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ANALYSIS OF THE NEEDS OF AI-BASED ANIMATED VIDEOS AS A LEARNING AID MEDIA FOR THE LOCAL WISDOM BLOCKS AND CUBES MATERIAL OF MUSI BANYUASIN TRADITIONAL HOUSES IN ELEMENTARY SCHOOLS

Ani Musfiroh[1], Makmum Raharjo[2], Sardianto Markos Slahaan[3]
[1,2,3]Universitas Sriwijaya
Corresponding Email: 06032622428029@student.unsri.ac.id, makmurraharjo@unsri.ac.id, mr.sardi@unsri.ac.id

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Abstract

The transformation of learning paradigms at the elementary school level demands innovation in educational media that is not only adaptive to technological developments, but also relevant to the local cultural context. This study focuses on the analysis of the need for the development of animated videos assisted by Artificial Intelligence (AI) for spatial geometry material, integrated with the local wisdom of Musi Banyuasin traditional houses, specifically for 2nd grade elementary school students. This study aims to identify the potential of this innovative media in creating a more contextual and effective learning experience. The approach used is quantitative descriptive with a survey method. The study involved 150 students and 100 elementary school teachers in the Sungai Lilin and Babat Supat sub-districts, Musi Banyuasin Regency, South Sumatra. The results of the analysis showed that 87% of teachers felt that the learning media currently available were not contextual and were still abstract, making it difficult for students to understand the form and function of spatial geometry concretely. Meanwhile, 97% of students showed high enthusiasm for the use of moving visual media, and 97% stated that it was easier to understand the material through animations that presented real examples from their cultural environment. In addition, schools do not yet have thematic digital media that utilizes sophisticated AI to facilitate visualization of spatial objects. This finding emphasizes the need to develop contextual, interactive, and local culture-based animated videos as an effort to improve the quality of thematic learning and strengthen spatial literacy and cultural character of students from an early age.

Keywords: ***Animated Video, Artificial Intelligence, Building Space, Local Wisdom, Musi Banyuasin Traditional House***

1. INTRODUCTION

Elementary education has a strategic role in shaping the academic abilities and character of students from an early age (Dewanti & Putra, 2022). One of the main challenges in the learning process at the elementary school level is conveying abstract concepts such as spatial shapes to students who are still at the stage of concrete thinking development towards concrete operations according to Piaget's theory. At this stage, students need a visual and contextual approach in order to understand three-dimensional shapes more realistically (Erawati, 2022). Unfortunately, the mathematics learning process in lower grades is still dominated by lecture and text-based methods without adequate visual media (Taqwiem & Luthfiyanti, 2023). As a result, students have difficulty distinguishing the characteristics of geometric shapes such as cubes, blocks, cones, and cylinders. Therefore, it is important to develop innovative learning media that can bridge students' cognitive limitations with this abstract material, while at the same time linking it to the local cultural context.

As the Merdeka Curriculum is implemented nationally, contextual and local culture-based learning approaches are very relevant, especially in strengthening the Pancasila Student Profile (Ashshiddiqi et al., 2024). The incorporation of local values such as the Musi Banyuasin traditional house into mathematics learning not only enriches the teaching content but also increases the appeal and relevance of the material for students. Traditional houses such as the Limas House and the Rakit House represent real spatial forms and can be used as contextual visual aids. Previous studies have shown that technology-based media can improve students' conceptual understanding and learning motivation (Siahaan et al., 2024; Aska Rika et al., 2023). In fact, the use of AI in learning media has been shown to be able to personalize the learning experience and significantly increase learning interactions (Aprianti

Astuti et al., 2024; Farida & Makbul, 2024). Features such as automatic narration, adaptive quizzes, and voice recognition are the main attractions in increasing student engagement. The rapid development of technology has changed the paradigm in the world of education, especially in learning innovation (Siahaan et al., 2024). The learning process becomes more interesting with a variety of innovative learning resources. (Aska Rika et al., 2023). In line with the rapid development of information and communication technology, the use of multimedia based on artificial intelligence (AI) is a great opportunity in educational transformation. AI technology enables personalization of learning, improving the quality of interaction, and visualization of more dynamic and adaptive materials. In the context of mathematics learning, AI-assisted animated videos can present interactive, attractive visual representations that can stimulate students' spatial logic more optimally. Moreover, AI enables interactive features such as automatic narration, voice recognition, and adaptive quizzes that adjust the level of difficulty based on student performance. Previous studies have shown that the use of AI-based media can significantly increase learning motivation, conceptual understanding, and student learning outcomes (Aprianti Astuti et al., 2024; Farida & Makbul, 2024)

This gap indicates the need for a new approach that combines the power of animated media visualization, artificial intelligence, and local cultural richness to create more meaningful mathematics learning media. In the context of Musi Banyuasin Regency, the use of traditional houses as contextual material for spatial structures has not been widely used, even though its relevance is very high in strengthening students' understanding of geometric shapes. Meanwhile, AI technology has the potential to improve the quality of interaction and adaptability of learning media through features such as automatic narration, voice recognition, and adaptive quizzes. Therefore, identifying needs is a very important initial step to determine the extent of the readiness and needs of teachers, students, and school infrastructure conditions in supporting the development of this media.

Based on these gaps, this study aims to analyze the need for developing AI-assisted animated videos on spatial geometry material integrated with the local wisdom of Musi Banyuasin traditional houses for grade 2 elementary school students. The main question in this study is: "What are the needs of teachers and students related to the development of contextual and local culture-based AI-assisted animated video learning media in spatial geometry learning?" The novelty of this study lies in the simultaneous integration of three main components: (1) abstract mathematical content, (2) concrete local cultural context, and (3) adaptive and interactive AI technology. This combination is expected to produce contextual, inclusive, and transformative learning media in responding to the challenges of today's basic education.

This study refers to the concept of developing AI-based animated video media that is effective in increasing motivation and understanding of concepts (Aprianti Astuti et al., 2024; Farida & Makbul, 2024). The integration of local culture in mathematics learning has also been shown to strengthen cultural identity and the relevance of material to real life (Ningsih, 2025; Sari & Rahman, 2023). In addition, the application of the CTL approach supports meaningful learning by connecting mathematical concepts to local cultural contexts that are familiar to students (Alfianita & Astuti, 2022). This shows the need to develop media that combines AI visualization, local wisdom, and contextual learning synergistically.

2. METHOD

This study aims to analyze the need for the development of animated videos assisted by Artificial Intelligence (AI) in learning spatial geometry material integrated with the local wisdom of Musi Banyuasin traditional houses in grade 2 of Elementary School. Data were obtained through a survey by distributing questionnaires to teachers and students. This study uses a descriptive quantitative approach with a survey method as a basis for designing the development of animated videos assisted by AI on spatial geometry material with the local wisdom of Musi Banyuasin traditional houses (Widodo, 2019). Needs analysis was carried out to obtain accurate data regarding actual conditions, ideal expectations, gaps, and potentials and obstacles in the mathematics learning process for grade 2 of elementary school. This research was conducted in several elementary schools in the Musi Banyuasin district. The focus of the research is to explore the needs of teachers and students for animation-based learning media that integrate technology and local culture. The grid for analyzing student needs (Raharjo, et al., 2024) can be seen in the table below.

Table 1. Student Needs Analysis Grid

Aspect	Indicator	Question Number
Pedagogical	a. Learning Style	1
	b. Learning Process	2

Technical	a. Accessibility	3
Cognitive	a. Ability to Absorb Information	4
	b. Ability to Understand Material	5.6
Aesthetics	a. Preferences	7,8,9
	b. Visual Display	10,11,12
Evaluation	a. Measuring the Level of Understanding	13,14,15,16
	b. Feedback	17.18

Source: Modification of Raharjo, M. et al (2024)

This study only focuses on the stage of teacher and student needs analysis, without testing the effectiveness of the media developed, so it is descriptive quantitative. The researcher conducted a teacher needs analysis by distributing questionnaires to 100 teachers in 6 elementary schools in the Musi Banyuasin district. This aims to determine the need for learning media, elements of local wisdom, effectiveness, teacher readiness and interesting media that they need. To access the details of the questions included in the teacher needs analysis questionnaire, more information is available in the following table:

Table 2. Teacher Needs Analysis Grid

Aspect	Indicator	Question Number
Pedagogical	a. Training	1
	b. Teaching Methods	2
Technical	a. Infrastructure	3
	b. Affordability	4
Cognitive	a. Ability	5
	b. Understanding	6
Aesthetics	a. Design	7,8,9
	b. Harmony	10,11,12
Evaluation	a. Internal Evaluation Tools	13,14,15,16,17,18

The respondents in this study consisted of two main groups, namely grade 2 elementary school teachers and grade 2 elementary school students. The number of teachers who were respondents was 100 people who taught in public elementary schools based on location, availability of technology access, and the willingness of teachers to be involved in the research. In addition, 150 grade 2 elementary school students were also involved as the main data source to explore their perceptions, understanding, and interest in the material of spatial structures and the learning media used. Respondents were selected by considering the cultural background that was in accordance with the Musi Banyuasin region to ensure the relevance of the cultural context in media development.

Table 3. Number of Respondents for Needs Analysis

Subdistrict	Respondents	
	Teache r	Student
Candle River	70	150
Tripe Soup	30	-
Amount	100	150

The research began with a study of literature and problems in mathematics education, especially elementary school spatial geometry material for lower grades. In addition, this study is to identify the main concepts in the development of AI-assisted animated video media, integration of local wisdom, for elementary school mathematics learning. Furthermore, the preparation and validation of instruments were carried out by experts in elementary

education and learning technology. The data collection process was carried out through a questionnaire survey distributed to teachers and students and explained to students in a simple visual form so that it could be well understood by children aged 7-8 years. The data obtained were analyzed and reflected on to identify the real and ideal needs that underlie the development of the designed animated media.

Data analysis

Data were analyzed using a descriptive quantitative approach. Data from the questionnaire were analyzed quantitatively descriptively using percentages to determine the tendency of teacher and student answers in terms of interest in learning media, understanding of spatial geometry material, and interest in animation and local cultural elements. The results of the analysis were used as a basis for compiling an initial design for the development of AI-assisted animation videos that will be developed in the advanced research stage.

3. RESULTS AND DISCUSSION

This research was conducted for two months in the even semester of the 2024/2025 academic year in two elementary schools in Musi Banyuasin Regency. The instrument used was a needs questionnaire consisting of indicators of media needs, media form preferences, obstacles faced by teachers and students, and the potential for integrating local wisdom in mathematics learning. The research procedure included the preparation of instruments, validation by experts, distribution of questionnaires to selected respondents, and data collection and processing. The collected data were analyzed using quantitative descriptive techniques through percentages and trends of data classified into low, medium, and high needs categories. Thus, the results of this analysis provide a comprehensive picture of the factual conditions of user needs that can be used as a basis for developing learning media that are in accordance with the cultural context and needs of elementary schools.

The needs questionnaire was distributed in 2 elementary schools to 150 grade 2 elementary school students. The questionnaire instrument was arranged in the form of a selection of images and emoticons to make it easier for students to understand and respond to questions. The aspects measured include: Learning Style, Learning Process, Accessibility, Absorbing Information, Understanding Material, Display Preferences, Visual Display, Measuring Understanding, Feedback. The results of the recapitulation of the student needs analysis questionnaire can be seen in table 4 below:

Table 4. Recapitulation of Student Needs Questionnaire Results

Question	Number of "Yes"	Number of "No"	Percentage of "Yes"	Interpretation
P1	146	4	97%	Very high
P2	146	4	97%	Very high
P3	141	7	94%	Very high
P4	146	4	97%	Very high
P5	110	39	73%	Tall
P6	105	42	70%	Tall
P7	142	5	95%	Very high
P8	139	8	92%	Very high
P9	146	4	97%	Very high
P10	146	4	97%	Very high
P11	146	4	97%	Very high
P12	146	4	97%	Very high
P13	141	7	94%	Very high
P14	146	4	97%	Very high
P14	110	39	73%	Tall
P15	105	42	70%	Tall
P16	142	5	95%	Very high
P17	139	8	92%	Very high
P18	141	7	94%	Very high

Based on the recapitulation of the results of the student needs questionnaire, it can be concluded that most of the aspects asked received a response with a very high percentage of "Yes" answers, ranging from 92% to 97%. This shows that the needs of students in these aspects are in the very high category, reflecting strong hopes and interests in fulfilling various learning and self-development needs. Several questions, such as P5, P6, P14 (duplicate), and P15, showed percentages between 70% and 73%, which remained in the high category, but showed room for increased attention and reinforcement. In general, these results show that students have a fairly large need for the development of educational programs that are responsive to their needs, both in terms of academics and non-academics.

This finding is also in line with the findings of Eprilia et al. (2023) who stated that the level of complex and real participatory interactivity is very much needed in 21st century learning, because it involves students actively in responding to instructional cues in a variety of ways. In this context, AI-based animated videos that enable the integration of stories, 3D visualizations, sound, and responsive interactions are effective and relevant solutions. In addition, the results of the teacher needs analysis also strengthen the need to develop AI-Assisted Animation Videos on the Local Wisdom of the Musi Banyuasin Traditional House Spatial Building Material. The following is the result of the teacher needs analysis graph to strengthen the development of AI-assisted animation videos.

Table 5. Recapitulation of Teacher Needs Questionnaire Results (n = 100))

Question	Number of "Yes"	Number of "No"	Percentage	Interpretation
P1	200	0	100%	Very high
P2	160	40	80%	Tall
P3	120	80	60%	Currently
P4	150	50	75%	Tall
P5	80	40	40%	Low
P6	80	40	40%	Low
P7	80	40	40%	Low
P8	200	0	100%	Very high
P9	85	15	90%	Very high
P10	66	34	66%	Low
P11	120	80	60%	Tall
P12	150	50	75%	Currently
P13	80	40	40%	Tall
P14	80	40	40%	Low
P15	80	40	40%	Low
P16	200	0	100%	Low
P17	85	15	90%	Very high
P18	66	34	66%	Very high

The results of the teacher needs analysis show that in the pedagogical aspect, the need for technology training is a major concern. This can be seen from 100% of respondents who stated "yes" to questions related to training (P1), indicating that all teachers feel a great need to improve their competence in utilizing learning technology. In addition, 80% of teachers (P2) also stated the need for more contextual and innovative teaching methods, reflecting a desire to increase the effectiveness and involvement of students in the learning process.

In terms of technical aspects, there are differences in the level of need. Although 75% of teachers (P4) stated the importance of accessibility to learning media, only 60% (P3) felt that the technology infrastructure in schools was adequate. This indicates that there are challenges related to facilities and infrastructure that are still not optimal and need more attention, especially in supporting the implementation of technology-based learning.

For the cognitive aspect, the results show that the level of teachers' ability and understanding of educational technology is still low. Both in the ability (P5) and understanding (P6) indicators, only 40% of teachers answered "yes", which indicates an urgent need to improve technological literacy and further training for teachers so that they are able to keep up with the development of digital learning.

In terms of aesthetics, there are striking differences between indicators. Only 40% of teachers (P7) support the importance of attractive learning media design, but the other two indicators, P8 and P9, show very high numbers (100% and 90%). This indicates that although some teachers have not paid much attention to media design, the majority are still aware of the importance of visual suitability with student characteristics and local cultural relevance,

which are part of material alignment (P10–P12, with values varying between 66%–75%). Meanwhile, in the evaluation aspect, there is a positive tendency towards the use of interactive digital evaluation tools. Although most indicators are still in the medium to low category (between 40%–66% in P13–P16), the last two indicators (P17 and P18) show very high percentages, 90% and 66% respectively. This reflects that some teachers are starting to be open to innovation in learning assessment and shows a promising trend for further development.

Overall, these data show that teachers have a high need for improving pedagogical competence and integrating technology into learning, but still face challenges in cognitive and technical aspects. Targeted training interventions, infrastructure improvements, and ongoing mentoring are needed to comprehensively address these needs. competence in utilizing learning technology. In addition, 80% of teachers (P2) also stated the need for more contextual and innovative teaching methods, reflecting the desire to increase the effectiveness and engagement of students in the learning process. In terms of technical aspects, there are differences in the level of need. Although 75% of teachers (P4) stated the importance of accessibility to learning media, only 60% (P3) felt that the technology infrastructure in schools was adequate. This indicates that there are challenges related to facilities and infrastructure that are still not optimal and need more attention, especially in supporting the implementation of technology-based learning.

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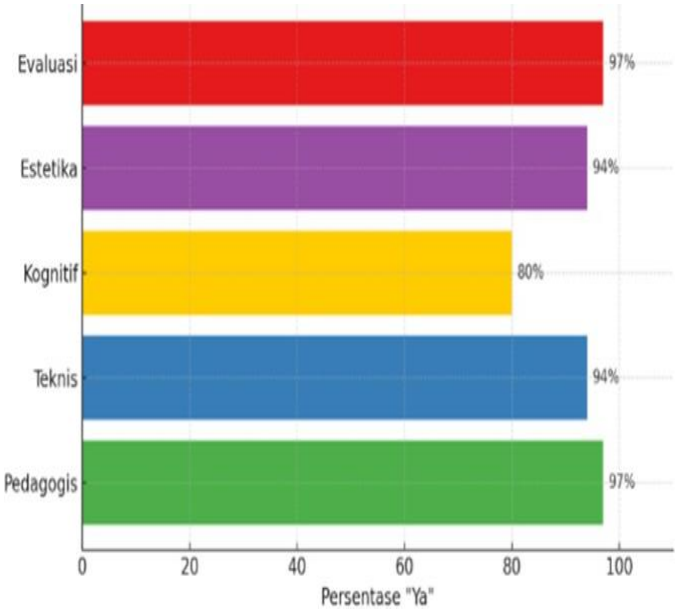


Figure 1 Recapitulation of Student Needs Analysis

The results of the pedagogical aspect analysis show that 97% of students have an audiovisual learning style and require a learning process that supports active involvement, indicating the urgency of learning media that are appropriate to the learning characteristics of early childhood students. This is in line with Piaget's constructivism learning theory, which emphasizes the importance of concrete visualization in understanding abstract concepts such as spatial shapes (Simamora & Siregar: 2024). These findings answer the problem of the lack of visualization in conventional mathematics learning, and contribute to the development of contextual media based on local wisdom that strengthens understanding and cultural values. The limitation of the study lies in the fact that the effectiveness of the media has not been directly analyzed on learning outcomes, so further research needs to evaluate the real impact of AI-based media on students' mathematics learning achievements.

The technical aspect showed a positive response of 94%, indicating that students need media with an attractive visual appearance and easy access. This finding confirms students' readiness to access AI-based digital learning media, as stated by Putri et al. (2023) who stated that infrastructure readiness, technology access, and child-friendly interfaces are key factors in increasing student engagement in the digital era. However, this study has not fully explored the disparity in access in less accessible areas. Therefore, future media development needs to consider aspects of inclusivity and diversity of technology access in various regions.

The cognitive aspect showed varying positive responses, with 97% of students stating that they were able to absorb information, but only 73% and 70% stating that they were able to understand the material, so that the average was in the high category (80%). This finding shows that although students can receive visual information well, they still have difficulty understanding the abstract concept of spatial shapes as a whole. This finding is in line with research by Utami and Nugroho (2023) which emphasizes that learning media must be designed in stages, starting from concrete to abstract representations, to support the cognitive development of elementary school students. Therefore, the development of AI-assisted interactive animation-based media that integrates simulations and local cultural contexts such as the Musi Banyuasin traditional house is important to strengthen students' understanding of mathematical concepts. This limitation also opens up opportunities for further research through an experimental approach to empirically measure the effectiveness of the media.

The aesthetic aspect showed very high results (93.5%), with 95% of students having a preference for the media and 92% responding positively to the visual display. This finding confirms the importance of attractive visual design to improve student attention and understanding. This is in line with the findings of Pratiwi et al. (2023) which showed that visual elements that are appropriate to the characteristics of early childhood can increase learning motivation and cognitive engagement. Therefore, the development of AI-based animation media needs to be designed with child-friendly and contextual aesthetics.

The limitation of this study lies in the fact that the most effective type of visual display has not been explored, so further research is needed to examine the optimal visual design in local culture-based mathematics learning.

The evaluation aspect showed a positive response of 87%, indicating that students want learning media to be equipped with evaluation features to measure understanding. This finding is in line with the research results of Wulandari et al. (2023) which emphasized that the integration of interactive formative evaluation in digital media can increase self-reflection and engagement of elementary school students. However, the type of evaluation that is most appropriate for grade 2 elementary school students has not been specifically identified, so future media development needs to consider an interactive, fun, and appropriate evaluation model for students' cognitive development stages.

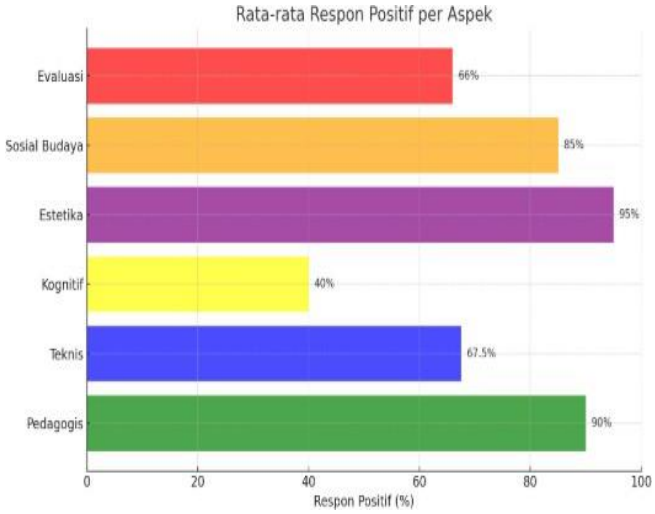
The results of the needs analysis show that students need interactive, aesthetic, easily accessible, and evaluation-equipped learning media, but are still low in cognitive aspects, especially understanding the material. This finding emphasizes the importance of developing AI-assisted animated videos that highlight local wisdom to improve elementary school students' understanding of spatial structures, in accordance with the Multimedia Learning principles put forward by Mayer (2009), that visual-interactive media supports meaningful learning processes (Mayer, 2009). These results also strengthen the research of Sari & Putra (2021) which found that local culture-based media can increase students' interest in learning mathematics (Sari & Putra, 2021). However, this study is still limited to needs analysis so that further research based on media effectiveness trials is recommended.

The results of the teacher needs analysis show a similar tendency to students. The graph of the teacher needs analysis for the development of AI-assisted animated videos on the material of the spatial structure of the local wisdom of the Musi Banyuasin traditional house for grade 2 of elementary school can be seen in the graph below:

Figure 2 Summary of Teacher Needs Analysis

Based on the data, the pedagogical aspect shows that all respondents (100%) need technology training, and 80% want project-based and contextual learning methods. This finding indicates a gap in teacher skills in utilizing

digital learning media, especially in visualizing abstract concepts such as spatial shapes. This is in line with research by Akendita et al. (2024) which states that a social constructivist approach can improve students' learning achievement and self-efficacy in mathematics. In addition, Arifin et al. (2025) emphasized the effectiveness of multimodal learning strategies in improving numeracy learning outcomes without relying on a particular learning style. Therefore, developing appropriate training programs is very important to improve the quality of mathematics learning in the digital era.



The technical aspects in this study include infrastructure indicators (questions 5 and 6) and media accessibility (questions 7 and 8), with a percentage of positive responses of 60% and 75%, respectively. This finding shows that despite the availability of devices such as LCDs, internet connectivity is still a significant obstacle in several elementary schools, especially in the Musi Banyuasin area. This indicates that AI-based learning media must be designed to be used offline and not dependent on high-speed internet networks. These results strengthen the findings of research by Fitriyani et al. (2020) which suggests the importance of developing media that is adaptive to the conditions of educational infrastructure in the region. These technical limitations must be anticipated from the media design stage, including in the selection of file formats, media sizes, and hardware requirements. Therefore, the contribution of these findings is very important in ensuring that digital learning innovations remain inclusive and applicable to schools with limited facilities and infrastructure, while also opening up opportunities for further research related to the effectiveness of digital media in the context of limited infrastructure.

The cognitive aspect, which includes technological ability and understanding (questions 9–12), showed a low positive response of 40%. This indicates low technological literacy of teachers, especially in understanding the concept of artificial intelligence and animation as learning media. This condition has the potential to hinder the effective integration of technology in the learning process. In line with the findings of Rahman et al. (2023), which emphasizes the importance of integrating pedagogical knowledge, content, and technology as the basis for developing teacher competencies in the digital era. Therefore, this finding emphasizes the need for training programs that not only focus on technical aspects, but also strengthen teachers' conceptual capacity as a prerequisite for the successful implementation of AI-based learning media at the elementary education level.

The aesthetic aspect, which includes indicators of visual design and material alignment (questions 13–15), showed a very high positive response rate, namely 100% and 90%. This indicates that teachers give an important assessment to learning media that are visually attractive, appropriate for the age of students, and in line with local content. This finding is in line with the results of a recent study by Nugroho and Santosa (2024) which stated that aesthetic elements in digital learning design have a significant influence on increasing students' attention and learning retention. In the context of AI-based animated videos, attractive and contextual designs with local culture such as the Musi Banyuasin Traditional House not only increase visual appeal but also enrich students' cognitive understanding of spatial building material. Therefore, the aesthetic aspect is a key factor in developing effective and meaningful learning media.

The evaluation aspect, which includes indicators of internal evaluation tools (question 18), showed a positive response of 66%. This shows the need for teachers for learning media equipped with interactive evaluation features. This finding is in line with research by Kurniawan et al. (2023) which states that digital-based formative assessment can increase student motivation and engagement in mathematics learning. In the context of AI-based animated videos, the integration of evaluation features allows for effective direct feedback to strengthen the understanding of basic

spatial concepts in elementary school students. Therefore, the evaluation aspect needs to be an integral part of media design with a fun approach and in accordance with the stage of students' cognitive development.

The results of the teacher needs analysis clearly show that the development of AI-assisted animated video media for spatial construction material with the local wisdom of Rumah Ada Musi Banyuasin needs to be supported by adequate technology training, attractive and contextual visual design, and integration of local cultural values of Rumah Adat Musi Banyuasin. Limited infrastructure and low understanding of technology are the main challenges, while high support for aesthetic aspects shows the readiness of teachers to accept relevant and meaningful learning innovations. Therefore, the media developed must be adaptive, easily accessible, and equipped with interactive evaluation features to support the effectiveness of learning in grade 2.

4. CONCLUSION

The results of the needs analysis show that elementary school students need interactive, aesthetic, easily accessible learning media equipped with evaluation features to improve their understanding of spatial concepts. On the other hand, teachers showed enthusiasm for the development of local culture-based media, especially the Musi Banyuasin Traditional House, although challenges such as limited infrastructure and low understanding of technology are still obstacles. This study reinforces the importance of integrating local cultural values into technology-assisted media, and supports the principles of Multimedia Learning (Mayer, 2020). Thus, this study contributes to broadening the understanding of the development of contextual media based on local culture that supports meaningful mathematics learning. However, the results of this study are contextual and limited to the analysis of needs in certain regions and subjects, so they cannot be generalized widely.

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