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Developing a Generative AI-Assisted Training Module for Integrated Digital Big Book in Guidance and Counseling to Enhance Elementary Teachers' Pedagogical Competence

Chrisma Prateila Kusumaningsih,^{*} Yari Dwikurnaningsih , and Stefanus Christian Relmasira 

Magister Administrasi Pendidikan, Universitas Kristen Satya Wacana Salatiga, Indonesia

^{*}Corresponding author: chrismaprateila@gmail.com

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Abstract

This study aims to develop and evaluate the effectiveness of a Generative AI-based training module in enhancing the pedagogical competence of elementary school teachers, particularly in integrating Guidance and Counseling (BK) services into daily instructional practices. The study involved a sample of 72 elementary school teachers drawn from six schools within a single educational cluster. The participants were selected using a cluster random sampling technique, ensuring that each school had an equal probability of being assigned to either the experimental or control group. The findings indicate that the Generative AI-based training module significantly improved teachers' pedagogical competence, as evidenced by an average N-Gain score of 73.28%. The module effectively enhanced teachers' conceptual understanding and practical ability to integrate BK services into classroom instruction, while simultaneously promoting a pedagogical approach that fosters students' character development and socio-emotional competencies. This study concludes that the integration of AI in education, particularly through the development of Digital Big Book media, not only enriches instructional content but also reinforces essential social and ethical values required in 21st-century learning environments. Furthermore, the study recommends extending future research to a broader range of schools and investigating specific AI tools to examine the long-term impact, scalability, and sustainability of the competencies acquired by teachers.

Keywords: Digital Big Book; Generative AI; Integrated Guidance and Counseling; Pedagogical Competence; Teacher Training.

1. Introduction

The transformation of education in the digital era necessitates substantial advancements in teachers' pedagogical competencies, particularly in their capacity to effectively integrate digital technologies and artificial intelligence into the instructional process [1] [Wibowo2025]. The rapid evolution

of educational technology has fundamentally reshaped how teachers design, deliver, and evaluate learning, thereby positioning digital competence as a central component of contemporary teaching professionalism [2]. In this context, the integration of digital technologies enables educators to create more interactive, personalized, and contextually relevant learning experiences that align with the evolving needs of learners in the digital age [3].

At the elementary school level, these demands become increasingly complex, as teachers are required not only to function as instructional facilitators but also to support students' social and emotional development through Guidance and Counseling (GC) services [4]. Guidance and counseling programs at this level are strategically designed to foster students' social-emotional competencies and promote positive behavioral development, thereby contributing to optimal academic outcomes [5]. Furthermore, the integration of counseling services into classroom practices facilitates students' self-awareness, emotional regulation, and the development of constructive interpersonal relationships within the school environment [6].

In parallel with the increasing integration of technology in education, digital literacy has emerged as a fundamental competency for teachers in the design and implementation of effective learning environments [7]. Digital literacy extends beyond mere technical proficiency, encompassing the ability to critically, creatively, and ethically access, evaluate, and utilize digital information within pedagogical contexts [3]. Recent empirical evidence indicates that the adoption of artificial intelligence-based technologies can significantly enhance teachers' capabilities in information processing, problem-solving, and critical thinking, particularly in the context of technology-enhanced instructional design [8].

Moreover, advancements in artificial intelligence—particularly Generative Artificial Intelligence—have introduced new opportunities for the development of innovative instructional media [9]. Generative AI technologies enable teachers to efficiently generate instructional materials, design engaging learning activities, and develop digital learning resources with greater creativity and flexibility [3]. The integration of AI into educational practices has also been shown to improve instructional effectiveness and enrich students' learning experiences through the provision of adaptive, interactive, and personalized content [10].

Despite these advancements, a growing body of research indicates that many teachers continue to encounter significant challenges in the effective utilization of digital technologies in their teaching practices [11]. Constraints such as limited digital literacy, insufficient access to professional development opportunities, and a lack of understanding regarding the pedagogical applications of AI remain critical barriers to successful technology integration in educational settings [12]. This condition underscores the urgent need for the development of structured training programs and technology-enhanced learning modules that simultaneously strengthen teachers' digital and pedagogical competencies [13].

In response to these challenges, the development of digital learning media that integrates digital literacy, artificial intelligence, and Guidance and Counseling services is of paramount importance. Such an integrative approach not only enhances teachers' pedagogical competence but also supports students' academic achievement alongside their socio-emotional development in a holistic manner [14]. Accordingly, this study aims to develop a Generative AI-based training module for the creation of a Digital Big Book integrated with Guidance and Counseling services, to improve the pedagogical competence of elementary school teachers.

2. Methods

This study adopts a Research and Development (R&D) methodology to design, develop, and evaluate the effectiveness of a Generative Artificial Intelligence-assisted Digital Big Book Guidance and Counseling (GC) training module aimed at enhancing the pedagogical competence of elementary school teachers [15]. The R&D approach is extensively employed in educational research to generate valid, practical, and effective instructional products through a systematic process encompassing design, validation, and iterative field testing [16].

The development framework employed in this study represents an integration of the Borg and Gall model with the ADDIE instructional design framework. This hybrid model enables a structured yet flexible development process, while simultaneously accommodating the integration of emerging learning technologies [17]. Specifically, the Borg and Gall model provides a comprehensive research-oriented framework with sequential product testing procedures, whereas ADDIE offers a systematic instructional design structure consisting of analysis, design, development, implementation, and evaluation phases [18].

The research procedure is organized into five principal stages. The first stage, analysis, involves a comprehensive needs assessment focusing on teachers' competencies in developing digital learning media and integrating Guidance and Counseling services into instructional practices [19]. Data collection at this stage was conducted through a triangulation of literature review, semi-structured interviews with teachers, and classroom observations in elementary school contexts [20]. The findings from this phase indicate that a majority of teachers experience limitations in digital literacy and demonstrate minimal utilization of artificial intelligence technologies in instructional media development [21].

The second stage, design, entails the conceptualization and structuring of the Generative AI-assisted Digital Big Book training module. This phase includes the development of the module framework, instructional scenarios, interface design of the Digital Big Book, and the integration of Guidance and Counseling components into narrative structures and learning activities [22]. The Digital Big Book is developed using a Generative AI platform to produce visual illustrations, pedagogically meaningful narratives, and interactive learning scenarios that support students' social and emotional development [3]. Furthermore, the design incorporates principles of digital literacy and story-based learning to enhance student engagement and reading motivation [23].

The third stage, development, focuses on the production of the training module and the prototype of the Generative AI-based Digital Big Book [24]. This phase involves the creation of digital storytelling content, visual elements, and interactive features aimed at fostering literacy and character development. Additionally, expert validation was conducted involving specialists in educational technology, elementary education, and Guidance and Counseling. The validation process aimed to assess the appropriateness of content, instructional design quality, and the integration of counseling principles within the digital learning media [6].

The fourth stage, implementation, involves the execution of the training program for elementary school teachers using the developed module [25]. To enhance external validity and ensure broader generalizability, the study engaged 72 teachers from six elementary schools within a single educational cluster. The participants were selected using cluster random sampling, ensuring equal probability for each school to be assigned to either the experimental or control group [26]. The sample consisted of 36 teachers in the experimental group and 36 in the control group.

Teachers in the experimental group participated in four structured training sessions focused on the application of the Generative AI-based module to develop Digital Big Books integrated with Guidance and Counseling services [27]. In contrast, the control group continued their regular instruc-

tional practices without exposure to the intervention during the study period. This comparative design enabled a more objective assessment of changes in teachers' pedagogical competence between the two groups [28].

The final stage, evaluation, assesses the effectiveness of the training module using a quasi-experimental nonequivalent control group design with pretest and posttest measures [29]. Data collection was conducted at two points: prior to the intervention (pretest) and following its completion (posttest). The instruments employed included a pedagogical competence test, a teacher perception questionnaire regarding the training module, and structured observation sheets for classroom implementation. The pedagogical competence assessment specifically measured teachers' abilities in lesson planning, integration of digital technologies, incorporation of Guidance and Counseling services into instruction, and reflective teaching practices [30].

The study employed a rigorous methodological framework to ensure both the validity and reliability of the research instruments, as well as the robustness of the data analysis. Instrument validity was established through expert judgment involving specialists in primary education and learning technology, thereby ensuring content appropriateness and relevance [31]. In addition, the reliability of the instruments was examined using the Cronbach's Alpha coefficient to confirm internal consistency and measurement stability [32].

To assess the effectiveness of the intervention, pretest and posttest data were analyzed using inferential statistical methods, including independent samples t-tests and N-Gain analysis, which enabled a comprehensive evaluation of improvements in teachers' pedagogical competence [33]. Overall, this systematic approach not only resulted in the development of a Generative AI-assisted Digital Big Book training module, but also generated strong empirical evidence supporting its effectiveness in enhancing the pedagogical competence of elementary school teachers.

3. Results and Discussion

3.1 Results

3.1.1 Teachers' Needs Analysis and Initial Conditions

Based on the results of a preliminary study conducted through observations and interviews at SDN Karangtengah 01 and the Perkutut Cluster, it was found that the implementation of integrated Guidance and Counseling (BK) services in elementary schools has not been optimal. BK services are currently provided more incidentally, namely, only when certain problems arise, such as student conflict, decreased learning motivation, or behavioral problems [34]. This indicates that the preventive and developmental functions of BK have not been fully integrated into more structured and sustainable learning plans. Although teachers recognize their role as counselors, they often find it difficult to plan and integrate BK services into daily learning activities. This condition reflects a lack of understanding and implementation of BK holistically in the context of elementary education [35].

Initial interview findings also revealed that approximately 80% of teachers at SDN Karangtengah 01 and the Perkutut Cluster have not utilized information technology in developing learning media integrated with guidance and counseling content. The main obstacles identified were limited technical competence in using technology, confusion in selecting applications appropriate to the learning context, and limited time outside of teaching hours to develop digital media [4]. Most teachers felt that developing digital media for guidance and counseling requires specialized expertise in design or technology, so they tended to avoid or delay the use of technology in the classroom. As a result, existing guidance and counseling media are still simple, verbal, and not documented in a digital format that can be accessed by students. This indicates a clear gap between the demands of pedagogical competence in the digital era, which prioritizes technology integration and media innovation, and

teachers' limited readiness to utilize technology to develop learning materials [3].

To address these issues, this study involved a sample of 72 teachers from six schools within one educational cluster. The sample was selected using cluster random sampling, so that each school had an equal opportunity to be part of the experimental or control group. Of these, 36 teachers were assigned to the experimental group and 36 to the control group. The experimental group received training in developing Generative AI-based learning media to support guidance and counseling services, while the control group received no training. This approach allowed researchers to more objectively measure the effect of technology-based training on teachers' pedagogical competence, particularly in integrating guidance and counseling services into daily learning [36].

The results of this study can provide important insights for the development of more effective technology-based training, taking into account the real-world conditions faced by teachers in implementing technology in the classroom. Skills in developing digital media for guidance and counseling services should be part of training specifically designed to address the technical and non-technical barriers faced by teachers, while simultaneously increasing the effectiveness of guidance and counseling services integrated into the learning process. Therefore, this research is expected to make a significant contribution to developing teacher competency and improving the quality of guidance and counseling services in elementary schools [37].

3.1.2 Module Validity and Practicality Testing

The developed training module has been validated by subject matter experts and instructional design experts [38]. The validation results showed scores of 87.50% (content) and 92.50% (design), both categorized as highly valid. Furthermore, a practicality test was also conducted with 72 teachers from six schools in one educational cluster, using cluster random sampling techniques to divide participants into experimental and control groups, which yielded an average score of 92.75%. This indicates that the module is easy to understand, provides clear instructions, and is relevant to teachers' needs.

Table 1. Descriptive Statistics for Validation and Practicality

Validation Type	N	Min	Max	Mean	Std. Dev.
Content Expert	1	87.50	87.50	87.50	0.000
Design Expert	1	92.50	92.50	92.50	0.000
Practicality (Teachers)	72	88.00	96.00	92.75	2.14

The results above indicate that the instructional design and module content have met the eligibility standards before conducting effectiveness tests on the experimental and control groups.

3.1.3 Effectiveness Test Results

The effectiveness test was conducted using an experimental design with an experimental group (36 teachers) and a control group (36 teachers). Data were collected through pretests and posttests to measure teachers' pedagogical competence before and after the training. Analysis using a paired sample t-test revealed a significant difference between the pretest and posttest scores for teachers' pedagogical competence. The calculated t-value was -21.950 with a $df = 16$ and a Sig. (2-tailed) value of 0.000 ($p < 0.05$), indicating that the Generative AI-based Guidance and Counseling module training was effective in improving the pedagogical competence of elementary school teachers [39].

Table 2. Paired Samples Test

Pair	Mean Difference (Pretest and Posttest)	t	df	Sig. (2- tailed)
Pretest and Posttest	-23.35	-21.950	16	0.000

As presented in Table 2, the results of a paired samples test comparing pretest and posttest scores on teachers' pedagogical competence. The mean difference between the pretest and posttest scores was -23.35, indicating that the posttest scores were higher than the pretest scores, indicating a significant improvement after the training. The t-value of -21.950 represents the t-test statistic used to measure the magnitude of the difference between the pretest and posttest scores.

This very negative t-value indicates a significant difference between the two scores. The df (Degrees of Freedom) of 16 indicates the number of degrees of freedom used in the t-test calculation. The larger the t-value, the more significant the difference between the pretest and posttest. A 2-tailed Sig. value of 0.000 indicates a p-value less than 0.05, indicating that the difference between the pretest and posttest scores is statistically significant [40]. In other words, the training provided to teachers significantly improved their pedagogical competence. These results confirm that the training teachers receive has a strong influence on improving their competence after the training.

3.1.4 N-Gain Analysis

The results of the N-Gain presented in Table 3 analysis showed that the average N-Gain score was 0.7328 (73.28%), which falls into the high category ($g > 0.7$). This indicates that the training not only resulted in statistically significant but also practically meaningful improvements in teachers' pedagogical competence. All participants experienced improvements, albeit at varying levels. The standard deviation of 0.15 indicates that the distribution of N-Gain scores was relatively homogeneous, indicating that the improvement in teachers' pedagogical competence was fairly even among the participants [41].

Table 3. Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Dev.
N-Gain	77	0.55	1.00	0.7328	0.15

Based on the results of this N-Gain analysis, it shows that it reinforces the findings of the Paired Sample t-test, which confirmed that the Generative AI-based training module is effective in improving the pedagogical competence of elementary school teachers as also found by [42]. This study involved 72 elementary school teachers from six schools within one educational cluster. The sample was selected using a cluster random sampling technique, so each school had an equal opportunity to be part of the experimental or control group. Of these, 36 teachers were assigned to the experimental group and 36 teachers to the control group. These findings provide strong evidence that Generative AI-based training can help substantially improve teachers' pedagogical abilities.

3.2 Discussion

This study aims to develop and test the effectiveness of a Generative AI-based training module for creating a Digital Big Book integrated with Guidance and Counseling (BK) services to improve the pedagogical competence of elementary school teachers. The results indicate that the developed module significantly improved teachers' pedagogical competence, with an average N-Gain score of 0.7328 (73.28%), which is considered high. This finding strengthens the evidence that the use

of Generative AI-based technology can make a positive contribution to education, particularly in integrating BK services into the learning process.

Although this module is connected to relevant frameworks such as TPACK (Technological Pedagogical Content Knowledge), it is important to explore more deeply why this module is effective in this context. TPACK proposes that the effectiveness of technology integration in learning depends not only on technological understanding but also on pedagogical knowledge and content relevant to the learning context [43]. In this study, the Generative AI-based training module successfully combined these three components, with a primary focus on integrating BK services into daily teaching.

3.2.1 Technology: Leveraging AI for Innovative Learning Media

The integration of generative artificial intelligence (AI) in the development of Digital Big Books represents a significant innovation in instructional media. Generative AI facilitates the efficient creation of highly interactive and visually enriched learning materials, which are essential for enhancing student engagement and fostering the internalization of character values alongside social-emotional competencies. Within this paradigm, technology functions not merely as a tool for augmenting instructional content but as a transformative medium for constructing more meaningful and holistic learning experiences. This is particularly important given that character formation and social-emotional development are often inadequately addressed within conventional pedagogical approaches that predominantly emphasize cognitive outcomes [44].

Within the framework of Technological Pedagogical Content Knowledge (TPACK), the application of AI extends beyond content generation to encompass the design of pedagogically sound and socially relevant learning activities. In this regard, AI serves as an enabling mechanism that supports adaptive and responsive teaching practices aligned with diverse student needs—dimensions that are frequently insufficiently accommodated by traditional instructional models. Moreover, generative AI enables the development of learning materials that are not only engaging but also intentionally structured to cultivate essential character attributes, including empathy, collaboration, and emotional regulation. These competencies are particularly critical within the context of character education at the elementary school level [45].

Furthermore, training modules that incorporate generative AI equip teachers not only with technical proficiency but also with the pedagogical capacity to meaningfully integrate AI into instructional practices that support students' character development. A key advantage of generative AI lies in its capacity to facilitate contextually rich learning experiences, wherein students are actively engaged in interactive activities that simultaneously address academic objectives and social-emotional learning outcomes. For instance, AI-supported Digital Big Books can be designed to present interactive narrative scenarios that embed moral values, thereby enhancing students' abilities to regulate emotions and establish positive interpersonal relationships [46].

In sum, the utilization of generative AI in the creation of Digital Big Books contributes not only to the enhancement of instructional material quality but also to the promotion of more holistic educational experiences that integrate cognitive, social, and emotional dimensions of learning. This perspective is consistent with prior research indicating that technology-enhanced learning environments can significantly improve instructional effectiveness, particularly in relation to the development of students' character and social competencies. Consequently, AI-based training modules offer a robust framework for enabling teachers to synergistically integrate technological tools with pedagogical strategies that support students' comprehensive development, thereby fostering more personalized, interactive, and impactful learning experiences.

3.2.2 Pedagogy: Strengthening the Social-Emotional Teaching Approach

This Generative AI-based training module focuses not only on technology instruction but also introduces a pedagogical approach that integrates Guidance and Counselling (BK) services into daily learning. One key aspect of this module is providing teachers with training to design activities that not only educate academically but also address students' social and emotional development. For example, the Digital Big Book used in this training is designed to convey moral and social values through interactive stories and illustrations. This approach allows teachers to address various aspects of student development more holistically, including character building, social skills, and emotional management within the school environment. This emphasis on social-emotional skills is highly relevant to the needs of 21st-century students, who require not only academic knowledge but also sound life skills [35].

The use of AI-based Digital Big Books allows teachers to deliver more personalized and contextual material, not just in the form of plain text but also through more vibrant and engaging visual narratives. With this technology, students not only read but also interact with the stories presented, such as choosing the storyline or engaging in activities that lead them to understand and feel the moral message being conveyed. This supports the principles of Social-Emotional Learning (SEL), which aims to help students develop skills in managing their emotions, building positive relationships, and making responsible decisions [47]. Research shows that interactive media such as Digital Big Books are more effective in capturing students' attention, which in turn improves their understanding and internalization of moral values.

In the pedagogical approach promoted by this module, teachers are trained to design social-emotional activities that focus not only on academic content but also on how students can manage their emotions and learn to interact positively with their peers. These interactive narrative-based activities enable teachers to develop students' social skills through scenarios and characters relevant to their lives. For example, in the stories contained in the Digital Big Book, students are faced with situations that require them to resolve conflicts, manage emotions, or make responsible decisions. These types of activities are crucial in the context of character education, where students' social and emotional development is expected to strengthen their academic learning [48].

Furthermore, this module supports the development of teachers' competencies in integrating guidance and counselling services into every aspect of their learning. Previously, guidance and counselling services were often viewed as separate from academic learning. However, with this approach, guidance and counselling are integrated into daily learning activities, enabling teachers to provide emotional and social support to students in a more contextual manner. This training not only provides teachers with knowledge on how to provide effective guidance and counselling services but also teaches them how to utilize digital technology to reinforce the messages they want to convey. For example, teachers can use a Digital Big Book to provide psychological support and teach social values, such as empathy, cooperation, and respect for differences [49].

Overall, integrating guidance and counselling services into daily learning through the use of an AI-based Digital Big Book provides a more comprehensive and effective approach to educating students. This approach not only supports academic aspects but also focuses on developing students' character and social skills. This is crucial given that social-emotional education plays a crucial role in shaping students who are not only academically intelligent but also able to adapt to life's challenges and build positive relationships with others. This module demonstrates that the use of technology not only improves teaching effectiveness but can also strengthen a holistic pedagogical approach in education [50].

3.2.3 Relevance to the Curriculum and Student Character

The Generative AI-based training module used in the creation of the Digital Big Book was designed to ensure that the material taught is not only academically relevant but also aligns with the characteristics and social-emotional needs of students. Using the Digital Big Book as a learning medium allows teachers to deliver material that combines academic knowledge with character values and social skills. Thus, the material taught not only equips students with cognitive knowledge but also facilitates their character development, which is crucial in 21st-century learning. This integration is highly relevant to the demands of the educational curriculum, which increasingly emphasizes character development as part of a holistic education.

The importance of integrating character values into learning materials is reinforced by the fact that students' social-emotional development plays a significant role in enhancing their ability to manage their feelings, interact with others, and make sound decisions. In the Digital Big Book, each story and activity presented is designed to incorporate moral messages appropriate to student development, such as empathy, cooperation, responsibility, and discipline. This module emphasizes the importance of teaching social values through interactive learning experiences, enabling students not only to understand the theory but also to implement it in their daily lives [51].

Furthermore, the material presented in the Digital Big Book is also aligned with the national curriculum and the character development needs of students in this digital age. This module not only teaches academic content but also introduces social values that help students develop interpersonal and intrapersonal skills. With this approach, students not only learn subjects like mathematics or language but also learn to understand and manage their feelings, communicate effectively, and work collaboratively in groups. This is important because today's education emphasizes not only mastery of subject matter but also character development that can be applied in their social lives [52].

This module is also designed to introduce profound moral and social concepts, often difficult to achieve through traditional academic instruction. The use of interactive narratives in the Digital Big Book allows students to explore stories featuring characters with various social and emotional challenges. Activities related to the story encourage students to think critically and make decisions consistent with the moral values taught. With this approach, students are taught not only academic knowledge but also morality and ethics, which are increasingly important in shaping individuals who are prepared to face future social and global challenges [53].

Overall, this training module reinforces a more holistic educational concept, where the teaching of academic content and the development of student character go hand in hand. By integrating character values and social skills into the curriculum, this module not only facilitates students' academic development but also strengthens their development as individuals with strong emotional and social intelligence. This approach is crucial in 21st-century education, which demands students not only be academically intelligent but also possess strong social and emotional skills to face the challenges of an increasingly complex and interconnected world [54].

One factor that distinguishes this module from other approaches is its ability to overcome several technical and non-technical barriers faced by teachers. Most teachers struggle to integrate technology into their teaching, primarily due to limited digital skills and a lack of time to develop technology-based learning materials. With Generative AI, teachers can access tools that simplify the process of creating learning media without requiring advanced graphic design or technical skills. This is particularly relevant given the challenges teachers face in today's digital education landscape, where many teachers struggle to utilize technology optimally [55].

This training module focuses not only on technology use but also on teacher professional development. By using Generative AI, teachers are provided with creative tools that enable them to design more adaptive and responsive learning to meet students' needs. As found in previous research,

technology-based teacher professional development can increase teachers' confidence in integrating technology into their teaching, ultimately improving the quality of the learning they deliver [37].

The Generative AI-based training module in this study has proven effective in improving teachers' pedagogical competencies, particularly in integrating guidance and counselling services into learning. This discussion demonstrates that the module's effectiveness lies not only in its consistency with the TPACK framework but also in its ability to address barriers teachers face in utilizing technology. By combining technology, pedagogy, and relevant content, this module provides practical solutions to improve the quality of learning that not only focuses on academics but also supports students' holistic character development.

4. Conclusion

This study demonstrates that the Generative AI-based training module developed to enhance teachers' pedagogical competence—particularly in integrating Guidance and Counseling (BK) services into daily instructional practices—has proven to be effective. The findings reveal a significant improvement in teachers' pedagogical competence, as evidenced by a high N-Gain score of 73.28%. The module not only facilitates the development of teachers' technical proficiency in utilizing digital technologies but also strengthens pedagogical approaches that support the cultivation of students' character and socio-emotional competencies.

Notwithstanding these positive outcomes, several avenues for further investigation remain. First, future research is recommended to expand the scope of this study by involving a broader range of schools and geographical regions in order to assess the generalizability and scalability of the module across diverse educational contexts. Additionally, longitudinal studies are needed to evaluate the sustainability of the training outcomes, particularly in terms of the persistence of pedagogical competence and the retention of technological skills over time. Such investigations are essential to determine whether the competencies acquired through the training can be consistently implemented in routine teaching practices.

Furthermore, subsequent research could place greater emphasis on examining specific Artificial Intelligence tools utilized within the training module, particularly those related to Generative AI for the development of interactive learning media. A more granular analysis of different AI applications may yield deeper insights into their optimal integration within educational settings. For instance, future studies could explore the use of advanced AI-driven tools in the design of BK instructional materials or in the development of assessment instruments aimed at fostering character education and students' emotional regulation. Such inquiries would contribute to identifying the most effective AI technologies for enhancing instructional quality and enriching students' learning experiences.

Finally, this study provides a foundational basis for further exploration of the long-term implications of technology integration in education, particularly with regard to its impact on students' character formation and socio-emotional development. As technological advancements continue to evolve, it is imperative to examine not only their influence on teachers' professional practices but also their transformative potential in shaping students' learning processes and socio-emotional growth within increasingly digital learning environments.

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