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Interactive Multimedia Based on Daily Life Nuances of Balinese Local Wisdom to Improve Learning Outcomes of Fourth Grade Elementary School Students

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A B S T R A K. *Penelitian ini didasarkan pada rendahnya hasil belajar siswa dalam pembelajaran IPAS serta kurang optimalnya pemanfaatan media pembelajaran. Penelitian ini bertujuan untuk menghasilkan rancang bangun, menguji validitas, kepraktisan, dan efektivitas Multimedia Interaktif berbasis* daily life *dengan nuansa kearifan lokal Bali terhadap hasil belajar siswa pada topik daerahku dan kekayaan alamnya kelas IV SD. Penelitian pengembangan ini menggunakan model ADDIE (*Analyze, Design, Development, Implementation, Evaluation*). Subjek penelitian ini adalah 4 orang ahli, 3 guru dan 6 siswa, serta seluruh siswa di kelas IV yang berjumlah 25 orang. Penelitian ini menggunakan desain* one shot case study. *Metode pengumpulan data yang digunakan adalah angket dan tes dengan instrumen berupa lembar skala penilaian dan tes pilihan ganda. Hasil penelitian menunjukkan skor validitas ahli media dan ahli muatan materi adalah 0,93 (sangat baik), penilaian kepraktisan media oleh guru dan siswa adalah 97.5% (sangat baik), dan multimedia Interaktif berbasis daily life dengan nuansa kearifan lokal Bali efektif untuk meningkatkan hasil belajar siswa pada topik Daerahku dan Kekayaan Alamnya. Hasil penelitian ini menunjukkan media yang dirancang memiliki tingkat validitas, dan kepraktisan yang tinggi, serta efektif meningkatkan hasil belajar siswa kelas IV pada mata pelajaran IPAS topik Daerahku dan Kekayaan Alamnya.*

A B S T R A C T. This research is based on low student learning outcomes in science and the suboptimal use of learning media. This study aims to develop a design and test the validity, practicality, and effectiveness of Interactive Multimedia based on daily life, incorporating nuances of Balinese local wisdom, on student learning outcomes related to my region and its natural resources in grade IV of elementary school. This development research uses the ADDIE model (Analyse, Design, Development, Implementation, Evaluation). The subjects of this study were 4 experts, 3 teachers, 6 students, and 25 students in class IV. This study uses a one-shot case study design. The data collection method used was a questionnaire and tests, including an assessment scale sheet and multiple-choice tests. The results showed that the validity score of media experts and material content experts was 0.93 (very good), the practicality assessment of the media by teachers and students was 97.5% (perfect), and Interactive multimedia based on daily life with nuances of Balinese local wisdom was effective in improving student learning outcomes on the topic of My Region and Its Natural Resources. The results of this study indicate that the designed media have high validity and practicality and are effective in improving fourth-grade students' learning outcomes in the Natural Sciences subject on the topic of My Region and Its Natural Resources.

A R T I C L E I N F O

Kata Kunci:
Pengembangan; Multimedia Interaktif; Daily Life; Hasil Belajar

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1. INTRODUCTION

Elementary school education still faces various challenges in increasing the effectiveness and attractiveness of learning for students. Learning can be effective if it enables students to learn easily and enjoyably and to achieve predetermined learning objectives (Anwar, 2017). One common problem in education is low student learning outcomes, particularly in Natural and Social Sciences (IPAS). IPAS is an important subject within the independent curriculum. It combines science and social studies, with content closely related to nature and human interaction. The goal of IPAS in the independent curriculum is to develop interest, curiosity, active participation, and the development of knowledge and

skills (Anggita et al., 2023). At the elementary school level, IPAS material is adapted to everyday experiences. However, in practice, many teachers still experience difficulties in presenting relevant and engaging learning for students (Marlensi et al., 2024). This may be due to the limited learning media used during the learning process. Learning that is less engaging and non-contextual can lead to low student participation and limited understanding of the material (Rahma & Ritonga, 2022). One solution to address this problem today is the use of technology in learning. Technological developments in the Society 5.0 era require education to adapt to digital advancements. Therefore, education is not only about teaching basic skills such as reading and writing, but also about equipping students with critical and creative thinking, as well as digital skills, to compete globally (Sabaruddin, 2022). This is supported by a quote stating that the role of technology in teaching and learning is crucial, as it can help convey knowledge to elementary school students for effective teaching (Simanjuntak et al., 2020). As elementary school is the initial level of education, technology not only helps prepare students from the beginning to adapt to increasingly rapid developments, but also makes it easier for them to learn new concepts more engagingly and enjoyably through technology-integrated learning media. This can make learning more effective, thereby influencing student learning outcomes.

Learning media is a crucial component in the teaching and learning process. Without media, learning will be monotonous and ineffective, as students become easily bored and struggle to develop their understanding of the material due to the lack of supporting media (Wulandari dkk., 2023). Conversely, the presence of learning media offers various benefits in the learning process, including increased student engagement through visually and interactively presented material. However, careful consideration of the media used is crucial. When teachers choose inappropriate media, it can reduce students' comprehension of the material being studied (Miftah & Rokhman, 2022). Therefore, teachers play a crucial role in the learning process. They are responsible for acting as facilitators and mediators. As facilitators, teachers are obligated to provide facilities or support the teaching and learning process, for example, by creating a conducive learning atmosphere that aligns with student development, thereby enabling effective teaching and learning interactions. The teacher as a mediator can be understood as either intervening in student learning activities or providing solutions when discussions do not go well. Mediators can also be seen as providers of learning media; teachers determine which media are appropriate for learning (Arisanti, 2012).

Based on this, to create a learning environment that supports the achievement of learning objectives and makes learning more effective, it is necessary to develop media that meets the demands of modern developments and the needs of students, such as utilising today's digital technology. However, it is still necessary to ensure its relevance to students' daily lives. Therefore, one of the best digital-based interactive learning media to use, especially for science learning content, is interactive multimedia based on daily life with nuances of Balinese local wisdom. This multimedia will focus on my region and its natural wealth. Multimedia can increase students' enthusiasm for learning by combining engaging text, animation, sound, and video (Triana et al., 2021). This aligns with the elements of multimedia, namely text, sound, images, animation, and video, delivered via a computer or interactively manipulated and controlled (Darmawan et al., 2017). Interactive multimedia based on daily life is media designed to connect learning materials with students' daily lives. This media is designed so students can see and understand the concepts they learn in a context close to their daily experiences. The topic "My Region and Its Natural Resources" in the science content is suitable for teaching using interactive multimedia grounded in daily life, with nuances of Balinese local wisdom, because it can clearly and engagingly depict the natural wealth and local culture in students' areas. Through this multimedia, students can see and understand visualisations of flora, fauna, natural resources, and the local community's customs.

2. METHOD

The model used in this research is the ADDIE model. It was used to develop interactive multimedia on daily life, incorporating nuances of Balinese local wisdom on the topic of "my region and its natural resources" for fourth-grade elementary school students. The ADDIE model comprises analysis, design, development, implementation, and evaluation (Setiawan et al., 2021). The analysis stage begins with curriculum analysis, needs analysis, and student characteristics analysis. The design stage involves preparing and designing the interface from the initial display when the multimedia starts, through to the exit. In the development stage, the design or framework, which is still conceptual, is realised into a product ready for implementation. Experts conduct media validity tests, and teachers and students conduct practicality tests (for teachers and students). The implementation stage involves integrating interactive multimedia into daily life, with nuances of Balinese local wisdom, for fourth-grade students at SD Negeri 1 Banjar Bali, using a one-shot case study design. The evaluation stage involves summative and formative evaluations. The subjects of this study were 4 experts, 3 teachers, and 6 students, as well as all 25 students in grade IV. The objectives of this study were to assess the validity, practicality, and effectiveness of the developed learning media. The data collection methods used in this development research were questionnaires and tests. The questionnaires were in the form of rating scale sheets for media validity testing by media experts and material experts, and for practicality testing by teachers and students. The tests were in the form of multiple-choice question sheets used to collect data related to the effectiveness of multimedia on student learning outcomes. The outlines of the questionnaire and test instruments used can be seen in Table 1, Table 2, Table 3, Table 4, and Table 5.

Table 1. Grid of Subject Matter Expert Validity Instruments

No.	Aspect	Indicator	Number of Item
1.	Content Quality	a. Clarity of material presentation	6
		b. Appropriateness of material to learning objectives	
		c. Depth and completeness of material	
		d. Appropriateness of images to material	
		e. Appropriateness of comic-style stories to material	
		f. Systematic, coherent, logical, and clear media material	
2.	Language Quality	a. Clarity of word meaning	2
		b. Word arrangement in accordance with good and correct language rules	
3.	Practice/Test Question Quality	a. Appropriateness of exercise/test types to learning objectives	2
		b. Balanced proportion of questions to material	
		Total	**10**

(Source: modification by Pratama dkk., 2022)

Table 2. Media Expert Validity Instrument Grid

No	Component	Indicator	Number of Items
1.	Text	a. Appropriate text type and size	3
		b. Clarity of text for each topic	
		c. Appropriate text color with the background	
2.	Images	a. Clarity of images in interactive multimedia	4
		b. Appealing images in interactive multimedia	
		c. Images support the explanation of the material	
		d. Appropriate image placement	
3.	Animation	a. Quality of animation in interactive multimedia	2
		b. Appropriate animation used	
4.	Comic	a. Appropriate background sound in comics	5
		b. Appropriate images and animation in comics	
		c. Appropriate story in comics with learning material	
		d. Comics make it easier for students to understand the material	
		e. Appealing comics used	
5.	Audio	a. Appropriate music and sound effects	1
6.	Layout	a. Appropriate text placement	3
		b. Appropriate media size	
		c. Appropriate menu composition	
7.	Program Operation	a. Ease of use of interactive multimedia	2
		b. Interactive multimedia can be used repeatedly	
		Total	**20**

(Source: modification by Pratama dkk., 2022)

Table 3. Practicality Instrument Grid Based on Teacher Responses

No	Component	Indicator	Number of Item
1.	Aspects of Learning Media Display	a. The overall appearance of interactive multimedia is attractive	5
		b. The text in interactive multimedia is clearly legible	
		c. The images and animations in interactive multimedia are clearly visible	
		d. The suitability of background music and sound effects in interactive multimedia	
		e. The attractive color display of interactive multimedia	
2.	Content Quality Aspects	a. The material contained in Interactive Multimedia can be easily explained to students	3
		b. The presentation of questions in Interactive Multimedia is appropriate to the material	
		c. Interactive Multimedia contains problems relevant to the surrounding environment	

No	Component	Indicator	Number of Item
3.	Aspects of Interactive Multimedia Operation	a. Interactive Multimedia can be used easily for teaching b. Interactive Multimedia can be used repeatedly, thus contributing to effective learning	2
		Jumlah	**10**

(Source: modification by Bayu & Wibawa, 2021)

Table 4. Practicality Instrument Grid Based on Student Responses

No	Component	Indicator	Number of Item
1	Material Aspect	a. Clarity of the material presented b. Appropriateness of the language used in delivering the material c. Ease of understanding the material	3
2	Multimedia Quality Aspect	a. Clarity of learning instructions b. Appealing multimedia displays c. Appealing colors in interactive multimedia d. Appealing images and animations in interactive multimedia e. Ease of use of interactive multimedia	5
3	Usefulness Aspect	a. Usefulness of the media in helping students understand the material/topic b. Appealing media in stimulating students' interest in learning	2
		Total	**10**

(Source: modification by Bayu & Wibawa, 2021)

Table 5. Grid of Learning Outcome Effectiveness Instruments

Learning Material	Learning Objectives	Question Indicator	Cognitive Level	Question No.
My region and its natural resources	1. Students can mention the natural resources in the area where they live.	1.1 Students can name the natural resources found in their area of residence	C1	1,2,3
		1.2 Students can compare the different natural resources in each region	C4	25,26,27, 28
	2. Students can correlate geographical influences with the natural resources in the area where they live.	2.1 Students can explain why mountainous areas produce certain commodities, such as vegetables and fruit	C2	7,8
		2.2 Students can investigate the relationship between climate and the types of plants that can grow in their area	C3	12,13,14
		2.3 Students can analyze the geographic factors that make a region rich in certain natural resources	C4	17,18,19
		2.4 Students can correlate geographic influences with the natural resources of a region	C4	21,22
		2.5 Students can correlate the geographic location of coastal areas with their potential marine resources	C4	23,24
	3. Students can describe wise ways to utilize natural resources in the area where they live	3.1 Students can provide examples of how to utilize natural resources in their area of residence.	C2	4,5,6
		3.2 Students can determine wise ways to utilize natural	C3	9,10,11

Learning Material	Learning Objectives	Question Indicator	Cognitive Level	Question No.
		3.3 resources in their area of residence.		
		3.4 Students can demonstrate ways to conserve forests in mountainous areas to maintain water availability.	C3	15,16
		3.5 Students can analyze the causes of reduced clean water availability in an area.	C4	20,
		3.6 Students can design actions to protect natural resources in their area so that they remain sustainable and can be utilized sustainably.	C5	29,30

To ensure the validity of the designed instrument, a content feasibility test is required by judges competent in the variables being studied. This content validity test is conducted using the Gregory formula. For the test instrument, the point-biserial correlation technique is used to measure the validity of the test items. Furthermore, the reliability of the multiple-choice instrument is calculated using the Kuder-Richardson 20 (KR-20) formula. Additionally, discriminatory power and difficulty level tests are conducted. After each instrument is declared valid for use in data collection, the data obtained from experts and practitioners is analysed.

3. RESULT AND DISCUSSION

Result

This research examines the development of interactive multimedia based on daily life, incorporating nuances of Balinese local wisdom, to improve student learning outcomes on the topic of "My Region and Its Natural Resources" in grade IV of elementary school. The research model is the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). The analysis stage consists of curriculum analysis, student textbook analysis, and analysis of the needs and characteristics of students at the target school, namely SD N 1 Banjar Bali. This was done to support the development of interactive multimedia based on daily life with nuances of Balinese local wisdom. Curriculum analysis shows that the Independent Curriculum is used in SD Negeri 1 Banjar Bali, with the results of the analysis of Learning Outcomes, Learning Objective Flow, and Learning Objective Completion Criteria (KKTP) as the basis for media development. Analysis of student textbooks shows that the topic of "My Region and Its Natural Resources" in the science subject is incomplete, so it requires material development through learning media. The needs analysis from teacher interviews indicated that more than 50% of students have low learning outcomes in the science subject. Analysis of student characteristics through questionnaires revealed that the majority of students have difficulty understanding science material without learning media, are interested in using technology in their learning, and prefer a visual but interactive learning style. Based on this, one potential development medium is interactive multimedia.

The process continues to the design stage of interactive multimedia based on daily life with nuances of local Balinese wisdom. The design stage includes selecting the application or software to use (Articulate Storyline) and preparing the interface design. This design includes planning the initial display when the multimedia starts, through the final display when the user exits the multimedia. An example of the results of the multimedia display design is shown in Figure 1. In the development stage, the validity and practicality of the learning media were tested. This is the initial step to assess whether the product design is valid and practical for use. The interactive multimedia validity test stage was assessed by four experts, including two content experts and two learning media experts. After receiving assessments from the four experts, the assessment data were analysed using the Aiken Validity formula to obtain a feasibility index and feasibility qualifications for the developed Interactive Multimedia. The results of the Aiken Validity analysis are shown in Table 6.

Table 6. Validity Analysis of Interactive Multimedia Based on Daily Life with Nuance of Balinese Local Wisdom

Judgest	Item	Evaluation		V	Kategory
		I	II		
Material	1-10	37	39	0.93	Very High Validity
Media	1-20	76	76	0.93	Very High Validity

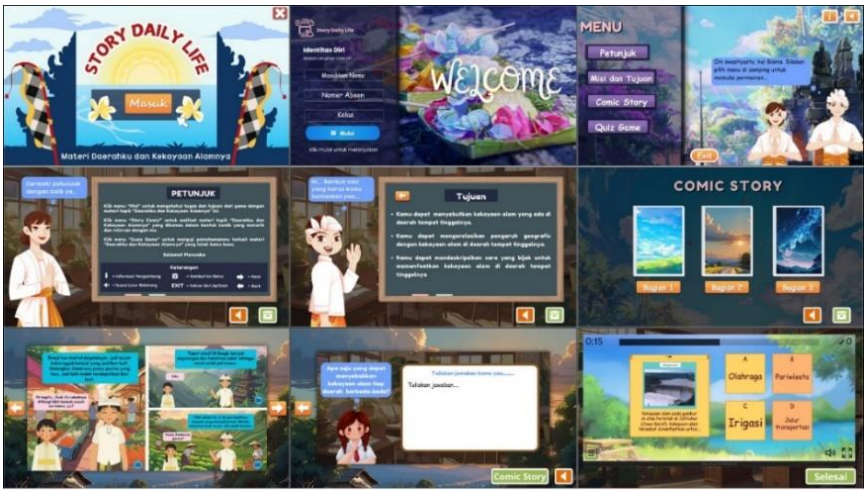

Figure 1. Interactive Multimedia Display Based on Daily Life with Nuance of Balinese Local Wisdom

After being declared valid, the interactive multimedia practicality test was continued. The practicality test was viewed from the perspective of teachers and students. The media practicality test was assessed using a questionnaire distributed to teachers as practitioners in learning and to students as practitioners in using learning media. This included 3 teacher responses and 6 student responses. After obtaining assessments from the three teachers and six students, the assessment data were analysed using a percentage formula to determine the level of media practicality achievement for teachers and students, as well as the qualification of Interactive Multimedia practicality in daily life. In summary, the analysis results are presented in Table 7 and Table 8.

Table 7. Practicality of Interactive Multimedia by Teachers

Practicality by Teacher	Score	Percentage	Average Percentage	Category
Practitioner I	39	97.5%	99.17%	Very Good
Practitioner II	40	100%		
Practitioner III	40	100%		

Table 8. Practicality of Interactive Multimedia by Students

Practicality by Students	Score	Percentage	Average Percentage	Category
Student I	40	100%	99.17%	Very Good
Student II	39	97.5%		
Student III	39	97.5%		
Student IV	40	100%		
Student V	40	100%		
Student VI	40	100%		

The implementation stage was carried out after the multimedia was declared valid and practical for use in learning. At this stage, an interactive multimedia program based on daily life with nuances of Balinese local wisdom was trialled at the target school, namely the fourth-grade students of SD Negeri 1 Banjar Bali, using a one-shot case study design. The purpose of this trial was to analyse the effectiveness of the developed multimedia on student learning outcomes on the topic of My Region and Its Natural Resources. Data analysis was carried out using a one-sample t-test, with a normality test as a prerequisite to assess the data distribution. The normality test was carried out using the Shapiro-Wilk test because the sample size was 25 students, fewer than 50. Data were considered normally distributed if the significance value was greater than 0.05. The results of the normality test showed a p-value of 0.11, indicating that the data were normally distributed. Furthermore, the hypothesis test was carried out using the one-sample t-test, with the criterion (of.tailed) value ≤ 0.05; if the Sig. was rejected, then H_0 was rejected. (2-tailed) value ≥ 0.05, then H_0 was accepted. The test results show a Sig. (2-tailed) value of 0.00, indicating significance ($p < 0.05$), so H_0 is rejected and H_a is accepted. This shows that interactive multimedia based on daily life with nuances of Balinese local wisdom is effective in improving student learning outcomes on the topic of My Region and Its Natural Resources in grade IV of elementa

The evaluation phase is the final stage of this development research and includes two types of evaluation: formative and summative. Formative evaluation is conducted at each stage of the research, focusing on the research implementation process and the quality of the resulting product. Meanwhile, summative evaluation is conducted at the end of all research stages, aiming to reflect on the ongoing process and ensure the resulting product has optimal quality. All stages of this research model have been implemented effectively, with all problems addressed and the research objectives achieved. However, the research process encountered obstacles, primarily related to limited time and

resources in product development. Due to these obstacles, the research could only be carried out up to the implementation stage with a pre-experimental design.

Discussion

An interactive multimedia program based on daily life with nuances of Balinese local wisdom has undergone feasibility, practicality, and effectiveness testing. Several reasons why this interactive multimedia received excellent reviews from experts and practitioners, and is effective for use in the learning process to improve student learning outcomes. First, this development research produced an Interactive Multimedia on daily life, focusing on "My Region and Its Natural Resources," for grade IV elementary school students. This multimedia has its own characteristics compared to other interactive multimedia, namely, a focus on daily life, with content adapted to everyday life, making it easier to understand and more relevant to students' experiences. Through this multimedia, students can relate the subject matter to situations they have experienced, thereby increasing their understanding and engagement in the learning process. This aligns with the view that contextual learning relevant to students' lives can increase their engagement and understanding of the material (Yolanda dkk., 2024). Therefore, students will be more active in the learning process because they see the direct benefits of the material learned in their daily lives.

Second, in the Daily Life-Based Interactive Multimedia, students can access a collection of learning comics. These comics are designed to present learning materials in an engaging and relevant way, making it easier for them to understand abstract concepts. This approach aligns with Piaget's (1970) constructivist theory, which holds that learning is an active process in which students construct new knowledge from prior experiences. Through comics in interactive multimedia, students not only read and observe but also explore and relate learning materials to their direct experiences in everyday life. A similar research finding, but focused on comics, is the effectiveness of context-based comic media, which has been found valid and practical for use in the learning process to improve student learning outcomes (Astuti et al., 2021). Comics in interactive multimedia are not just images containing characters. They also include audio that supports the storyline and several questions to practice knowledge that can be answered directly in the multimedia. This feature allows students to have a new and enjoyable learning experience. The use of multimedia, including multiple media and interactive components, can increase student engagement and strengthen their retention of learned information (Oktaviani et al., 2024). The integration of multimedia rich in visual, audio, and interactive elements can create a more engaging and meaningful learning experience. This aligns with the principles of learning theory proposed by Mayer (2009), which states that the use of various media formats in learning can enhance students' cognitive information processing and strengthen long-term learning.

Third, learning with Interactive Multimedia based on daily life on the topic of "My Region and Its Natural Resources" aligns with Ausubel's learning theory, as the material will be explored by linking it to students' real-life surroundings. This aligns with Ausubel's theory, which emphasises meaningful learning in which students connect new information with their existing knowledge. By linking subject matter to real-life situations, students can more easily understand and absorb information because they can see the direct relevance to their daily experiences. According to Ausubel (1968), meaningful learning occurs when new information is understood by connecting it to concepts already existing in the student's cognitive structure (Ardiani, 2022). The findings of a similar study discussing this theory, entitled "Android Application Oriented to Ausubel's Theory in Social Studies Content," from the study, explained that the results of the development feasibility test showed that the Android application based on Ausubel's learning theory was very suitable for use in the learning process (Adiutami & Sujana, 2022).

Fourth, the developed Interactive Multimedia demonstrated feasibility with an excellent rating. This is because the Interactive Multimedia has a design that suits students' characteristics and a clear presentation of the material. Furthermore, the media display is tailored to students' preferences, which tend toward visual elements such as colour and images. This is because elementary school students are more attracted to bright colours and animations, as these colours convey a cheerful impression and can capture their attention (Habib et al., 2020). Furthermore, to enhance the Interactive Multimedia, animations and illustrations are used alongside explanations. Adding images and animations to the media can help students visualise the concepts being taught (Gunawan et al., 2017). By combining visual, interactive, and contextual elements, this interactive multimedia can enhance learning effectiveness. Students not only feel more motivated to learn but also demonstrate a better understanding of the material. Therefore, this interactive multimedia is suitable for use as an innovative learning medium in elementary schools.

This is reinforced by previous research findings that Interactive Multimedia is highly effective in increasing students' learning interest (Faizah et al., 2020; Nazhiroh et al., 2021). Furthermore, other research findings indicate that the application of Interactive Multimedia in the learning process is practical and can improve student learning outcomes (Gunawan et al., 2017; Habib et al., 2020). The development of Interactive Multimedia focused on daily life in the topic of My Region and Its Natural Resources is unprecedented. This makes research related to the development of Interactive Multimedia based on daily life an innovation in the field of Interactive Multimedia studies. Furthermore, relevant research indicates that this multimedia is practical and effective for learning activities.

The development of interactive multimedia in daily life, with nuances of Balinese local wisdom, on the topic of My Region and Its Natural Wealth, has proven effective in improving learning quality at the elementary school level. The main advantage of this multimedia is its contextual approach, which is relevant to students' daily lives and is supported by visual, audio, and interactive elements that engage students and enhance understanding. Features such as learning

comics equipped with audio and interactive questions create a fun and meaningful learning experience, in line with the learning theories proposed by Piaget, Ausubel, and Mayer. Media design that aligns with students' characteristics, such as bright colours, animation, and illustrations, further enhances its appeal and effectiveness. Furthermore, previous research findings supporting the effectiveness of interactive multimedia in improving student motivation and learning outcomes reinforce the value of this innovation. With these advantages, the development of interactive multimedia based on daily life is an important contribution to providing innovative, relevant content aligned with today's educational needs.

4. CONCLUSION

This research has successfully developed interactive multimedia content based on daily life, incorporating nuances of Balinese local wisdom, that effectively improve learning outcomes in the science subject "My Region and Its Natural Resources" at the elementary school level. This multimedia is designed with a relevant contextual approach, supported by features such as comic stories, quiz games, and interactive navigation, and is considered valid by experts and declared practical by practitioners. In addition, its effectiveness in improving student learning outcomes confirms its potential as an innovative learning medium. The implications of these findings underscore the great potential of interactive multimedia to support students' technological literacy and to provide a more interesting and meaningful learning experience. The use of this multimedia is not limited to the classroom; it can also be used independently to strengthen conceptual understanding outside class hours. For teachers, the integration of this media in learning is expected to create a more dynamic and interactive learning experience, as well as serve as a model in the development of similar media for various other materials

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