POBALIS LIDI Media Integrated with a Digital Interactive Guide for Batik Learning Mastery

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Abstract: Batik learning faces persistent challenges, particularly the scarcity of alternative instructional media and limited student engagement in the digital era. This study developed POBALIS LIDI, a hybrid media that integrates physical and digital elements to support students' batik-making achievement in a valid, practical, and effective manner. The research employed a design-based research approach using the ADDIE model, involving fifth-grade students from a primary school in Indonesia. Data were collected through interviews, observations, questionnaires, and tests. The validity tests demonstrated that the media was highly valid, with material validation at 91.66%, media validation at 97.50%, and instructional validation at 93.75%. The media's practicality was also rated highly, with a score of 90.33% based on positive user feedback. Implementation proved effective, as indicated by a one-sample t-test yielding $p < 0.001$ and a Cohen's d value of 1.687, indicating a large effect size. The average student learning outcome was 81.91, exceeding the minimum mastery criteria. This study concludes that the developed hybrid media successfully integrates authentic and digital learning experiences. The research contributes to educational technology by developing culturally grounded hybrid media that enhance adaptive learning in the digital era.

Keywords: *batik learning; culture-based education; hybrid media; pobalis lidi*

INTRODUCTION

Indonesia, as a multicultural nation, possesses a rich cultural heritage reflected in its diverse ethnic groups and local traditions, including batik. Batik not only represents local wisdom but also serves as a cultural identity and a noble legacy passed down from previous generations (Oktaviasary & Sutini, 2024; Azizah et al., 2025). As an integral part of national culture, batik features a wide variety of regional motifs, such as those from Cirebon, Banyumas, and Pekalongan (Trixie, 2020; Herwiyanti et al., 2021), and has been officially recognized by UNESCO as an intangible cultural heritage of humanity (Evita et al., 2022; Zainuri et al., 2021). The intricate batik motifs are imbued with philosophical meanings and national and civic values, underscoring the importance of preserving and safeguarding this cultural heritage (Barriyah & Rahayu, 2023; Kapeanis et al., 2025). Such preservation efforts align with the mandate of the Indonesian National Education System Law No. 20 of 2003, which emphasizes the role of education in developing students' potential and shaping a dignified national civilization to promote intellectual advancement (Saputra et al., 2021; Hermanto, 2020; Syafii et al., 2023). Primary education plays a strategic role in introducing cultural arts, as stipulated in Government Regulation of the Republic of Indonesia No. 4 of 2022, Article 40, Paragraph 2, which makes cultural arts a compulsory component of the curriculum (Hasanah & Andaryani, 2025; Syahidan & Rahmat, 2023). However, a needs analysis revealed that batik education continues to face limitations, particularly in the availability of alternative instructional media. In classroom practice, learning is often restricted to initial stages and rarely progresses to the completion of full works. Furthermore, instructional approaches tend to rely on teacher-centered lectures or simple demonstrations. Consequently, student enthusiasm was low, and based on the analysis of the teacher's assessment records, only 33.3% achieved scores above the minimum mastery level.

Integrating interactive instructional guides into learning media has thus become essential for bridging conventional methods with the demands of the digital era (Pramesty et al., 2022). Instructional media play a pivotal role in the teaching and learning process (Wulandari et al., 2023; Saleh et al., 2023). Therefore, the developed media must present batik-making in a more engaging, digitally relevant, and culturally contextualized manner. This approach not only enhances students' artistic skills but also contributes to cultural preservation through meaningful educational experiences. Batik education is an instructive approach that not only introduces aesthetic aspects but also instills cultural values and fosters students' creative thinking skills. As an element of Indonesia's intangible cultural heritage (Evita et al., 2022; Zainuri et al., 2021), batik serves as an effective medium for developing students' potential in creating two-dimensional visual artworks, particularly in terms of length and width dimensions (Liantoni, 2018; Ambarawati & Agustin, 2019). The practice of batik-making enhances both visual and motor skills while also supporting the contextual internalization of local cultural values.

In line with these benefits, the characteristics of batik art education that align with student learning

needs encompass several key aspects that support holistic development, cognitively, affectively, and psychomotorically. 1) *Integration of self-expression and local culture in art learning*: Batik-making activities provide students with opportunities to express themselves through visual language and forms, while simultaneously introducing local cultural values that shape identity and strengthen multicultural awareness; 2) *Development of life skills and creative abilities*: The batik-making process fosters not only fine motor skills and understanding of artistic elements such as line, color, shape, and texture, but also instills perseverance, independence, and responsibility in the creative process; 3) *Enhancement of contextual and meaningful learning experiences*: The *Merdeka Curriculum* offers flexibility for schools to incorporate local content such as batik into the learning process, enriching students' emotional, intellectual, social, kinesthetic, aesthetic, and artistic experiences; 4) *Appreciation and creation as a form of holistic learning*: Through batik-making, students not only create artworks but also learn to appreciate the process and the meaning behind each motif, which directly contributes to character formation and life competencies (Ampera & Juliarti, 2015; Hartatik et al., 2021).

By linking batik education to the learning outcomes prescribed by the *Merdeka Curriculum*, students gain not only aesthetic experiences but also cultivate cultural awareness and preservation. This approach aligns with the reinforcement of key dimensions in the *Profil Pelajar Pancasila* (Pancasila Student Profile), particularly *Faith in God Almighty and Noble Character*, as well as Global Diversity, where batik serves as a tangible medium for internalizing these values. Batik content is highly relevant within the *Arts and Culture* subject, specifically in visual arts at the elementary school level. By the end of Phase C, students are expected to be able to create two-dimensional artworks based on their own ideas or external inspirations, combining elements such as line, color, texture, and form, while applying principles of design and perspective. Batik education encompasses understanding of various forms, motif placement, color combinations, patterns, and techniques using a range of materials and media (Wahidah, 2021; Janeska et al., 2025). Decorative batik motifs can be created through techniques such as *canting* (hand-drawn waxing), stamping, and others. For example, Pacitan batik continues to exhibit distinctive features influenced by multiple factors, including motif design, color schemes, and ornament placement (Setiyoko, 2022; Christina & Asiatun, 2025). Instructional media serve as intermediaries for delivering educational messages between the source (typically the teacher) and the receiver (the student). Beyond that, media also function as tools of communication and information that support more effective, efficient, and high-quality learning processes (Zahro, 2024; Nurfadhillah et al., 2021). Instructional media are generally classified into two categories: conventional media and digital media (Faqihuddin, 2024; Yuniarti et al., 2023).

Conventional media refer to physical tools that rely on direct, face-to-face interaction, while digital media utilize modern technologies to deliver content. In contrast, hybrid media integrate both physical and digital elements within a multimodal approach. Instructional media play a vital role in enriching content delivery through multiple sources, enabling students to engage in more diverse, concrete, and experiential learning (Kosim et al., 2024; Nurfadhillah, et al., 2021). By leveraging hybrid media, the learning process is expected to become more effective, providing a balanced bridge between the demands of conventional and digital learning environments. The POBALIS LIDI media is a purposefully designed instructional tool that encompasses not only physical development but also the integration of elements tailored to meet the learning needs of the digital era. Three relevant studies have previously indicated directions for innovation in batik education media. The first study introduced cold batik techniques using tamarind paste and plant-based fats; however, the resulting color quality deteriorated after the *pelorodan* (wax-removal) process (Dewanti, 2021). The second study developed a learning model for early childhood using plastic *canting* tools and cold wax, which was shown to enhance fine motor skills and received highly positive feedback from teachers, although it was heavily dependent on adult guidance (Pertiwi et al., 2022). The third study focused on developing an interactive multimedia platform (desktop/Android-based) that enabled digital batik simulations without physical tools. While the media was deemed highly feasible and effective in enhancing conceptual understanding, it did not offer real, hands-on learning experiences with physical materials (Wicaksono et al., 2025).

The POBALIS LIDI media offers comprehensive solutions to the limitations identified in the aforementioned studies. Compared to the first study, this media uses water glass as a fixative agent, which is more stable and better at maintaining color quality. Addressing the limitations of the second study, POBALIS LIDI is supported by a digital interactive guide that promotes learner autonomy. In contrast to the third study, which relied solely on digital simulations, POBALIS LIDI implements a hybrid learning model that merges physical and digital components. This enables students to engage in authentic batik-making experiences while exploring batik motifs through the Artsteps virtual exhibition, thereby reinforcing both the philosophical and educational value of batik as a cultural heritage. This study aims to develop POBALIS LIDI as a hybrid media that combines physical and digital components to facilitate students' mastery of batik-making in a valid, practical, and effective way. This innovation aligns with the goals of the Merdeka Curriculum, particularly in achieving learning outcomes related to two-dimensional artwork using line and color elements, while simultaneously reinforcing cultural preservation through a technology-integrated educational approach.

METHODS

This study employed a research and development approach utilizing the ADDIE model, which comprises five systematic phases: Analysis, Design, Development, Implementation, and Evaluation. The ADDIE model was selected for its structured yet adaptable nature, which allows procedural flexibility across stages while maintaining a linear progression and requiring a thorough initial analysis (Spatioti et al., 2022). The systematic procedure of this model ensures that instructional resources and tools are aligned with student characteristics, thereby fostering effective learning outcomes (Martatiyana et al., 2023). Consequently, this model supports the development of instructional products that are both effective and responsive to learners' needs. The primary objective of this research was to develop, validate, and evaluate POBALIS LIDI, a hybrid learning media designed to support batik-making skills. Specifically, the study aimed to determine the validity, practicality, and effectiveness of the developed media in enabling students to exceed the minimum competency threshold. This study was conducted at SD Negeri 2 Jatigunung in January to May 2025, involving nine fifth-grade students as research subjects. During the learning process, students actively participated in the initial exploratory study. The stages of the ADDIE model that guided this research can be seen in Figure 1.
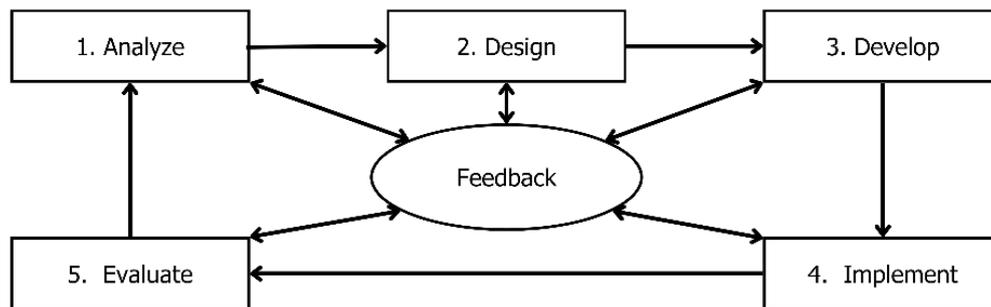
Figure 1. The steps of the ADDIE model (Piskurich et al., 2000)

The implementation of the ADDIE model in this research was carried out in the following stages: 1) *Analysis*: The initial phase involved identifying the need for instructional media through data triangulation, including interviews, observations, and document reviews. The objective was to analyze instructional content, existing media, and teaching materials to ensure the media being developed aligned with instructional needs; 2) *Design*: Based on the analysis findings, the learning media were designed to meet identified needs. This stage included material preparation, the development of a media prototype, and the design of data-collection instruments, such as questionnaires, observation sheets, and assessment rubrics; 3) *Development*: This phase involved the production of the media, followed by expert validation. The instructional media developed in this study included a table set, a bottle-based wax applicator, cold wax, and an interactive digital guide. The validation process was conducted using questionnaires by content experts, media experts, and instructional experts, each with relevant academic backgrounds, namely a doctoral degree in content and media, and a master's degree in instructional design. The validity and practicality percentages were calculated following the procedure described by Akbar (2022). Furthermore, the same reference also provides percentage-based criteria to determine the levels of validity or practicality achieved, presented in a structured format to support consistent interpretation. These criteria are summarized in Table 1.

Table 1. Interpretation of validation or practicality questionnaire scores

Achievement	Description
81.00% - 100,00%	Highly valid or practical
61.00% - 80,00%	Moderately valid or practical
41.01% - 60,00%	Less valid or practical
21.00% - 40,00%	Invalid or impractical
00.00% - 20,00%	Highly invalid or impractical

4) *Implementation*: Following the validation process, the media was implemented in classroom learning activities, which included the stages of *pencantingan* (wax application), coloring, and *pelorodan*. The implementation phase was divided into two parts: a limited-scale implementation to assess practicality, and a broader implementation to evaluate effectiveness; 5) *Evaluation*: This stage involved formative evaluation throughout all phases of development, including during the limited-scale implementation, using student questionnaires and classroom observation. Summative evaluation was conducted after the development stage, during broader implementation, using standardized tests to assess learning outcomes.

After the summative evaluation data were collected, a normality test was conducted in SPSS version 27

using either the Kolmogorov-Smirnov or Shapiro-Wilk test (Jaramillo et al., 2023). The Shapiro-Wilk test was selected, as it is typically recommended for small sample sizes. If the p-value exceeds 0.05, the data are considered to be normally distributed, allowing the analysis to proceed with a parametric one-sample t-test. If the results of the one-sample t-test show a p-value less than 0.05, this indicates a statistically significant difference between the students' average skill scores and the minimum mastery criterion (Nashan et al., 2023), suggesting a positive contribution of the instructional media. Conversely, if the data are not normally distributed, the nonparametric Wilcoxon Signed-Rank Test is used as an alternative. This procedure provides empirical evidence on the effectiveness of the POBALIS LIDI media in supporting students' achievement of batik mastery standards.

RESULT AND DISCUSSION

This phase began with a needs analysis through a preliminary survey. Data triangulation was conducted through interviews with students and the school principal, classroom observations, and a review of the teacher's instructional documents. The objective was to evaluate the current state of batik instruction to identify the need to develop more effective instructional media. The analysis revealed that the school had implemented the *Merdeka* Curriculum and had previously conducted batik learning activities in grade 5. The instructional method remained student-centered, relying primarily on lectures and demonstrations as outlined in the existing teaching modules. However, the use of conventional media, limited to thread and rubber bands, restricted students' ability to explore batik techniques more comprehensively. This limitation negatively affected student engagement and concentration throughout the learning process.

Assessment data indicated that of the nine students, only three achieved scores above the minimum mastery criterion, five met the minimum standard, and one did not meet the competency threshold. These findings suggest that students' batik-making skills had not developed optimally. Therefore, there is a pressing need for more varied and adaptive instructional media to support learning mastery better better. Based on these findings, the design phase was conducted to develop instructional media tailored to students' characteristics and the contextual requirements of batik learning. The product designed was a hybrid learning media called POBALIS LIDI, which integrates physical teaching aids with an interactive digital guide. The prototype of this POBALIS LIDI media is shown in Figure 2.
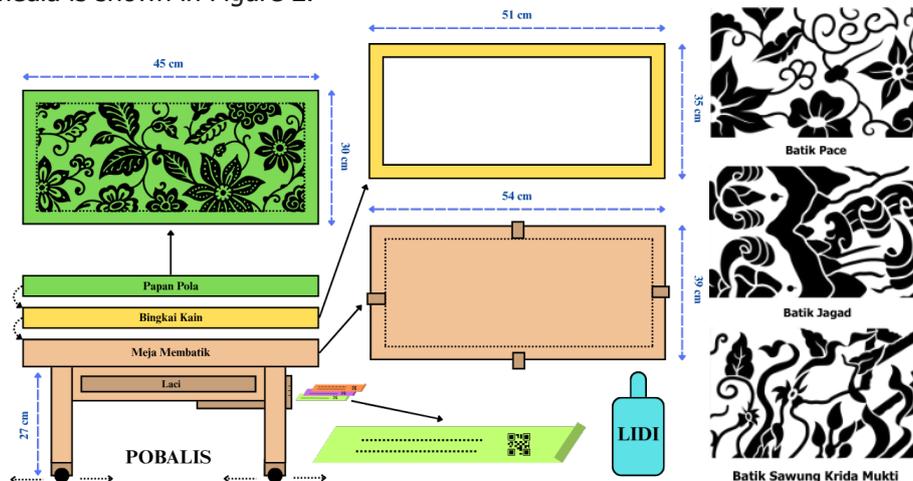

Figure 2. Prototype of the POBALIS LIDI media

In addition, this stage involved designing data collection instruments, including an implementation observation sheet, student questionnaires, and assessment tools. These instruments were developed with reference to the expected learning outcomes and instructional objectives, ensuring that the media effectively support the comprehensive attainment of student competencies. The development stage aimed to realize the POBALIS LIDI media design in both physical and digital forms. The physical media consisted of a batik practice table set and a cold wax applicator made from repurposed bottles. The cold wax was formulated using a mixture of glutinous rice flour, water, brown sugar, liquid paraffin, and alum. This media was complemented by an interactive digital guide presenting step-by-step batik-making procedures, from *pencantingan* to *pelorodan*.

Additionally, a virtual exhibition via the Artsteps platform was integrated to introduce various traditional batik motifs from Pacitan, reinforcing students' understanding of aesthetic and philosophical values. This hybrid approach enables batik learning that is not only technical in nature but also contextual and meaningful. An overview of the POBALIS LIDI media developed for this hybrid learning is shown in Figure 3.
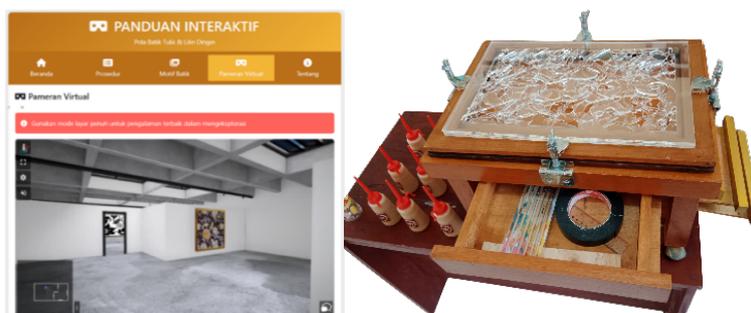
Figure 3. POBALIS LIDI Media

Subsequently, formative evaluation was conducted through validation by subject-matter, media, and instructional design experts. The instruments used consisted of validation questionnaires. The validation results served as the basis for revisions to ensure the media's level of validity prior to its implementation in the learning process. These results are presented in Table 2.

Table 2. Validation Results

Aspect	Validator	Score	Interpretation
Material	Validator 1	91.66%	Highly valid
Media	Validator 2	97.50%	Highly valid
Learning	Validator 3	93.75%	Highly valid

The validation results showed that all three assessed aspects (material, media, and instructional design) were rated as very valid, confirming the strong alignment of POBALIS LIDI with learning objectives and media design principles. It is therefore recommended that the batik learning implementation follow the instructional sequence outlined in the teaching module. The implementation of the POBALIS LIDI media was conducted in two stages: a limited pilot to assess the media's practicality and a broader rollout to evaluate its effectiveness. This stage was carried out with fifth-grade elementary school students, including a class of nine. Practicality data were collected through student questionnaires designed to assess students' responses to the POBALIS LIDI media integrated with an interactive guide. The results of this questionnaire are displayed in Table 3.

Table 3. Student Questionnaire Results

Aspect	Score
Ease of use	3.78
Readability of the interactive guide	3.67
Operational ease	3.33
Learning benefits	3.56
Learning motivation	3.56
Learning atmosphere	3.78
Total	21.68
Percentage	90.33%

According to the interpretation criteria in Table 1, the practicality assessment percentage falls into the Highly Practical category. This indicates a highly favorable student response, showing that the media is user-friendly, motivating, and effective in supporting classroom engagement. The findings from the implementation observation support the results of the student questionnaire. Based on classroom observations during the learning process, the POBALIS LIDI media was found to be practical, aligned with student characteristics, and easy to use in each stage of batik-making, including *canting*, coloring, and *pelorodan*. The media was also considered safe, free of technical obstacles, and effective in achieving learning objectives. Moreover, the observer noted that the learning process ran smoothly, reinforcing that this media can be implemented practically in the classroom. These results indicate that the POBALIS LIDI media support students' learning needs. The practicality of the media encompasses various elements contributing to a positive and engaging classroom experience. The effectiveness data of the learning media were obtained through a test administered during the broader implementation phase. The skill test instrument used had been previously validated to ensure its accuracy in measuring students' learning outcomes. The statistical results of the one-sample t-test and Cohen's d analysis are presented in Table 4.

Table 4. Results of the one-sample
t-test and Cohen's d

Statistic	Value
p-value	< 0.001
Cohen's *d*	1.687

The Kolmogorov-Smirnov and Shapiro-Wilk normality tests indicated that the data were normally distributed, allowing for further analysis using a one-sample *t*-test. Statistical analysis confirmed a significant and meaningful effect of the media, as evidenced by a large effect size and students' scores exceeding the minimum threshold. The distribution of students' batik-making skill criteria is presented in Table 5, and the test results of students achieving "Good" and "Fair" performance levels are shown in Figure 4.

Table 5. Distribution of Batik-Making
Skill Criteria among Students

Number of Students	Category
8	Good
1	Fair

Figure 4. Test results of students with "Good" (left) and "Fair" (right) performance levels

The predominance of students achieving "Good" skills indicates that the POBALIS LIDI media effectively support procedural mastery. This suggests that the combination of hands-on practice and the interactive digital guide allows students to follow batik-making steps independently, enhancing both technical accuracy and engagement. The data indicate that most students reached a high level of proficiency in batik-making, suggesting the media's strong effectiveness in facilitating practical mastery. The test result of a student categorized as having "Good" batik skills showed a firm grasp of the batik-making process using the POBALIS LIDI media. *Interpretation*: The student followed most procedures for using the POBALIS LIDI media effectively, demonstrating a consistent understanding of the batik-making stages.

Analysis: The *canting* and coloring techniques were performed neatly, the motif pattern appeared fairly precise, and the color composition was nearly even, indicating well-developed technical skills. *Evaluation*: The final artwork reflected attention to detail, aesthetic quality, and meaningful motif representation. Although minor flaws were observed, the final product was still considered a successful example of batik work. Meanwhile, the test result of a student categorized as having "Fair" batik skills indicated moderate performance. *Interpretation*: The student demonstrated a moderate understanding of the batik-making procedures using the POBALIS LIDI media. However, several steps, such as *pelorodan* and coloring, were not executed accurately. *Analysis*: The student's application of batik techniques was fairly adequate, yet the neatness of *canting* and consistency of the motif patterns were lacking. The color composition was also not entirely even. *Evaluation*: The student's batik artwork reflected a fair level of achievement, with attention to detail and aesthetic quality needing further improvement. The final product indicated that revisions were necessary before it could be considered a finished work.

These results can be explained through relevant learning theories. These findings align with Vygotsky's scaffolding theory, as the structured guidance provided by POBALIS LIDI enabled students to progressively master complex batik-making skills. Similarly, Mayer's Cognitive Theory of Multimedia Learning is supported, as the combination of verbal instructions and visual aids facilitated cognitive processing, reducing errors and enhancing skill acquisition. Compared to previous studies, POBALIS LIDI demonstrates clear advantages: unlike Dewanti (2021), whose cold wax led to unstable colors, the fixative used here ensures consistency; unlike Pertiwi et al. (2022), which required adult assistance for plastic canting tools, the interactive guide promotes learner autonomy; and in contrast to Wicaksono et al. (2025), which only provided virtual simulations, POBALIS LIDI combines physical practice with digital exploration, offering an authentic hands-on experience.

The evaluation phase was comprehensively conducted to assess the validity, practicality, and effectiveness of the POBALIS LIDI learning media. Based on validation by subject matter experts, media specialists, and instructional design experts, the media was declared valid and suitable for use in elementary school batik instruction. The practicality aspect was assessed through student questionnaires and classroom observations during the limited implementation phase, which revealed that the media were user-friendly and easily understood by students. The effectiveness evaluation was carried out during the broader implementation phase using a batik skills test. Analysis of student learning outcomes using a one-sample t-test showed that the average skill score significantly exceeded the minimum mastery standard ($p < 0.001$). The effect size, measured using Cohen's *d*, was 1.687, indicating a substantial effect. These results demonstrate that the POBALIS LIDI media is effective in supporting students' development of batik-making skills in accordance with the minimum mastery criteria.

The findings of this study indicate that the POBALIS LIDI media, integrated with an interactive guide, has a significant impact on enhancing students' batik-making skills. The integration of tangible tools with interactive digital technology proved effective in facilitating students' step-by-step comprehension of batik techniques, particularly in elementary schools where students were previously only familiar with conventional batik practices. This aligns with previous research asserting that technology-based learning media function as effective intermediaries that support students in comprehending subject matter more fully (Derajat et al., 2024). The hybrid integration of physical tools and digital guidance in POBALIS LIDI addresses the limitations of traditional learning media. This novelty also becomes evident when compared with prior studies. Unlike Dewanti (2021), whose cold wax formulation resulted in unstable color quality after the pelorodan stage, POBALIS LIDI uses water glass as a fixative, ensuring greater color stability. In contrast to Pertiwi et al. (2022), who developed plastic canting tools for early childhood learning but required strong adult assistance, POBALIS LIDI is supported by a digital interactive guide that enhances learner autonomy. Finally, compared to Wicaksono et al. (2025), whose digital platform offered only virtual batik simulations, POBALIS LIDI combines physical practice with digital exploration through Artsteps, offering an authentic, hands-on experience while reinforcing cultural appreciation.

These findings also reinforce Vygotsky's constructivist theory of *scaffolding*, wherein instructional support enables learners to master complex skills in a more structured and meaningful manner (Azzaroiha et al., 2025; Setiawan, 2024). POBALIS LIDI provides procedural stages via visual guidance and hands-on practice, fostering learner autonomy. This multimodal approach aligns with Mayer's Cognitive Theory of Multimedia Learning, which emphasizes that learning is more effective when information is presented through both verbal and visual channels simultaneously, enhancing cognitive processing while minimizing cognitive overload (Twabu, 2025; Wibowo, 2021). Quantitatively, the media's effectiveness was validated by a one-sample t-test ($p < 0.001$), with the average student skill score reaching 81.91, exceeding the school's minimum competency threshold of 76, as set by the prevailing curriculum. The Cohen's *d* value of 1.687 indicates a large effect size, indicating a strong and meaningful impact. Theoretically, this research extends the application of multimedia learning theory and scaffolding to the context of traditional art-based skill acquisition, an area that remains underexplored. In practice, POBALIS LIDI provides an instructional model that can be adapted for other vocational or arts-based learning. Socio-culturally, it supports the preservation of batik as Indonesian cultural heritage by making the learning process more engaging for digitally native learners.

The use of the Artsteps-based virtual exhibition further enriched the learning experience by enabling students to digitally explore traditional batik motifs from Pacitan, thereby deepening cultural appreciation. The score distribution analysis showed that 8 of 9 students were categorized as "Good," while one student received a "Fair" rating. This reflects substantial attainment of learning outcomes, both in technical skills and in the understanding of batik's philosophical significance. Given its success in elementary batik instruction, POBALIS LIDI may be adapted for other batik motifs or batik techniques that require procedural mastery and cultural contextualization. However, challenges persist regarding access to physical tools and teacher readiness. As prior studies suggest, teacher competence and training in media implementation are crucial for achieving successful learning outcomes (Caswita & Noviyani, 2023; Mustafa, 2024). Overall, these findings demonstrate that the POBALIS LIDI media successfully met the research objective of enhancing fifth-grade students' batik-making skills, as evidenced by high mastery scores, positive classroom engagement, and effective procedural execution.

CONCLUSION

The use of the POBALIS LIDI media, which integrates physical tools with digital guidance via an interactive platform and a virtual exhibition, is valid, practical, and effective. This conclusion is drawn from expert validation and the improvement in students' mastery of batik-making procedures, including *pencantingan*, coloring, and *pelorodan*. The media addresses the limitations of conventional cultural arts instruction by providing a hybrid learning experience that enhances engagement and comprehension. It has demonstrated the ability to improve student competency beyond expected standards. This research contributes to the field of educational innovation by presenting a culturally contextualized learning medium that can be applied in other

traditional or vocational subjects. Future efforts are recommended to strengthen teacher capacity and expand the media's interactive features to support meaningful learning further.

ACKNOWLEDGMENTS

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