. The development of digital social studies teaching materials based on local wisdom, including Dayak Deah local wisdom, can be a strong foundation in creating meaningful learning and oriented towards the formation of comprehensive environmental awareness (Andriani et al., 2023; Immaniar et al., 2019). However, studies that specifically develop digital social studies teaching materials based on certain local wisdom are still relatively limited.

Based on this description, this research is directed to develop digital social studies teaching materials based on local wisdom values that are not only oriented towards improving

students' understanding of the environment, but also systematically encourage the formation of deeper and sustainable environmental attitudes, actions, and responsibilities. Thus, the teaching materials developed are expected to be able to bridge the gap between environmental knowledge and real behavior of students, so that environmental awareness does not stop at the cognitive level and formal routines, but develops as intrinsic awareness.

RESEARCH METHODS

Metode penelitian yang digunakan dalam penelitian ini adalah *Research and Development* (R&D) dengan model 4D, yang mencakup empat tahap utama: *Define*, *Design*, *Develop*, dan *Disseminate* (Susanto & Andayani, 2023). This model was chosen to develop digital Social Sciences (IPS) teaching materials based on the values of local Dayak Deah wisdom, with the aim of increasing students' environmental awareness. This study involved social studies students and teachers at SMPN 2 Upau consisting of 27 students in grade VII A as an experimental group and 25 students in grade VII B as a control group. The sampling technique is carried out purposively by considering the direct involvement of students in the use of the developed teaching materials. Data collection is carried out by means of observation using observation sheets, interviews with interview guidelines which are also used to analyze the initial needs of the teaching materials to be used. Furthermore, the validation lens is used to assess the feasibility of teaching materials in terms of content, language, and appearance, student response measures to measure the practicality of use, as well as environmental awareness questionnaires in the form of pre-tests and post tests to measure the effectiveness of the teaching materials developed.

The data analysis technique was carried out by quantitative descriptive analysis to process validation data and questionnaires in the form of percentages and eligibility categories, as well as statistical analysis to evaluate the effectiveness of the use of teaching materials. The statistical tests used include the Kolmogorov Smirnov normality test, the Levene's test homogeneity test and the hypothesis test using a paired sample t-test. To be clearer, the development stages are as follows :

1. Define Stage

The definition stage aims to establish the basis and direction of the development of teaching materials. Here, an analysis of learning needs, environmental awareness conditions, and the potential of Dayak Deah local wisdom that is relevant to social studies materials is carried out. This process also includes an analysis of student characteristics and curriculum to ensure the suitability of teaching materials with

learning needs and competencies that must be achieved. The results of this stage will be the basis for determining the specifications of the teaching materials to be developed.

2. Design Stage

In the design stage, the main focus is to compile the structure and flow of the material and integrate the values of local Dayak Deah wisdom into learning activities. This stage also includes determining learning objectives, digital formats, media displays, and evaluation instruments that include aspects of knowledge, attitudes, and actions. The output of this stage is the initial prototype of the teaching materials.

3. Develop Stage

The development stage aims to produce teaching materials that are valid, practical, and suitable for use. This stage is carried out through several steps, starting with validation by learning experts and social studies teachers to evaluate the suitability of the material with the curriculum, the accuracy of the concept, and its integration with social studies learning objectives. Furthermore, validation was carried out by learning media experts to assess the quality of display, readability, navigation, and the level of interactivity of digital teaching materials ([Hafizah et al., 2021](#); [Usman et al., 2021](#)). After obtaining input from experts, the teaching materials were revised according to the suggestions given, then tested on a limited scale to social studies students and teachers. At this stage of the trial, the responses of students and teachers were collected to assess the practicality, ease of use, and usefulness of teaching materials in the social studies learning process.

4. Disseminate Stage

The dissemination stage aims to introduce and utilize the teaching materials that have been developed. This activity includes limited implementation in learning, socialization of the use of teaching materials to teachers, and distribution through digital platforms. Feedback from this stage will be a reference for further development evaluation ([Hafizah et al., 2021](#); [Paradkar et al., 2024](#)).

RESULTS AND DISCUSSION

This section presents the results of research and discussion obtained from each stage of the development of social studies teaching materials in the form of digital storybooks based on the Tawas Jaa Dayak Deah tradition. The presentation of the results not only presents the

empirical findings obtained during the research process, but also examines analytically the relationship between the initial conditions of social studies learning, the level of environmental awareness of students, and the rationality of the development of teaching materials based on local wisdom. The discussion was directed to interpret the research findings critically by linking them to the research objectives, the social studies learning context, and the relevance of the values of the Tawas Jaa tradition in strengthening students' environmental awareness.

Systematically, the results of the research are presented based on the stages of the 4D development model, starting from the define stage which describes the initial conditions and development needs, followed by the design and develop stage which shows the design process as well as product validation and trial, to the disseminate stage as an effort to utilize and disseminate the product. Through this approach, the results and discussion sections are expected to provide a complete picture of the contribution of the development of digital storybooks based on the tradition of Tawas Jaa Dayak Deah in strengthening students' environmental awareness in social studies learning. The results of the research and discussion are as follows :

1. Define Stage

The definition stage is the initial stage in the 4D development model which aims to obtain an overview of social studies learning conditions, the level of environmental awareness of students, and the potential for integration of Dayak Deah local wisdom at SMPN 2 Upau.

Based on the initial data obtained from the survey using the guttman scale with 5 basic statements made to see the factual condition of environmental awareness of students at SMPN 2 Upau got an average score of 67.5%. Based on the results of the initial survey using the Guttman scale instrument consisting of several basic statements related to environmental behavior, it was obtained that the environmental awareness of students is still not developing optimally. This can be seen from the students' answers which show that environmental care behaviors, such as throwing garbage in its place, have not been done consistently.

These results are strengthened by field observations that show that there are still environmental problems in schools, such as the existence of plastic waste that is out of place and the low active participation of students in maintaining environmental cleanliness, especially outside of direct supervision from teachers. In addition, the implementation of environmentally friendly school policies has not been consistent in daily activities.

Other findings show that social studies learning in schools still tends to be oriented towards delivering material conceptually and has not optimally integrated the values of Dayak Deah local wisdom that are relevant to environmental conservation. Although there are efforts to introduce local culture, the integration is still limited to ceremonial activities, such as the involvement of students in traditional ceremonies or certain cultural activities.

This condition shows that there is a gap between the potential of Dayak Deah local wisdom which is rich in ecological value and social studies learning practices in schools. The Dayak Deah community is known to have values that uphold harmony between humans and nature, but these values have not been substantively integrated in learning materials, activities, and evaluations.

In addition, the use of contextual and digital-based learning media is still limited, so learning is not fully able to relate the concept of social studies to the social, cultural, and environmental realities of students.

Overall, the results of the definition stage through the observation of the initial problem show that the level of environmental awareness of students is still in the moderate category in all aspects, and there is a gap between knowledge, attitudes, commitments, and environmental actions and the real practices of students in daily life. In addition, there are still inconsistencies between school policies, learning practices, and the potential for local wisdom in supporting the formation of students' environmental awareness.

The results of the study at the definition stage show that the level of environmental awareness of students is still in the moderate category in all aspects, with variations in achievement between knowledge, attitudes, actions, and environmental commitments. These findings indicate that although students have a fairly good understanding of environmental issues, this understanding has not been fully internalized in the form of consistent attitudes and behaviors in daily life.

This condition shows that there is a gap between students' environmental knowledge and actions, which in environmental literacy studies is often referred to as the *knowledge-behavior gap*. This indicates that the mastery of environmental knowledge does not linearly have implications for the attitudes and behaviors of the circle (Cahyani et al., 2025). This phenomenon confirms that mastery of environmental concepts is not automatically followed by behavioral changes, especially when the learning process still focuses on cognitive aspects. This is in line with the view that declarative learning tends to produce conceptual understanding without being followed by the internalization of deep values (Arbayah et al., 2024; Asy'ari, 2023; Muslich, 2015).

Findings related to schools with Adiwiyata status show that the existence of environmental programs and policies has not been fully able to form sustainable environmental awareness. The awareness that is formed still tends to be normative and depends on institutional supervision. This shows that formal habituation that is structural is not enough to build students' intrinsic awareness, so a more reflective and meaningful learning approach is needed ([Iswari & Utomo, 2017](#); [Pahru et al., 2021](#); [Ulhasanah, 2019](#)).

In addition, the results of observations show that environmental problems such as the existence of plastic waste in the school environment and inconsistencies in the implementation of Adiwiyata's policies. These findings reinforce that there is a mismatch between the policies designed and real practices on the ground. This condition indicates that the formation of students' environmental behavior has not been supported by a learning system that consistently instills ecological values and habits.

In the context of social studies learning, the results of the study show that the learning process still tends to be oriented towards delivering material conceptually and not fully contextual. This causes the environmental material presented to be not directly connected to the students' life experiences, making it difficult to encourage the formation of reflective and applicative awareness.

Furthermore, although the Dayak Deah community is known to have local wisdom values that uphold harmony between humans and nature, these values have not been optimally integrated in social studies learning. The integration carried out is still ceremonial and incidental, such as through cultural activities or traditional ceremonies, and has not been systematically implemented in materials, learning activities, and evaluations. This condition shows that there is a gap between the potential of local wisdom and learning practices in schools ([Manu, 2023](#)).

Therefore, learning innovations that are able to integrate local wisdom values in a contextual and meaningful manner are needed. The development of digital storybooks based on the Tawas Jaa tradition is one of the relevant alternative solutions, because it is able to present environmental values in the form of narratives that are close to the lives of students. This approach allows learners not only to understand the concept of the environment, but also to reflect on values and internalize them in the form of attitudes and actions ([Hidayati et al., 2022](#)).

Overall, the results of the definition stage confirm that the main problem in social studies learning does not lie in the lack of environmental knowledge, but in the weak process of internalizing values and the lack of linkage between learning and the cultural

context and the lives of students. Therefore, the integration of local wisdom in the form of contextual learning media is important to bridge the gap between students' knowledge, attitudes, and environmental actions.

2. Design Stage

The *Design stage* is a strategic step in designing an initial prototype of a digital storybook based on the tradition of Tawas Jaa Dayak Deah. At this stage, the design is not just to compile a cultural narrative in the form of a story, but is further directed to present learning media that is able to integrate character education values such as religiosity, environmental concern, mutual cooperation, and responsibility. These values were chosen because they are in accordance with the essence of *the Tawas Jaa tradition* which is full of philosophical meanings about harmony between humans, nature, and the Creator.

The storyline in the digital storybook is developed by raising the real experience of the Dayak Deah people in carrying out the Tawas Jaa tradition. The story is packaged in the form of a simple, contextual, and relevant narrative to the daily lives of junior high school students. For example, the main character in the story can be played by a Dayak Deah child who participates in a traditional procession with his family, then reflects on moral messages related to the preservation of forests, rivers, and land.

Technically, storybook design refers to the principle of multimedia learning that combines narrative text with visual illustration. The illustrations are then presented in a visual style that is in accordance with the characteristics of the custom, which is raised with sharp coloring to make it attractive to the participants to be identified, while the text uses language that is communicative, simple, and as much as possible reflective of the message raised so that it can be easily understood by students.

The design feasibility test, using validation from experts who are social studies teachers and expert lecturers with three main aspects, namely: (1) content aspects that focus on the suitability of the material with social studies learning and local wisdom and the values raised, (2) the language aspect that assesses the clarity and readability of the narrative, (3) visual aspects that include visual quality, navigation, and readability of text. Furthermore, the results of expert validation showed that the digital storybook bajwa obtained the "very feasible" category in these three aspects. In terms of content, the media is considered relevant because it can connect the local wisdom of the traditional traditions of Tawas Jaa by connecting it to environmental issues. In addition to the language aspect, the narrative is considered easy to understand and quite communicative, and in accordance

with the cognitive condition of the targeted students. Finally, in the aspect of appearance, the visual design is considered attractive, but there are few notes for the use of fonts to ensure that they can be read well in some parts.

Overall, at this stage, a digital storybook prototype was produced that could meet the feasibility criteria in terms of content, language, and display. The design of digital storybooks as social studies learning materials based on the values of local wisdom of Dayak Deah, is as follows :

Figure 3. The display of the Story book that was developed integrated with the values of local Dayak Deah wisdom



The results at the design stage show that the development of a digital storybook based on the tradition of Tawas Jaa Dayak Deah is an effort to integrate social studies learning with local wisdom that is contextual. This integration is important to bridge the gap between the learning material and the reality of students' lives, as found in the definition stage. This is in line with the concept of education based on local wisdom which emphasizes the integration of values, knowledge, and cultural practices in education, so that not only knowledge transfer occurs but more than iru can also be used as a means of shaping students' character (Fredyarini et al., 2025).

The use of cultural narratives in digital storybooks allows learners to understand environmental values through experiences close to their lives. This approach supports the creation of more meaningful learning, because the material is not only presented conceptually, but also associated with the social and cultural context of students. This finding is in line with previous research which shows that integrating local contexts in learning can help students in understanding the relevance of the material to real life that occurs in their environment, in addition to that it can also be used as a medium for internalizing students' values and morals (Jayanti & Sarasanty, 2024; Pasaka et al., 2022).

In terms of media design, the use of a combination of narrative text and visual illustration shows that the product developed has accommodated the needs of students in understanding information in a more interesting and easy-to-understand way (Norlela, 2023). This presentation supports student involvement in the learning process and has the potential to increase the attractiveness of learning. This is in line with the findings that the combination of illustrations and narratives in storybooks can increase understanding, attract attention, and increase students' interest in learning (Pasaka et al., 2022).

The results of expert validation that show the category of "very feasible" in terms of content, language, and display indicate that the product developed has met the feasibility standards as a learning medium. This shows that the integration of local wisdom values into digital media is not only conceptually relevant, but can also be implemented practically in learning.

However, the existence of inputs related to the use of local terms and font size shows that readability and accessibility aspects still need to be considered in the development of learning media. This emphasizes that in addition to the quality of content, technical aspects also play an important role in supporting the effectiveness of media use in learning.

Overall, the design stage shows that digital storybooks based on local wisdom have the potential as a contextual, interesting, and relevant learning medium in supporting the internalization of students' environmental values.

3. Develop Stage

The Develop stage is the process of developing a digital storybook prototype that has been compiled at the Design stage. Key activities include expert validation, limited trials, and revisions based on input. The results of the expert validation test and limited trial can be explained as follows:

1. Expert Validation

The initial prototype of the digital storybook resulting from the Design stage was then validated by a panel of experts representing three important areas: subject matter experts (social studies & environmental education), linguists (readability and language suitability), and learning media experts (visual design and usability). The purpose of validation is to ensure that the product meets the academic, pedagogical, and technical eligibility criteria before being tested on students.

The validation instrument contains indicators that cover three main aspects. First, the content aspect, which assesses the suitability of the material with the social studies curriculum, the depth of the material, and the extent to which the value of local wisdom is included in the narrative. Second, the language aspect, which includes readability, sentence clarity, and vocabulary suitability with the ability level of junior high school students. Third, the appearance or design aspect, which assesses the quality of illustrations, page layout, navigation in storybooks, and visual comfort such as font size. The table of digital storybook expert validation results is as follows:

Table 1. Digital storybook expert validation results

Assessment Aspects	Indicator	Score (%)	Category	Notes
Contents	Conformity with social studies objectives, integration of local wisdom, relevance to environmental awareness	88%	Highly feasible	Content is already relevant, need a glossary of local terms
Language	Narrative clarity, sentence simplicity, readability	85%	Highly feasible	Some terms need to be simplified
Display	Illustrations, layouts, fonts, visual appeal	83%	Highly feasible	Font size in some sections needs to be enlarged
Average		85%	Highly Worth It	

The results of expert validation of digital storybooks based on the tradition of Tawas Jaa Dayak Deah show that this media received an assessment with an average score of 85% and is included in the "very feasible" category. In detail, the assessment is carried out on three main aspects, namely content, language, and appearance.

In terms of content, the media received the highest score, which was 88%, with a very decent category. Experts consider the content to be in accordance with the social

studies learning objectives, especially in connecting the local Dayak Deah tradition with environmental awareness issues. Another advantage is the success of storybooks in presenting cultural values such as religiosity, mutual cooperation, responsibility, and environmental concern. However, experts suggest that the local terms used in the story be complemented by a simple glossary, so that students can more easily understand the meaning of the terms.

In the language aspect, the media received a score of 85% with a very decent category. The narrative is considered to be communicative, uses simple sentences, and is in accordance with the cognitive level of junior high school students. However, there are some terms that are still considered difficult for students, so it is recommended to simplify them without eliminating the cultural meaning contained in them.

Meanwhile, in the aspect of appearance, the score obtained was 83%, also included in the very feasible category. The illustrations presented are considered attractive, the layout is quite neat, and the visuals are in accordance with the characteristics of the digital generation students. However, experts suggest that the font size in some sections be increased to improve reading comfort.

a. Limited trial

The limited trial stage was carried out at SMPN 2 Upau by involving 27 grade VII students as research subjects. The purpose of this stage is to evaluate the practical feasibility of a digital storybook based on the tradition of Tawas Jaa Dayak Deah that has gone through an expert validation process. This trial focused on three main aspects, namely ease of use, attractiveness, and usefulness. In addition, at this stage, the level of environmental awareness of students is also measured through the use of a special questionnaire that measures their understanding, attitudes, and actions towards environmental conservation issues.

Table 2. Student response questionnaire related to digital storybooks as social studies teaching materials

Assessment Aspects	Indicator	Score (%)	Category
Ease of Use	Easy to understand, simple navigation, not confusing	82%	Highly feasible
Attraction	Interesting illustrations, appropriate colors, make students enthusiastic	87%	Highly feasible
Benefits	Helping to understand the value of Tawas Jaa, fostering environmental awareness	84%	Highly feasible

Assessment Aspects	Indicator	Score (%)	Category
Average		84%	Highly Worth It

Based on the results of the student response questionnaire, it was obtained that digital storybooks were considered very good in all aspects. In terms of ease of use, students gave a score of 82%, which shows that this product is easy to understand, has simple navigation, and is not confusing when used. In terms of attractiveness, storybooks obtained a score of 87%, which means that the illustration display, color selection, and visual style used are assessed in accordance with the characteristics of junior high school students and are able to foster enthusiasm for learning. As for the usefulness aspect, the product received a score of 84%, showing that students felt helped in understanding the values of the Tawas Jaa tradition, as well as being encouraged to foster environmental awareness in daily life. Overall, the average student response results reached 84% in the excellent category.

In addition, environmental awareness was measured through pretest and post tests in the experimental and control groups. Furthermore, environmental awareness was measured through a questionnaire containing 15 statements given to the experimental and control groups, both before (pre-test) and after the intervention (post-test). The results can be seen in Table 3.

Table 3 Environmental awareness scores of students of the experimental and control groups (pre-test and post-test)

Groups	Min Pretest	Max Pretest	Min Post test	Max Post test
Eksperimen	38	54	46	55
Control	38	45	43	50

Based on the table above, it can be seen that both groups have increased. In the experimental group, the minimum score increased from 38 to 46 (an eight-point increase), while the maximum score increased from 54 to 55. In the control group, the minimum score rose from 38 to 43 and the maximum score from 45 to 50.

Furthermore, a normality test (sig. > 0.05) and a homogeneity test were also carried out with the following results :

Table 4 Normality Test Results

Group	Pre-test Sig. (2-tailed)	Post-test Sig. (2-tailed)	Interpretasi
Eksperimen	0.178	0.200	Normal
Kontrol	0.063	0.178	Normal

Seluruh nilai signifikansi $> 0,05$ sehingga data berdistribusi normal. Selanjutnya dilakukan uji homogenitas menggunakan Levene's Test pada tabel 5.

Tabel 5 Hasil Uji Homogenitas

Group	Based on Mean (Sig.)	Based on Median (Sig.)	Based on Median adj. df (Sig.)	Based on Trimmed Mean (Sig.)	Interpretation
Experimental	0.325	0.347	0.347	0.347	Homogeneous
Control	0.289	0.316	0.316	0.317	Homogeneous

A significance value of > 0.05 indicates that the data is homogeneous, so the parametric assumptions are met.

Furthermore, a t-test was carried out to see the influence of students' environmental awareness by using digital storybooks as social studies teaching materials integrated with the values of local wisdom of Dayak Deah. The results can be seen in table 5.

Table 5 Paired *Sample t-test resultst*

Group	Mean Difference	Std. Deviation	Std. Error Mean	95% CI Lower	95% CI Upper	t	df	Sig. (2-tailed)
Control	-5.480	2.974	0.595	-6.708	-4.252	-9.214	24	0.000
Experimental	-7.148	3.697	0.712	-8.611	-5.686	-10.046	26	0.000

Based on the results of the analysis of the t-test in the control and experimental groups, it was obtained that there was a significant difference in pre-test and post-test scores related to the level of environmental awareness of students.

In the control group, the mean difference was -5.480 with a standard deviation of 2.974 and a mean error standard of 0.595. The confidence interval (95% CI) ranged from -6.708 to -4.252, with a value of $t = -9.214$ at a degree of freedom (df) of 24 and significance of $p = 0.000$ ($p < 0.05$). This shows that there is a significant increase in students' environmental awareness scores even without special treatment based on innovative learning media.

Meanwhile, in the experimental group, the average score difference was higher, namely -7.148, with a standard deviation of 3.697 and a standard mean error of 0.712. The confidence interval (95% CI) was in the range of -8.611 to -5.686. The value of $t = -10.046$ with df 26 and the significance of $p = 0.000$ ($p < 0.05$) confirmed that there was a significant

increase in the level of students' environmental awareness after being given digital storybook-based learning based on local Dayak Deah wisdom.

The findings of the study show that the use of digital storybooks based on the tradition of Tawas Jaa Dayak Deah can have a positive impact on increasing students' environmental awareness. This can be seen from a significant increase in scores in the experimental group. These findings are in line with the Contextual Teaching and Learning (CTL) approach which emphasizes the importance of connecting the content of learning with the real context of students' lives (Johnson, 2002) (Dewi & Primayana, 2019; Wibawa et al., 2023). This is also consistent with Vygotsky's (1978) sociocultural theory which states that meaningful learning occurs through interaction in relevant cultural and social contexts (Silalahi, 2019). Thus, it can be said that the integration of local wisdom as digital teaching materials can not only have implications for cognitive aspects, but can also support the process of internalizing environmental values in depth.

Statistically, the results of *the paired sample t-test* showed a significant difference between the pre-test and post-test scores in both groups. However, a greater increase in the experimental group indicated that the use of digital storybooks based on local traditions was more effective in increasing students' environmental awareness. These results reinforce empirical evidence that the integration of local cultural values in digital learning media has a significant contribution to increasing environmental awareness.

In addition, the results of the development stage show that digital storybooks based on the tradition of Tawas Jaa Dayak Deah have a high level of feasibility in terms of academic, pedagogical, and technical aspects. Expert validation that places the product in the "very feasible" category shows that the integration of social studies materials, local wisdom values, and environmental awareness issues has been done appropriately (Susanto & Andayani, 2023). The highest score on the content aspect confirms that the local culture-based approach is contextually relevant and in line with the social studies learning objectives, especially in building an understanding of human and environmental relations (Wibowo et al., 2018).

Respon positif siswa pada uji coba terbatas menunjukkan bahwa storybook digital praktis digunakan dan sesuai dengan karakteristik siswa SMP yang menyukai media digital dengan navigasi sederhana (Mansir, 2021). The high attractiveness score reinforces the role of illustration and visual narrative in increasing student engagement, while the usefulness score shows that these media help students understand the value of the environment and local culture in a more meaningful way (Subagtio, 2022). These findings are in line with

the principles of *Contextual Teaching and Learning* which emphasizes the importance of the relationship between learning and the real context of students' lives (Rismayanti et al., 2025), as well as a sociocultural perspective that views culture as an important medium in the learning process.

The results of environmental awareness measurements showed that the use of digital storybooks had a greater impact than conventional learning, especially in the experimental group. A more significant increase in this group suggests that cultural narrative-based media is inclusive and effective in helping students with lower initial abilities, while also contributing to reducing learning outcomes gaps (Mansir, 2021; Putri et al., 2023). Statistically, the results of the paired sample t-test significantly strengthen the empirical evidence that the integration of local cultural values in digital media is effective in increasing students' environmental awareness.

Thus, it can be concluded that the development of digital storybooks based on the Tawas Jaa Dayak Deah tradition not only meets the feasibility aspect, but also proves to be effective in significantly increasing students' environmental awareness. The integration of local wisdom values in digital media is a relevant and innovative strategy in social studies learning, because it is able to connect cognitive, affective, and behavioral aspects simultaneously in the context of students' real lives.

4. *Dissemination Step*

This stage is the final stage in the 4D development model which aims to disseminate products that have been declared valid, practical, and effective to a wider range of users. However, in this study, dissemination activities were carried out on a limited basis by introducing digital storybooks based on the Tawas Jaa Dayak Deah tradition only to social studies teachers at SMPN 2 Upau through socialization and discussion activities.

In addition, the product is also distributed in the form of a digital file that can be accessed and used as alternative teaching materials in social studies learning. This process aims to encourage the use of digitalization in learning and encourage the integration of local wisdom in a broader and useful context. Reflecting on the scope of dissemination, further development is needed to extend the implementation of the product to other schools as well as test its effectiveness in more diverse contexts.

CONCLUSION

The development of digital social studies learning materials based on the tradition of Tawas Jaa Dayak Deah is effective in increasing environmental awareness of junior high school students. The define stage shows that there is a gap between students' relatively good environmental knowledge and environmental attitudes and actions that are still in the medium to low category. The design stage produces a digital storybook design that integrates ecological values, local wisdom, contextually and in accordance with the characteristics of students. Furthermore, the development stage proves that the teaching materials developed have a very high level of validity (85%), excellent practicality (84%), and effectiveness shown through a statistically significant increase in students' environmental awareness ($p < 0.05$).

Theoretically, the findings of this study confirm the important role of social studies learning based on local wisdom in bridging the gap between students' knowledge and environmental behavior. Practically, the teaching materials developed can be used as an alternative to contextual and meaningful digital learning media to strengthen the value of environmental awareness. Further research is suggested to examine the application of these teaching materials in more diverse cultural contexts and examine their impact on environmental behavior change in the long term.

DAFTAR PUSTAKA

- Abbas, I. (2023). Opportunities and Challenges of Local History Research in North Maluku. *JURNAL SOCIUS*, 12(2), 11–24. <https://doi.org/10.20527/js.v12i2.17450>
- Andriani, R., Marlina, E., & Rahayu, N. S. (2023). The Character Education Based on Local Wisdom With Flipbook Assisted Digital Literacy Media in Online Learning. *International Journal of Quantitative Research and Modeling*, 4(2), 104–109. <https://doi.org/10.46336/ijqrm.v4i2.450>
- Arbayah, S., Adyatma, S., Hastuti, K. P., Angriani, P., & Aristin, N. F. (2024). TEACHER READINESS IN IMPLEMENTING THE MERDEKA CURRICULUM: A STUDY ON BANJARMASIN PGRI HIGH SCHOOL. *JURNAL SOCIUS*, 13(2), 77–87. <https://doi.org/10.20527/js.v13i2.18779>
- Asy'ari, M. (2023). Instigating Learning Management in Building Students' Ecological Awareness at Madrasah Ibtidaiyah Pamekasan Madura. *Jieman Journal of Islamic Educational Management*, 5(2), 151–167. <https://doi.org/10.35719/jieman.v5i2.194>
- Baron, R., Suwarsito, S., Chodidjah, C., & Lestari, V. L. (2022). Local Wisdom Value in Implementing of Merdeka Belajar Kampus Merdeka in Era Digital. *Al-Ishlah Jurnal Pendidikan*, 14(4), 7175–7184. <https://doi.org/10.35445/alishlah.v14i4.2048>
- Cahyani, R. P., Rahmat, A., Hamdiyati, Y., Amprasto, A., & Jamil, M. W. (2025). Does environmental knowledge predict attitudes and behaviors in environmental literacy? Evidence from senior high school students. *JPBI (Jurnal Pendidikan Biologi Indonesia)*, 11(3), 828–840. <https://doi.org/10.22219/jpbi.v11i3.41213>
- Chen, C., Chai, M., & Lin, P. (2025). Exploring the Impact of Interactive Multimedia E-Books on the Effectiveness of Environmental Learning, Pro-Environmental Attitudes, and

- Behavioural Intentions Among Primary School Students. *Journal of Computer Assisted Learning*, 41(4). <https://doi.org/10.1111/jcal.70087>
- Dewi, P. Y. A., & Primayana, K. H. (2019). Effect of Learning Module With Setting Contextual Teaching and Learning to Increase the Understanding of Concepts. *International Journal of Education and Learning*, 1(1), 19–26. <https://doi.org/10.31763/ijelev.1i1.26>
- Dwianto, A., Wilujeng, I., Prasetyo, Z. K., & Suryadarma, I. G. P. (2017). The Development of Science Domain Based Learning Media Which Is Integrated With Local Potention to Improve Science Process Skill and Scientific Attitude. *Jurnal Pendidikan Ipa Indonesia*, 6(1). <https://doi.org/10.15294/jpii.v6i1.7205>
- Fatmawati, F., Wahyudi, W., & Harjono, A. (2022). Pengembangan Perangkat Pembelajaran Berbasis Proyek Untuk Meningkatkan Keterampilan Proses Sains Peserta Didik. *Jurnal Ilmiah Profesi Pendidikan*, 7(4b). <https://doi.org/10.29303/jipp.v7i4b.983>
- Fredyarni, N. A., Siregar, I., Warsani, H., Supentri, Rafianti, R., Amnie, E., Suraya, R. S., Zulfa, Negara, C. P., Afrilia, I., Ratnawati, S. A., Suparno, A., & Barkara, R. S. (2025). *Pendidikan Berbasis Kearifan Lokal* (Suroyo, Ed.). PT Penamuda Media.
- Haerullah, A., Hasan, S., & Sahil, J. (2023). Analysis of Needs for Biology E-Module Based on Local Wisdom North Maluku, Indonesia. *International Journal of Social Service and Research*, 3(6), 1551–1559. <https://doi.org/10.46799/ijssr.v3i6.395>
- Hafizah, E., Annur, S., & Putri, R. F. (2021). Pengembangan Bahan Ajar IPA Terpadu Berbasis Kearifan Lokal Di Lahan Basah. *Vidya Karya*, 36(2), 68. <https://doi.org/10.20527/jvk.v36i2.10504>
- Hamson, Z., Akbar, M., & Aziz, S. (2025). Communication Ethics of Content Creators in the New Media Era Based on Bugis Makassar Local Wisdom. *Satwika Kajian Ilmu Budaya Dan Perubahan Sosial*, 9(1), 279–289. <https://doi.org/10.22219/satwika.v9i1.40189>
- Handy, M. R. N., Mutiani, M., Putra, M. A. H., Jumriani, J., & Rahman, A. M. (2021). CULTURAL ACCULTURATION OF CHINESE: ETNOGRAPHIC STUDY IN BANJARMASIN. *JURNAL SOCIUS*, 10(1), 66–75. <https://doi.org/10.20527/jurnalsocius.v10i1.9013>
- Hidayati, W. R., Warmansyah, J., & Zuhendri, Z. (2022). Upaya Penguatan Nilai-Nilai Karakter Islam Moderat Pada Satuan Pendidikan Anak Usia Dini. *Jurnal Obsesi Jurnal Pendidikan Anak Usia Dini*, 6(5), 4219–4227. <https://doi.org/10.31004/obsesi.v6i5.1756>
- Immaniar, B. D., Sumarmi, S., & Astina, I. K. (2019). Pembelajaran Lingkungan Berbasis Kearifan Lokal Dengan Model Experiential Learning. *Jurnal Pendidikan Teori Penelitian Dan Pengembangan*, 4(5), 648. <https://doi.org/10.17977/jptpp.v4i5.12431>
- Iswari, R. D., & Utomo, S. W. (2017). Evaluasi Penerapan Program Adiwiyata Untuk Membentuk Perilaku Peduli Lingkungan Di Kalangan Siswa (Kasus: SMA Negeri 9 Tangerang Selatan Dan MA Negeri 1 Serpong). *Jurnal Ilmu Lingkungan*, 15(1), 35. <https://doi.org/10.14710/jil.15.1.35-41>
- Jayanti, R., & Sarasanty, D. (2024). Integrasi Nilai-Nilai Lingkungan Lokal dalam Pembelajaran Bahasa Indonesia melalui Perancangan Kandang Eco-Friendly. *Journal of Education Research*, 5(4), 6813–6818. <https://doi.org/10.37985/jer.v5i4.2154>
- Jumriani, J., Mutiani, M., Putra, M. A. H., Syaharuddin, S., & Abbas, E. W. (2021). The Urgency of Local Wisdom Content in Social Studies Learning: Literature Review. *The Innovation of Social Studies Journal*, 2(2), 103. <https://doi.org/10.20527/iis.v2i2.3076>
- Mansir, F. (2021). Analisis Model-Model Pembelajaran Fikih Yang Aktual Dalam Merespons Isu Sosial Di Sekolah Dan Madrasah. *Ta Dibun Jurnal Pendidikan Islam*, 10(1), 88. <https://doi.org/10.32832/tadibuna.v10i1.4212>

- Manu, G. A. (2023). Memahami Pendidikan Secara Komprehensif-Integratif Melalui Tokoh Romo Mangun. *Tut Wuri Handayani Jurnal Keguruan Dan Ilmu Pendidikan*, 2(4), 123–133. <https://doi.org/10.59086/jkip.v2i4.372>
- Murtono, R. (2024). JARANAN CAMPURSARI ART IN ANGSANA VILLAGE AS AN IPS LEARNING RESOURCE. *JURNAL SOCIUS*, 13(2), 66–76. <https://doi.org/10.20527/js.v13i2.13159>
- Muslich, A. (2015). Metode Pengajaran Dalam Pendidikan Lingkungan Hidup Pada Siswa Sekolah Dasar (Studi Pada Sekolah Adiwiyata Di Dki Jakarta). *Jurnal Pendidikan*, 16(2), 110–126. <https://doi.org/10.33830/jp.v16i2.342.2015>
- Nadilla, D. F., Syaharuddin, S., Subiyakto, B., Arisanty, D., Jannah, F., & Mardiani, F. (2024). POWERFUL SOCIAL STUDIES LEARNING INTEGRATED WITH DAYAK DEAH LOCAL WISDOM AT JUNIOR HIGH SCHOOLS IN TABALONG. *International Conference On Social Science Education Proceeding*, 2, 248–255. <https://doi.org/10.20527/fffxsx42>
- Norlela, N. L. (2023). INTEREST IN LEARNING BY USING VISUAL MEDIA IN SOCIAL STUDIES SUBJECTS. *JURNAL SOCIUS*, 12(1). <https://doi.org/10.20527/js.v12i1.16004>
- Nugeraha, T. (2025). TEACHERS' STRATEGIES IN IMPLEMENTING THE INDEPENDENT CURRICULUM AT PENGAMBANGAN 6 PUBLIC ELEMENTARY SCHOOL, BANJARMASIN CITY. *JURNAL SOCIUS*, 14(1), 81–93. <https://doi.org/10.20527/js.v14i1.19623>
- Pahru, S., Akbar, S., & Hitipeuw, I. (2021). Pelaksanaan Program Adiwiyata Dalam Mendukung Pembentukan Karakter Peduli Lingkungan. *Jurnal Pendidikan Teori Penelitian Dan Pengembangan*, 6(1), 119. <https://doi.org/10.17977/jptpp.v6i1.14405>
- Paradkar, S., Deshmukh, T., Annewar, J., Dhore, S., & Choube, A. (2024). E-Learning Platform Using API Models – “QuantumQuotient.” *Gimrj*, 181–191. <https://doi.org/10.69758/akgy4752>
- Pasaka, J. T., Julianto, I. N. L., & Artha, I. G. A. I. B. (2022). PERANCANGAN STORYBOOK DIGITAL SEBAGAI MEDIA PEMBELAJARAN ANAK BERBENTUK GAME EDUKASI. *AMARASI: JURNAL DESAIN KOMUNIKASI VISUAL*, 3(02), 214–226. (Denpasar). <https://doi.org/10.59997/amarasi.v3i02.1682>
- Putri, A. S., Iriaji, I., & Wisesa, A. M. (2023). Pengembangan Media Interaktif Berbasis Aplikasi Mobile Pembelajaran Seni Grafis Pada Kelas IX Sekolah Menengah Pertama. *JITPro*, 1(1), 26–40. <https://doi.org/10.17977/um084v1i12023p26-40>
- Rismayanti, R., Apriyanto, A., & Suppa, R. (2025). Aplikasi Pembelajaran Aksara Lontara Bugis Berbasis Android Pada SDN 152 Cenning Di Desa Salobongko Kecamatan Malangke Barat. *Jurnal Informatika Dan Teknik Elektro Terapan*, 13(2). <https://doi.org/10.23960/jitet.v13i2.6075>
- Silalahi, R. M. (2019). Understanding Vygotsky's zone of proximal development for learning. *Polyglot: Jurnal Ilmiah*, 15(2), 169–186.
- Subagtio, M. E. (2022). Pemanfaatan Situs Kota Tua Padangan Kabupaten Bojonegoro Sebagai Objek Pembelajaran Kontekstual Berbasis Digital History. *Jurnal Pendidikan Sejarah Indonesia*, 5(1), 58. <https://doi.org/10.17977/um0330v5i1p58-75>
- Susanto, Y., & Andayani, E. S. (2023). Pengembangan Buku Digital Sejarah Lokal: Rapat Damai Tumbang Anoi 1894 Untuk Meningkatkan Kesadaran Sejarah Mahasiswa Pendidikan Sejarah Universitas Pgri Palangka Raya. *Jurnal Pendidikan Sejarah Indonesia*, 6(1), 117. <https://doi.org/10.17977/um0330v6i1p117-131>
- Syaharuddin, S., Subiyakto, B., Nadilla, D. F., & Jannah, F. (2025). The Integration of Dayak Deah's Local Wisdom in Social Studies Learning within The Merdeka Curriculum at

- Junior High Schools in Tabalong. *The Innovation of Social Studies Journal*, 6(2), 101–110. <https://doi.org/10.20527/issj.v6i2.14751>
- Ulhasanah, N. (2019). Apakah Pendidikan Lingkungan Merupakan Faktor Utama Pembentuk Perilaku Lingkungan Pada Masyarakat Di Negara Berkembang? *Dampak*, 16(1), 31–41. <https://doi.org/10.25077/dampak.16.1.31-41.2019>
- Untung, Moh. S., Mustakim, Z., Afroni, A., Kholid, M. N., & Rokhmah, A. (2022). Local Wisdom-Based Learning Innovation on Madrasah Ibtidaiyah in Digital Era. *Edukasia Islamika*, 7(1), 92–114. <https://doi.org/10.28918/jei.v7i1.5437>
- Usman, U., Bahraeni, B., & Garancang, S. (2021). Developing Teaching Materials of Islamic Education and Ethics Based on the Values of Local Wisdom. *Lentera Pendidikan Jurnal Ilmu Tarbiyah Dan Keguruan*, 24(1), 56. <https://doi.org/10.24252/lp.2021v24n1i6>
- Wahyuni, L. T. S., Lestari, N. A. P., Dharma, I. M. A., Lasmawan, I. W., & Suastra, I. W. (2023). Eksistensi Kearifan Lokal Bali Pada Kurikulum Merdeka di Sekolah Dasar. *Jurnal Paedagogy*, 10(3), 666–674. <https://doi.org/10.33394/jp.v10i3.7573>
- Wibawa, I. M. C., Margunayasa, I. G., & Widiastini, N. W. E. (2023). Needs Analysis: Development of Contextual Approach Learning Tools Based on Local Balinese Wisdom. *Journal of Education Technology*, 7(4), Article 4. <https://doi.org/10.23887/jet.v7i4.69933>
- Wibowo, B. R., S, D. L., Wasino, M., & Joebagio, H. (2018). *The Educational Values of Oral Tradition as an Attempt to Preserve Customary Land in Ketapang District West Kalimantan*. <https://doi.org/10.2991/iset-18.2018.17>
- Yusuf, M., Nahdhiyah, N., & Marjuni, K. N. (2022). Building Character of Bugis Community in Bone From the Perspective of Quran and Local Wisdom. *El Harakah Jurnal Budaya Islam*, 24(2), 193–220. <https://doi.org/10.18860/eh.v24i2.17047>
- Zannah, F. & Ayatusa'adah. (2023). Effectivity of Medicinal Plant Based on Local Wisdom of Dayak Community Textbook Development on Improving Student Learning Outcome. *Jurnal Penelitian Pendidikan Ipa*, 9(7), 5398–5405. <https://doi.org/10.29303/jppipa.v9i7.2615>