



Development of an AI-Assisted Teacher Training Module for Creating Digital Storybooks in Elementary Schools

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Abstract

Artificial intelligence offers new opportunities for elementary school teachers to design creative literacy-based learning media, yet its pedagogical use requires structured guidance, ethical awareness, and practical training. This study aimed to develop and evaluate an AI-assisted teacher training module for creating digital storybooks in elementary schools. The study used a research and development design with a mixed-method approach based on the ADDIE model, consisting of Analysis, Design, Development, Implementation, and Evaluation. The participants were 18 teachers at SD Negeri Getasan, Indonesia. Data were collected through interviews, expert validation sheets, teacher response questionnaires, cognitive tests, product assessment rubrics, reflection questionnaires, observation, and documentation. Quantitative data were analyzed using descriptive statistics, while qualitative data were used to interpret teacher needs, implementation experiences, and product refinement. The results showed that teachers had strong readiness to adopt AI, although they still needed support in story writing instruction and structured digital storybook production. Expert validation confirmed that the module was highly feasible, with scores of 88.75% from the material expert, 90.63% from the media expert, and 87.50% from the educational practitioner. The practicality test obtained 90.55%, while cognitive effectiveness reached 79.50%. Teachers' digital storybook products achieved an average score of 3.63 and were categorized as very good. Reflection and usefulness results also indicated positive acceptance and strong potential for sustainable implementation. The main contribution of this study is not limited to producing a training module, but lies in offering an integrated teacher professional development framework that connects AI literacy, digital storytelling pedagogy, ethical evaluation, creative authorship, and school portfolio documentation.

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INTRODUCTION

Artificial intelligence has increasingly transformed educational practices by expanding the ways teachers design instruction, develop learning materials, provide feedback, and manage professional tasks. In contemporary education, AI is no longer understood merely as a digital tool, but as part of a broader shift in teacher competence, digital pedagogy, and institutional innovation. Systematic reviews have shown that AI has been applied across learning, teaching, assessment, and educational administration, making it relevant not only for classroom activities but also for school management and teacher professional development (Faizuddin et al., 2022; He et al., 2024; McChesney & Cross, 2023). This transformation requires teachers to develop new forms of literacy, including the ability to understand AI functions, evaluate AI-generated outputs, and use AI responsibly in pedagogical contexts (Ding et al., 2024; Haroud & Saqri, 2025). In elementary

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education, these competencies are particularly important because teachers must create learning materials that are age-appropriate, meaningful, creative, and aligned with children's literacy development. Therefore, AI integration in elementary schools should be directed toward strengthening teachers' professional capacity rather than simply introducing new technology into classroom practice.

One learning medium that can be meaningfully developed through AI support is the digital storybook. Digital storybooks combine written texts, illustrations, narrative structures, moral messages, and digital presentation in a format that is attractive and accessible for young learners. Previous studies have shown that digital storytelling can support cognitive, affective, linguistic, social, and technological learning outcomes because it enables learners to engage with stories through multiple modes of representation (Karantalis & Koukopoulos, 2022; Sarica, 2023). In teacher education, digital storytelling has also been associated with the improvement of digital literacy, reflective competence, creativity, and professional identity formation (Shinas & Wen, 2022; Yu & Wang, 2025a). When supported by AI, digital storybook development may become more productive because teachers can use AI to generate story ideas, organize plots, refine language, and support visual illustration. However, the pedagogical quality of AI-assisted digital storybooks depends on teachers' ability to control, revise, and contextualize AI outputs so that the final product remains educational, ethical, and suitable for elementary school students.

Empirically, the need for AI-assisted digital storybook training is evident in the context of SD Negeri Getasan. The initial needs analysis showed that 15 out of 18 teachers had experience teaching story writing, yet 10 teachers still experienced difficulties in guiding students to write stories, and 14 teachers stated that students struggled to compose stories independently. These difficulties were mainly related to helping students determine themes, develop characters, arrange settings, organize plots, select vocabulary, and construct coherent story structures. At the same time, teachers showed strong readiness to adopt technological innovation because 17 out of 18 teachers were already familiar with AI, and all teachers expressed interest in using AI to create stories. This condition reveals a practical gap between teachers' willingness to use AI and the absence of a structured training module that can guide them in producing pedagogically appropriate digital storybooks. Without systematic guidance, teachers' interest in AI may remain at the level of curiosity and may not develop into sustainable instructional innovation.

The urgency of this study is also related to the broader demand for teacher professional development in the digital era. Teachers are increasingly expected to master not only subject knowledge and pedagogy, but also digital creativity, ethical technology use, and the ability to document professional works as evidence of continuous development. AI literacy in school contexts involves more than technical operation because it requires critical awareness of accuracy, bias, authorship, copyright, privacy, and responsible human-AI collaboration (Adamakis & Rachiotis, 2025; Kong et al., 2023). In the case of digital storybook creation, these issues become more important because teachers work with texts and images that may contain cultural meanings, moral values, and children's developmental considerations. Moreover, teacher-created digital storybooks can function not only as learning media but also as institutional portfolio documents that reflect school innovation and teacher professionalism. Thus, the development of an AI-assisted training module is important because it connects pedagogical creativity, digital literacy, ethical AI use, and educational administration within a single professional development framework.

Previous research has provided important foundations for understanding AI literacy, digital storytelling, and technology-supported teacher development. Chiu, (2025) conceptualized AI literacy as a multidimensional competence that includes knowing, using, evaluating, and applying AI ethically. Tan & Tang, (2025) emphasized the importance of AI literacy in K-12 education, while Aravantinos et al., (2026) showed that case-based professional development can improve teachers' AI literacy and strengthen their ideas for integrating AI into learning. In relation to story writing, Deshmukh & Shahade, (2026) found that AI technologies can support idea generation, plot development, and human-machine collaboration in story creation. Studies on digital storytelling have also confirmed its contribution to creativity, digital competence, reflective practice, and multimodal learning (Belda-Medina, 2022; Meier, 2022; Yu & Wang, 2025b). In instructional product development, ADDIE and design-based approaches have been widely used to produce, validate, and refine educational modules or digital learning products (Sufaidah & Wijaya, 2025; Yani & Sapriati,

2026). Collectively, these studies demonstrate that AI, digital storytelling, and instructional design have strong relevance for teacher professional learning.

Nevertheless, the existing literature still leaves several critical limitations. Many studies discuss AI literacy as a general competence, but fewer studies translate it into a practical training module that helps in-service elementary school teachers produce concrete literacy-based learning products. Studies on digital storytelling have mostly focused on students or pre-service teachers, whereas classroom teachers who directly face literacy instruction challenges in elementary schools remain underrepresented. Research on AI-assisted writing also tends to emphasize technological affordances, while the ethical, pedagogical, and administrative dimensions of teacher-created digital storybooks are not yet sufficiently integrated. In addition, previous development studies often stop at product feasibility and practicality, without clearly positioning the product as part of teacher professional documentation and institutional portfolio management. This leaves a critical research gap in the development of an integrated AI-assisted teacher training module that combines digital storytelling pedagogy, ethical human-AI collaboration, teacher creativity, and school portfolio documentation in an elementary school context. The novelty of this study lies in this integration, as the module does not merely train teachers to use AI, but positions AI as a pedagogical partner that must be critically guided, ethically evaluated, creatively adapted, and professionally documented by teachers.

Based on this background, this study aims to develop and examine the feasibility, practicality, effectiveness, and usefulness of an AI-assisted teacher training module for creating digital storybooks in elementary schools. Specifically, the study focuses on teachers at SD Negeri Getasan and investigates how the module supports story writing competence, AI utilization, digital storybook production, and school portfolio documentation. Theoretically, this study extends AI literacy and digital storytelling scholarship by demonstrating that teacher AI competence should be understood not only as technical ability, but also as pedagogical judgment, ethical evaluation, creative authorship, and professional documentation. Practically, the study offers a structured training module that guides teachers in generating ideas, organizing storylines, revising AI outputs, designing digital storybooks, and documenting their works as part of institutional innovation. This contribution is expected to strengthen the connection between educational technology, elementary literacy instruction, teacher professional development, and educational administration. By integrating these dimensions, the study provides a more comprehensive approach to AI implementation in elementary schools and supports teachers in transforming digital innovation into meaningful, ethical, and sustainable professional practice.

METHOD

Research Design

This study used a research and development design with a mixed-method approach. The development process followed the ADDIE model, consisting of Analysis, Design, Development, Implementation, and Evaluation. This design was selected because the study aimed to develop, validate, implement, and evaluate an AI-assisted teacher training module for creating digital storybooks in elementary schools. Quantitative data were used to examine the module's feasibility, practicality, effectiveness, and usefulness, while qualitative data were used to explain teacher needs, implementation experiences, and product improvement. The ADDIE model was considered appropriate because it provides a systematic framework for developing and evaluating instructional products (Adeoye et al., 2024; Spatioti et al., 2023; Zou et al., 2024).

Research Setting and Time

The research was conducted at SD Negeri Getasan, Indonesia. This school was selected because the preliminary analysis showed that teachers needed structured training to integrate artificial intelligence into digital storybook development and to document teacher products as part of the school portfolio. The research was carried out from February to April 2026. The activities included needs analysis, module design, prototype development, expert validation, limited implementation, data collection, data analysis, and final product revision.

Participants and Expert Validators

The participants were 18 teachers at SD Negeri Getasan. Total sampling was used because all teachers in the school were involved in teaching, literacy activities, and school-based professional development. The inclusion criteria were: (1) active teachers at SD Negeri Getasan, (2) involved in classroom learning or literacy activities, and (3) willing to participate in the full research process. In addition, three expert validators were involved: one material expert, one media expert, and one educational practitioner. The material expert reviewed content relevance and pedagogical suitability, the media expert reviewed layout and digital presentation, and the practitioner reviewed usability and contextual relevance.

Table 1. Profile of Participants and Expert Validators

Group	Number	Criteria/Role	Main Contribution
Teachers	18	Active teachers at SD Negeri Getasan; involved in teaching and literacy activities	Participated in needs analysis, module implementation, cognitive test, product creation, reflection, and evaluation
Material expert	1	Expert in children's story writing, literacy, and pedagogy	Validated content relevance, conceptual accuracy, story writing substance, AI ethics, and pedagogical suitability
Media expert	1	Expert in instructional media and digital learning design	Validated layout, readability, navigation, visual design, accessibility, and technical quality
Educational practitioner	1	Practitioner with experience in elementary education and teacher training	Validated usability, contextual relevance, clarity, efficiency, and professional benefits

Table 1 shows that the study involved both module users and expert validators. The teachers served as the primary users of the module, while the validators provided content, media, and practical assessments before the module was implemented. This combination allowed the module to be reviewed from theoretical, technical, and contextual perspectives.

Research Instruments

The instruments used in this study included an interview guide, expert validation sheets, teacher response questionnaire, cognitive test, product assessment rubric, reflection questionnaire, observation sheet, and documentation checklist. The interview guide was used to identify teacher needs, difficulties in teaching story writing, familiarity with AI, and expectations for the module. Expert validation sheets were used to assess the feasibility of the module from material, media, and practitioner perspectives. The teacher response questionnaire measured practicality, while the cognitive test measured teachers' understanding of AI-assisted digital storybook development. The product assessment rubric evaluated theme suitability, storyline, language, creativity, AI utilization, and digital display. The reflection questionnaire, observation sheet, and documentation checklist were used to capture teacher experiences, training activities, and digital storybook products.

Validity and Reliability

Content validity was established through expert judgment involving a material expert, a media expert, and an educational practitioner. The experts examined the relevance, clarity, accuracy, usability, and suitability of the module and research instruments. Their comments were used to revise the module, especially in relation to AI limitations, ethical use of AI, examples of AI-generated outputs, copyright awareness, and visual navigation. Reliability was maintained through structured rating scales, clear indicators, and consistent scoring procedures. All validation sheets, questionnaires, and rubrics used a four-point Likert scale to encourage clear assessment and reduce neutral responses. Because this study was conducted as a limited development trial in one school, the analysis focused on descriptive consistency rather than broad psychometric generalization.

Data Collection Procedure

Data collection was carried out according to the ADDIE stages. In the analysis stage, teacher needs were identified through interviews and preliminary questionnaires. In the design stage, the researcher prepared the module structure, learning objectives, training activities, prompt examples, story mapping worksheets, assessment rubrics, reflection sheets, and portfolio documentation format. In the development stage, the module prototype was created and validated by experts. The

prototype was then revised based on expert suggestions. In the implementation stage, the revised module was tested with 18 teachers through training activities, prompt-writing practice, story mapping, AI-assisted story development, illustration selection, story revision, and digital storybook production. In the evaluation stage, data from questionnaires, cognitive tests, product rubrics, reflections, observations, and documentation were analyzed to determine the quality of the module.

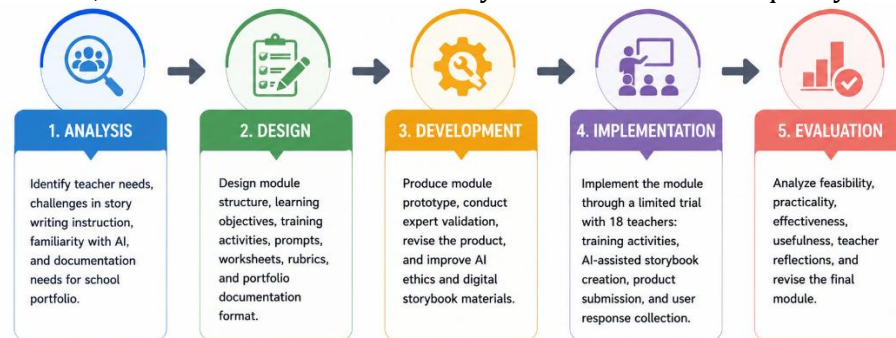


Figure 1. ADDIE-Based Research and Development Procedure

Figure 1 illustrates the systematic flow of the research and development process using the ADDIE model. Each stage was connected to the next stage so that the module could be developed based on teacher needs, improved through expert validation, tested with actual users, and revised based on evaluation results.

Data Analysis

Quantitative data were analyzed using descriptive statistics. Scores from expert validation sheets, teacher response questionnaires, cognitive tests, product assessment rubrics, reflection questionnaires, and usefulness assessments were tabulated, averaged, converted into percentages, and interpreted using predetermined categories. The percentage score was calculated using the formula:

$$P = (\Sigma x / \Sigma xi) \times 100\%$$

where P represents the percentage score, Σx represents the obtained score, and Σxi represents the maximum possible score. The module was considered feasible when expert validation reached at least the good category, practical when teacher responses showed clear usability and relevance, and effective when cognitive test results and product quality showed positive achievement after training.

Qualitative data were analyzed through data condensation, categorization, theme development, and conclusion drawing. Interview, observation, reflection, and documentation data were reviewed to identify teacher needs, implementation experiences, challenges in using AI, and suggestions for module improvement. The qualitative findings were then integrated with the quantitative results to provide a more comprehensive interpretation of the module's feasibility, practicality, effectiveness, and usefulness (Bhat et al., 2022; Li et al., 2024).

Research Ethics

This study followed academic ethical principles. Participants were informed about the research objectives, procedures, expected activities, and use of data before the study began. Participation was voluntary, and teachers were allowed to withdraw from the study at any time. Participant identities were kept confidential, and the results were reported in aggregate form. Training documentation and teacher products were used only for academic purposes. Ethical AI use was also emphasized by guiding teachers to review AI-generated texts and images, avoid inappropriate outputs, respect copyright, cite visual sources when necessary, and ensure that the digital storybooks were suitable for elementary school students.

RESULTS AND DISCUSSION

Results

This section presents the findings obtained from each stage of the development and evaluation process. The results are organized according to the main focus of the study, including teacher needs

analysis, module design and development, expert validation, module practicality, cognitive effectiveness, digital storybook product assessment, teacher reflection, and usefulness for sustainable implementation. The presentation combines descriptive quantitative findings and qualitative interpretation to show how the AI-assisted teacher training module was developed, validated, implemented, and evaluated in the elementary school context.

Results of the Teacher Needs Analysis

The analysis stage showed that story writing instruction had already been implemented at SD Negeri Getasan, but it had not yet reached an optimal level. Of the 18 teachers involved in the study, 15 teachers had experience teaching story writing to students. However, 10 teachers still experienced difficulties in teaching story writing, and 14 teachers stated that students had difficulty composing stories independently. The main difficulties were related to guiding students in determining themes, developing characters, selecting settings, organizing plots, choosing vocabulary, and constructing coherent story structures. These findings indicate that teachers required a practical and systematic guide to support story writing instruction in elementary school.

The needs analysis also showed strong potential for AI-based innovation. A total of 17 teachers were already familiar with AI, and all 18 teachers expressed interest in using AI to create stories. However, teachers' familiarity with AI was still general and had not yet been transformed into structured pedagogical practice. Teachers did not yet have step-by-step guidance for using AI to create digital storybooks in a responsible and educationally meaningful way. This condition became the empirical basis for developing an AI-assisted teacher training module that connects story writing pedagogy, digital literacy, AI utilization, and school portfolio documentation.

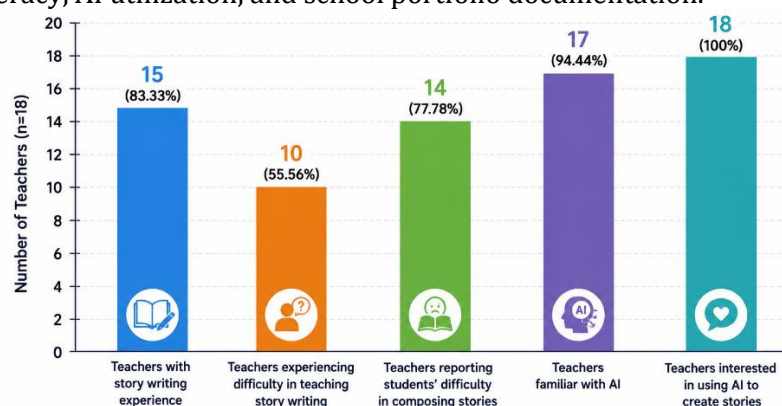


Figure 2. Teacher Needs Analysis

Figure 2 illustrates the initial condition of teachers before the AI-assisted training module was developed. The figure shows that most teachers had experience teaching story writing, but many still faced difficulties in guiding students to compose stories independently. At the same time, teachers demonstrated strong readiness to adopt AI because almost all were familiar with AI and all expressed interest in using it to create stories. This pattern indicates that the module was needed to transform teachers' initial interest in AI into structured, ethical, and practical digital storybook development.

Results of Module Design and Development

The design and development stage produced a digital teacher training module for creating AI-assisted digital storybooks. The module was arranged in gradual activities, beginning with productive literacy strengthening, introduction to AI, development of story ideas, use of story maps, creation of digital illustrations, ethical use of AI, and documentation of teachers' works in the school portfolio. The module was designed in digital format so that teachers could access it through laptops or mobile devices during and after the training. It was also supported by sample prompts, story writing exercises, teacher reflection activities, QR codes, tutorial links, and evaluation instruments.

The module structure consisted of four main phases. The first phase was foundation and awareness, which introduced teachers to children's story writing, digital literacy, and the basic concept of AI-assisted storybook development. The second phase was technical and ethical mastery, which guided teachers in using AI for idea generation, story development, illustration support, output revision, and ethical evaluation. The third phase was management and sustainability, which directed teachers to document digital storybooks as part of school literacy innovation and

professional portfolios. The fourth phase was evaluation and reflection, which helped teachers assess their products, reflect on the training process, and plan classroom implementation.



Figure 3. Structure of the AI-Assisted Teacher Training Module

Figure 3 presents the internal structure of the developed module. The figure shows that the module was not designed merely as a technical guide for using AI, but as an integrated training product that combines pedagogical preparation, ethical AI use, creative production, documentation, and reflection.

Results of Expert Validation

Expert validation was conducted by a material expert, a media expert, and an educational practitioner. The material expert validation obtained an average score of 3.55, equivalent to 88.75%, and was categorized as very good. The media expert validation obtained an average score of 3.625, equivalent to 90.63%, and was also categorized as very good. The practitioner validation obtained an average score of 3.50, equivalent to 87.50%, and was categorized as very good. These results indicate that the module was feasible in terms of content quality, visual design, technical presentation, usability, and contextual relevance for elementary school teachers.

Table 2. Validation Results

Validation Aspect	Average Score	Percentage	Category
Material expert	3.55	88.75%	Very good
Media expert	3.625	90.63%	Very good
Educational practitioner	3.50	87.50%	Very good

Table 2 shows that all validation components reached the very good category. The highest score was obtained from the media expert, indicating that the module had strong visual and technical quality. The validators' suggestions were used to revise the module, especially by adding material on AI limitations, criteria for evaluating AI-generated texts and illustrations, examples of AI outputs before and after teacher revision, and guidance on visual source citation to avoid copyright issues.

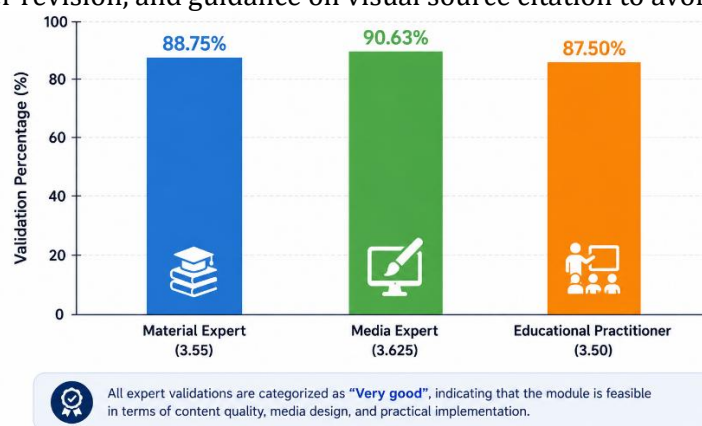


Figure 4. Expert Validation Results

Figure 4 provides a concise comparison of expert validation results. The figure helps readers see that the three expert assessments were consistently high and supported the feasibility of the module for teacher training.

Results of the Module Practicality Test

The practicality test was conducted after teachers participated in the training and used the module directly. The results showed that the module obtained an average score of 3.62, equivalent to 90.55%, and was categorized as highly practical. The highest score was found in the usefulness of the module for teacher professionalism, with a score of 3.89 or 97.25%. Other high-scoring aspects were the module's ability to help teachers understand AI in education and its potential for independent use, each obtaining a score of 3.72 or 93.00%. These results indicate that the module was easy to understand, systematic, relevant, useful, and applicable for elementary school teachers.

Table 3. Results of the Module Practicality Test

Practicality Aspect	Score	Percentage	Category
Material is easy to understand	3.61	90.25%	Highly practical
Module is systematic and coherent	3.67	91.75%	Highly practical
Examples are relevant to elementary schools	3.50	87.50%	Highly practical
Helps teachers understand AI	3.72	93.00%	Highly practical
Practical tutorials are easy to follow	3.33	83.25%	Highly practical
Encourages the creation of digital storybooks	3.61	90.25%	Highly practical
Useful for teacher professionalism	3.89	97.25%	Highly practical
Training time is appropriate	3.50	87.50%	Highly practical
Can be used independently	3.72	93.00%	Highly practical
Training satisfaction	3.67	91.75%	Highly practical
Average	3.62	90.55%	Highly practical

Table 3 shows that the module received consistently high practicality scores across all indicators. The lowest score was found in the practical tutorial aspect, although it remained in the highly practical category. This suggests that the tutorial section was generally usable, but it still required minor refinement, especially in relation to prompt-writing examples, AI output evaluation, and visual step-by-step guidance.

Results of Cognitive Effectiveness

The cognitive effectiveness test was conducted to examine teachers' understanding of the training material. The results showed that the module obtained an average score of 3.18, equivalent to 79.50%, and was categorized as very good. The highest score was found in the ability to organize a storyline through a story map, with a score of 3.44 or 86.00%. This result indicates that the story mapping component helped teachers organize ideas more systematically before developing digital storybooks with AI support. Meanwhile, the urgency of documenting digital works obtained the lowest score, namely 2.94 or 73.50%, although it remained in the good category.

Table 4. Cognitive Effectiveness Test Results

Material Aspect	Score	Percentage	Category
Definition of AI-assisted digital storybooks	3.06	76.50%	Very good
Benefits of AI in storybook writing	3.22	80.50%	Very good
Steps for organizing a storyline	3.44	86.00%	Very good
Urgency of documenting digital works	2.94	73.50%	Good
Differences between printed and digital storybooks	3.22	80.50%	Very good
Average	3.18	79.50%	Very good

Table 4 indicates that teachers achieved the strongest understanding in storyline organization. However, the lower score on digital work documentation shows that teachers were not yet fully accustomed to viewing digital storybooks as part of school administration and professional portfolio evidence. This finding suggests that future implementation should provide more concrete examples of digital archives, school portfolios, and teacher professional development documentation.

Results of Teachers' Digital Storybook Products

The implementation of the module resulted in digital storybooks created by teachers. The product assessment showed that teachers were able to develop story ideas, organize storylines, use appropriate language, apply AI support, and present stories in digital format. The digital storybook products obtained an average score of 3.63 and were categorized as very good. The highest score was found in the digital display aspect, with an average score of 4.00. Theme suitability and creativity also obtained high scores, with each reaching 3.80. However, AI utilization obtained a score of 3.20, and storyline obtained a score of 3.40, both categorized as good.

Table 5. Results of Teachers' Digital Storybook Products

Product Aspect	Average Score	Category
Theme suitability	3.80	Very good
Storyline	3.40	Good
Language	3.60	Very good
Creativity	3.80	Very good
AI utilization	3.20	Good
Digital display	4.00	Very good
Average	3.63	Very good

Table 5 shows that the module successfully encouraged teachers to produce digital storybooks with strong visual presentation, relevant themes, and creative ideas. However, the relatively lower score in AI utilization indicates that teachers still needed further support in writing prompts, selecting AI-generated outputs, revising AI texts, and aligning AI-assisted content with children's language, moral values, and local context. This result shows that human-AI collaboration in storybook production should be developed gradually through repeated practice and guided feedback.

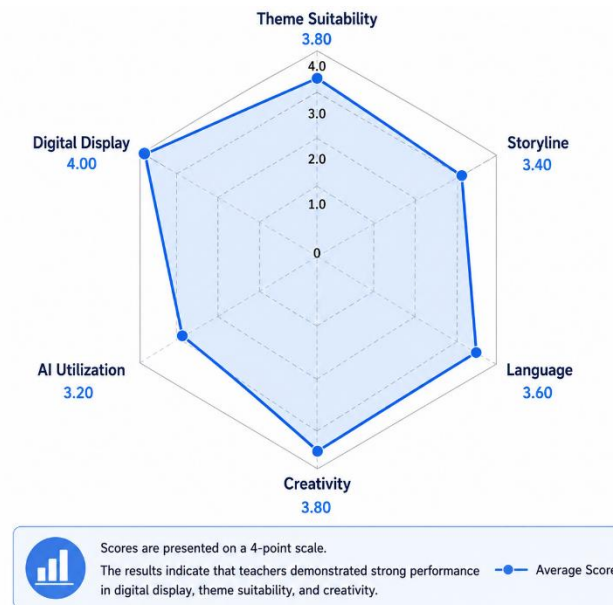


Figure 5. Profile of Teachers' Digital Storybook Product Scores

Figure 5 visualizes the strengths and areas for improvement in teachers' digital storybook products. The strongest aspect was digital display, while AI utilization remained the aspect that required the most support in future training.

Results of Teachers' Attitudes and Reflections

Teacher attitudes and reflections were assessed to identify teachers' learning experiences, new skills, challenges, and plans for classroom use. The results showed that the reflection assessment obtained an average score of 3.10, equivalent to 77.50%, and was categorized as very good. The highest score was found in the plan for classroom use, with a score of 3.22 or 80.50%. This result indicates that teachers did not only complete the training, but also began to consider how digital storybooks could be used in literacy and writing activities in the classroom. Teachers also showed a

change in perspective by viewing AI not only as a technological tool, but also as a creative assistant that could support learning media development.

Table 6. Results of Teacher Reflection

Reflection Aspect	Score	Percentage	Category
Most meaningful experience	3.11	77.75%	Very good
Mastery of new skills	3.06	76.50%	Very good
Plan for classroom use	3.22	80.50%	Very good
Analysis of creation challenges	3.11	77.75%	Very good
Suggestions for module development	3.00	75.00%	Good
Average	3.10	77.50%	Very good

Table 6 indicates that teachers responded positively to the training and showed readiness to apply digital storybooks in classroom practice. The lowest score was found in suggestions for module development, which may indicate that some teachers still needed more confidence in evaluating and improving training materials. This result suggests that future implementation should include more structured reflection sessions and collaborative feedback activities.

Results of the Module's Usefulness and Sustainability

The usefulness and sustainability assessment was conducted to determine whether teachers perceived the module as beneficial beyond the training activity. The results showed that the module obtained an average score of 3.81, equivalent to 95.30%, and was categorized as very good. The highest score was found in teachers' willingness to share good practices, with a score of 4.00 or 100%. Support for school literacy also obtained a high score of 3.89 or 97.20%. These findings indicate that the module was perceived not only as training material, but also as a potential instrument for school literacy development and teacher professional collaboration.

Table 7. Results of the Module's Usefulness

Usefulness Aspect	Score	Percentage	Category
Potential implementation in schools	3.78	94.50%	Very good
Usefulness of AI and Canva materials	3.72	93.00%	Very good
Support for school literacy	3.89	97.20%	Very good
Willingness to share good practices	4.00	100.00%	Very good
Contribution of development suggestions	3.67	91.70%	Very good
Average	3.81	95.30%	Very good

Table 7 confirms that the module has strong potential for sustainable implementation in school-based professional development. Teachers considered the module useful for school literacy programs, teacher learning communities, internal training, and documentation of teacher innovation. The high willingness to share good practices also suggests that the module can be expanded into collaborative teacher development activities.

Summary of Results

Overall, the results show that the AI-assisted teacher training module met the criteria of feasibility, practicality, effectiveness, product quality, positive teacher reflection, usefulness, and sustainability. Expert validation demonstrated that the module was feasible for use in teacher training. The practicality test showed that teachers found the module understandable, systematic, useful, and applicable for independent use. The cognitive effectiveness test showed that teachers achieved good understanding of AI-assisted digital storybook development, particularly in organizing storylines through story maps. The product assessment demonstrated that teachers were able to create digital storybooks with strong visual quality, relevant themes, and creative ideas. However, AI utilization, storyline development, and digital documentation still require further strengthening in future training. The usefulness assessment also showed that the module has strong potential to support school literacy programs, teacher professional development, and institutional portfolio documentation.

Discussion

The findings indicate that the AI-assisted teacher training module responded to a real pedagogical need among elementary school teachers, particularly in relation to story writing

instruction and the use of AI for learning media development. Although most teachers had experience teaching story writing, many still faced difficulties in guiding students to develop themes, characters, settings, plots, vocabulary, and coherent story structures. This condition suggests that teaching experience alone does not automatically lead to pedagogical mastery, especially when teachers are expected to transform conventional writing instruction into digital and AI-supported learning products. From the perspective of teacher professional development, the gap between teachers' readiness to use AI and their limited ability to apply it systematically shows the importance of structured, practice-based training. This finding supports the concept of AI literacy as a multidimensional competence that includes not only technical familiarity, but also pedagogical judgment, ethical awareness, and the ability to evaluate AI-generated outputs (Chiu, 2025; Ding et al., 2024; Kong et al., 2023). It also aligns with studies showing that teachers need concrete cases, examples, and guided activities to integrate AI into classroom contexts rather than relying only on general knowledge of technology (Aravantinos et al., 2026; Haroud & Saqri, 2025). Thus, the module addresses an important gap in the literature by translating AI literacy into a practical training framework for in-service elementary school teachers.

The expert validation results show that the module had strong feasibility in terms of content, media, and practical relevance. This finding is important because a training module for AI-assisted digital storybook creation must meet several quality dimensions at the same time: accurate literacy content, usable digital design, ethical AI guidance, and contextual suitability for elementary school teachers. The high media validation score indicates that the module was not only conceptually relevant but also accessible and visually appropriate for teacher use. However, the validators' suggestions regarding AI limitations, output evaluation, revision examples, and visual source citation reveal a critical point: AI-based learning materials cannot be judged only by technical attractiveness, but must also be evaluated through ethical and pedagogical standards. This interpretation extends previous ADDIE-based development studies, which often emphasize product feasibility and practicality, by showing that AI-integrated instructional products require stronger attention to authorship, copyright, human verification, and responsible adaptation (Sufaidah & Wijaya, 2025; Yani & Sapriati, 2026; Zou et al., 2024). It is also consistent with critical discussions on generative AI in education, which argue that AI can support content creation but still requires human control to prevent inaccurate, biased, or pedagogically inappropriate outputs (Adamakis & Rachiotis, 2025; Ding et al., 2024). Therefore, the module's feasibility lies not merely in its high validation scores, but in its capacity to connect technical guidance with ethical reflection.

The practicality test demonstrates that teachers perceived the module as clear, systematic, useful, and applicable for independent use. The strongest response was found in the usefulness of the module for teacher professionalism, which indicates that teachers did not view the module only as temporary training material but as a resource for improving their professional work. This finding supports the argument that teacher professional development becomes more meaningful when it is connected to concrete products, classroom needs, and opportunities for continued use. Compared with studies on digital storytelling that focus mainly on student learning outcomes or pre-service teacher creativity, this study places in-service teachers as active producers of digital literacy materials (Belda-Medina, 2022; Karantalis & Koukopoulos, 2022; Meier, 2022; Yu & Wang, 2025a). The result also strengthens the idea that technology training is more likely to be accepted when teachers can directly see its relevance to instructional tasks and professional identity. Nevertheless, the relatively lower score on practical tutorials indicates that teachers still require more detailed guidance in prompt writing, AI output selection, and step-by-step digital production. This implies that AI training should not stop at tool introduction, but should include repeated practice, examples of output revision, and collaborative feedback.

The cognitive effectiveness and product assessment results reveal that the module helped teachers understand the structure of AI-assisted digital storybook development, especially in organizing storylines through story maps. This finding indicates that AI does not replace the teacher's pedagogical role; instead, its usefulness depends on the presence of a clear instructional scaffold. Story mapping appears to function as a bridge between human creativity and AI assistance because it helps teachers control the direction of the story before using AI for idea development, language refinement, or visual support. This supports previous studies suggesting that digital storytelling requires multimodal organization, narrative coherence, and reflective decision-making rather than

simple technology use (Sarica, 2023; Shinas & Wen, 2022; Yu & Wang, 2025b). However, the lower score in AI utilization and the good but not very high storyline score show that teachers still need deeper competence in human-AI collaboration. One possible explanation is that teachers were still in an early stage of moving from AI familiarity to AI fluency, so they could produce visually attractive storybooks but had not yet fully mastered how to critically guide AI-generated content. This finding contributes conceptually by suggesting that teacher AI competence develops progressively from awareness, to guided use, to critical adaptation, and finally to pedagogically meaningful authorship.

The reflection and usefulness results show that the module has potential for sustainable implementation in school literacy programs, teacher learning communities, and institutional portfolio documentation. Teachers' strong willingness to share good practices suggests that the training created not only individual competence but also opportunities for collaborative professional learning. This is significant because many studies on AI literacy and digital storytelling remain focused on classroom application, while the administrative and institutional value of teacher-created digital products is less frequently discussed. In this study, digital storybooks are positioned not only as learning media, but also as evidence of teacher innovation that can support school documentation and continuing professional development. This perspective expands the discussion of AI in education by linking pedagogical innovation with educational administration, professional portfolios, and school-based knowledge sharing (Faizuddin et al., 2022; McChesney & Cross, 2023). At the same time, the findings should be interpreted within the context of a limited development trial involving 18 teachers in one elementary school, so wider implementation is needed before broader generalization can be made. Therefore, the main contribution of this study lies in offering an integrated module structure in which AI literacy, digital storytelling, teacher creativity, ethical evaluation, and institutional documentation are connected as complementary dimensions of elementary teacher professional development.

CONCLUSION

This study developed and evaluated an AI-assisted teacher training module for creating digital storybooks in elementary schools. The findings show that the module met the criteria of feasibility, practicality, effectiveness, and usefulness in supporting teacher professional development at SD Negeri Getasan. Expert validation confirmed that the module was appropriate in terms of material quality, media design, and practical relevance. The practicality results showed that teachers considered the module clear, systematic, relevant to elementary school contexts, and useful for improving professional competence. The cognitive effectiveness results also indicated that teachers developed a better understanding of AI-assisted digital storybook creation, particularly in organizing storylines through story maps.

The implementation of the module encouraged teachers to produce digital storybooks with strong visual presentation, relevant themes, appropriate language, and creative ideas. However, the findings also show that AI utilization, storyline development, and digital work documentation still require further strengthening. The main contribution of this study is not limited to producing a training module, but lies in demonstrating how AI literacy, digital storytelling pedagogy, ethical evaluation, creative authorship, and school portfolio documentation can be integrated into teacher professional development. This indicates that teacher AI competence should be understood as a gradual process involving pedagogical judgment, responsible technology use, creative adaptation, and professional documentation. Therefore, the module can be used as a practical training framework for school literacy programs, teacher learning communities, and continuing professional development. Future studies are recommended to test the module in a wider range of schools, involve larger samples, and examine its impact on students' reading interest, writing ability, creativity, and literacy learning outcomes.

AUTHOR CONTRIBUTIONS STATEMENT

Kartika Pradiningtyas contributed to the conceptualization of the study, needs analysis, module development, data collection, data analysis, and preparation of the initial manuscript draft. Bambang Ismanto contributed to the supervision of the research design, validation of methodological direction, interpretation of findings, and critical revision of the manuscript. Stefanus C. Relmasira

contributed to the refinement of the theoretical framework, evaluation of the module development process, discussion development, and final manuscript review.

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