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Generative Artificial Intelligence as an Adaptive Medium to Optimize Interactive Learning for Teachers at Public Special Schools

Kecerdasan Buatan Generatif sebagai Media Adaptif untuk Mengoptimalkan Pembelajaran Interaktif bagi Guru di Sekolah Luar Biasa Negeri

Kheyene Molekandella Boer[1*], Nurliah[2], Masna Wati[3]
Muhammad Aidil Ilham[4], Latifa5[5]
[1-5] Universitas Mulawarman, Indonesia
email correspondence: kheyene.molekandella@fisip.unmul.ac.id

Abstract

The rapid advancement of Generative Artificial Intelligence (GenAI) has transformed the global educational landscape; however, its implementation in Public Special Schools remains limited due to low digital competence and technological access gaps. This condition contributes to the continued dominance of conventional, teacher-centered instruction that lacks adaptability to diverse student needs. This community service research aimed to enhance teachers' competence in utilizing GenAI as an adaptive medium to optimize interactive learning. The program was conducted through a two-day workshop at SLBN Pembina, East Kalimantan Province, involving 46 teachers from elementary, junior high, and senior high special education levels. The activities included the development of two instructional modules ("Smarter Teaching with ChatGPT" and "Creative Teaching with Canva"), pre- and post-tests, hands-on practice, individual assignments, and post-activity monitoring. The findings revealed a 28.20% increase in teachers' understanding during the ChatGPT session and a 48.96% improvement during the Canva session. Classroom monitoring further indicated enhanced student engagement and enthusiasm when AI-based materials were implemented. The implications highlight that structured and contextual training can effectively bridge the digital divide in special education settings, strengthen teacher self-efficacy, and promote more personalized, interactive, and inclusive AI-enhanced learning practices

Keywords: artificial intelligence, competence, interactivity, inclusion, digitalization

Abstrak

Perkembangan pesat Generative Artificial Intelligence (GenAI) telah mentransformasi lanskap pendidikan global, namun implementasinya di Sekolah Luar Biasa Negeri (SLBN) masih terbatas akibat rendahnya kompetensi digital dan kesenjangan akses teknologi. Kondisi ini berdampak pada masih dominannya metode pembelajaran konvensional yang kurang adaptif terhadap kebutuhan peserta didik berkebutuhan khusus. Penelitian pengabdian ini bertujuan untuk meningkatkan kompetensi guru dalam memanfaatkan GenAI sebagai media adaptif guna mengoptimalkan interactive learning. Metode pelaksanaan dilakukan melalui pendekatan pelatihan berbasis workshop selama dua hari di SLBN Pembina Provinsi Kalimantan Timur dengan melibatkan 46 guru dari jenjang SDLB, SMPLB, dan SMALB. Kegiatan meliputi penyusunan dua modul ("Mengajar Lebih Cerdas dengan ChatGPT" dan "Kreatif Mengajar dengan Canva"), pre-test dan post-test, praktik langsung, penugasan individu, serta monitoring pascakegiatan. Hasil penelitian menunjukkan peningkatan pemahaman guru sebesar 28,20% pada sesi ChatGPT dan 48,96% pada sesi Canva. Monitoring lapangan juga menunjukkan meningkatnya keterlibatan dan antusiasme siswa saat materi berbasis AI diterapkan di kelas. Implikasi kegiatan ini menegaskan bahwa pelatihan terstruktur dan kontekstual mampu menjembatani kesenjangan digital di sekolah khusus, memperkuat kepercayaan diri guru, serta mendorong implementasi pembelajaran yang lebih personal, interaktif, dan inklusif berbasis teknologi AI.

Kata kunci; kecerdasan buatan, kompetensi, interaktivitas, inklusi, digitalisasi

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INTRUDUCTION

The rapid advancement of Generative Artificial Intelligence (GenAI) has significantly transformed the global educational landscape, reshaping how knowledge is created, delivered, and assessed (Y. Liu et al., 2026). Educational institutions across various levels are increasingly integrating AI-driven tools to promote interactive, adaptive, and personalized learning environments (Elgui de Oliveira, 2026). This phenomenon is not limited to mainstream schools but is gradually influencing special education settings, where diverse learner needs require more flexible and responsive instructional strategies (De Gagne, 2026).

Globally, the adoption of AI in education has shown exponential growth between 2021 and 2025, as highlighted by the Journal of Curriculum and Teaching through a scientometric review conducted (J. Liu et al., 2026). Their findings reveal a substantial increase in publications and implementation models focusing on generative AI applications in curriculum design, assessment, and learner engagement (Koivisto, 2026). This surge reflects the strong institutional interest in leveraging AI to address complex pedagogical challenges (G. Zhao et al., 2026).

In the context of STEM educationLiang et al. (2026) reported in Expert Systems that generative AI enhances conceptual understanding, automates feedback, and supports differentiated instruction. These findings suggest that AI can serve not merely as a technological supplement but as a transformative pedagogical partner capable of adapting to individual learner profiles (X. Wu & Xu, 2026). Interactive AI-powered environments such as metaverse-based learning have demonstrated promising results. Qi and Jin (2026) emphasized the potential of AI-generated content to create immersive and highly personalized learning spaces. Such adaptive environments are particularly relevant for learners who require multimodal stimuli and scaffolded instruction, including students in public special schools (Arones et al., 2026).

Empirical research also indicates that generative AI improves self-directed learning and cognitive engagement. Zhu et al. (2026) publishing in Scientific Reports, found that perceived interactivity in AI systems significantly enhances learners' autonomy and motivation. This is crucial for special education contexts, where maintaining student engagement often presents a persistent challenge (Yu et al., 2026). Despite these promising developments, there remains a significant gap in the practical implementation of generative AI in Public Special Schools (Sekolah Luar Biasa Negeri). Many teachers in these institutions continue to rely on conventional, teacher-centered approaches due to limited training, infrastructure constraints, and uncertainty regarding AI integration in inclusive classrooms (Chamola et al., 2026).

Field observations indicate that interactive learning in special education settings frequently lacks adaptive digital support tailored to students with cognitive, sensory, or communication differences (Guo et al., 2026). Teachers often struggle to design differentiated materials that accommodate diverse learning profiles within a single classroom. Previous studies have explored AI-based tools for specific functions, such as speech assessment applications validated by Sullivan et al. (2026), which demonstrate the technical feasibility of AI in identifying speech difficulties. However, these innovations are rarely translated into structured teacher training or community-based empowerment programs for public special schools. Research by Premalatha et al. (2026) on personalizing online nursing education illustrates how AI can be used to tailor instructional pathways

according to learner needs. Yet, similar personalization frameworks remain underdeveloped in special education teacher professional development programs (Pellas, 2026).

Ozkara San and Lim (2026) highlighted the influence of large language model chatbots on social and emotional learning. Their findings underscore the importance of guided implementation, as AI tools require pedagogical alignment to maximize positive outcomes and prevent superficial usage. The cognitive compatibility between human users and AI systems, as discussed by Gong et al. (2026), further suggests that input representation and output complexity must be carefully designed to ensure meaningful interaction. For teachers in public special schools, this implies the need for structured guidance in crafting prompts and interpreting AI-generated outputs (Zhang et al., 2026).

Xia et al. (2026) demonstrated that AI-based scaffolding in game-based learning environments significantly improves conceptual understanding among elementary learners. This reinforces the potential of adaptive AI as a supportive mechanism for differentiated instruction in special education contexts (Bawn et al., 2026). However, there is limited evidence documenting community service initiatives that focus on equipping special education teachers with practical GenAI competencies (Y. Zhao et al., 2026). Most research remains theoretical, laboratory-based, or conducted in higher education settings (Fang & CHIU, 2026).

Studies on immersive technologies, such as those by Wu et al. (2026), reveal that generative AI-enhanced pedagogical agents can foster deeper cognitive engagement. Yet, the accessibility of such advanced systems for public special schools, particularly in developing regions, remains uncertain. Cai and Zhou (2026) demonstrated that integrating generative AI into augmented reality applications improves literacy skills among children. While promising, these innovations require teacher readiness to ensure effective classroom adaptation (Rui et al., 2026).

The urgency of this issue becomes more apparent when considering the persistent digital divide affecting special education institutions (Ju et al., 2026). Limited infrastructure, insufficient professional training, and concerns regarding ethical AI usage hinder effective adoption. Basyoni et al. (2026) emphasized that enhancing faculty teaching capabilities through AI requires systematic training, reflective practice, and institutional support. Without structured empowerment programs, AI risks becoming an underutilized resource rather than a transformative tool. Kalak et al. (2012) revealed cognitive and neural benefits associated with human GenAI interactive learning. Their findings suggest that properly mediated AI interaction can stimulate higher-order reasoning processes, which are essential for inclusive and adaptive pedagogy (Y. Liu et al., 2026).

Ethical considerations remain critical. Elgui de Oliveira (2026) underscored the importance of integrating ethical frameworks when introducing AI innovation in educational contexts. For special education teachers, safeguarding student data and ensuring equitable AI use is paramount (De Gagne, 2026). The existing literature collectively demonstrates the transformative potential of generative AI across disciplines, from design and arts to medical and language education. However, its translation into community-based empowerment initiatives for public special school teachers remains limited (J. Liu et al., 2026).

This gap indicates a pressing need for applied community service programs that bridge theoretical research and classroom practice (Koivisto, 2026). Teachers require not only awareness but also hands-on training to design adaptive lesson plans, interactive content,

and differentiated assessments using generative AI tools (G. Zhao et al., 2026). The phenomenon of rapid AI expansion, supported by increasing global research output and empirical validation studies, contrasts sharply with the relatively slow integration in special education practice (Liang et al., 2026). This discrepancy highlights systemic inequities in technological access and professional development. Implementing Generative Artificial Intelligence as an adaptive medium in Public Special Schools is not merely an innovation but a necessity. It aligns with inclusive education principles by promoting personalization, accessibility, and interactive engagement. By empowering teachers through structured training and contextualized application models, generative AI can function as a collaborative partner rather than a replacement for human expertise. Such empowerment strengthens teachers' confidence in designing interactive learning experiences tailored to diverse student needs.

IMPLEMENTATION METHOD

The community service program was implemented through an integrated approach combining academic outreach and active student engagement. Lecturers delivered a series of structured activities, including counseling sessions, socialization programs, hands-on workshops, guided practice, and continuous mentoring. These activities were specifically designed to support teachers in integrating Generative Artificial Intelligence (GenAI) into adaptive and interactive learning practices. At the same time, university students were involved through community engagement initiatives such as the Community Service Program (KKN) and teaching assistance programs. Their roles included providing technical support, assisting with documentation, and mentoring participants during practical sessions to ensure effective learning experiences.

The partner institution for this program was SLBN Pembina of East Kalimantan Province, a public special school that serves students with diverse special needs, including hearing impairments, visual impairments, intellectual disabilities, physical disabilities, and autism. The school accommodates three educational levels: SDLB (elementary level), SMPLB (junior secondary level), and SMALB (senior secondary level). A total of 46 teachers from these levels actively participated in the program.

The implementation of the program was organized into three main phases: pre-activity, main activities, and monitoring and evaluation. During the pre-activity phase, the PKM team conducted a field visit and a comprehensive needs assessment through direct observation and in-depth discussions with teachers. This process aimed to identify key challenges faced by teachers in integrating AI into classroom instruction. Based on these findings, two instructional modules were developed: Module 1, "Smarter Teaching with ChatGPT," and Module 2, "Creative Teaching with Canva." Both modules were made openly accessible and distributed through a dedicated WhatsApp Group (WAG), ensuring that participants could continuously access the materials during and after the training. Additionally, the team facilitated access to ChatGPT and Canva accounts to ensure equitable participation among all teachers.

The main activities were conducted through a two-day intensive workshop held on June 30 and July 1, 2025, at the teachers' hall of SLBN Pembina. The first day focused on the use of ChatGPT, covering prompt engineering techniques, AI-assisted lesson planning, and the introduction of AI-powered academic tools. The second day emphasized the use of Canva for

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creative content development, including mini-quiz creation, visual teaching materials, and audiovisual learning media. Each session began with a pre-test to assess participants' initial knowledge and concluded with a post-test to measure learning improvement. At the end of each workshop session, participants were assigned individual tasks to design adaptive, interactive teaching materials using AI tools, ensuring the practical application of the knowledge gained.

Monitoring and evaluation were carried out in two stages to ensure both immediate and long-term impact. Formative evaluation was conducted during the workshop through direct observation, participant questionnaires, analysis of pre-test and post-test results, and assessment of individual assignments. Meanwhile, summative post-activity monitoring was conducted through follow-up school visits on September 18 and 22, 2025. These visits aimed to observe the real classroom implementation of AI-based teaching materials and to conduct brief interviews with teachers regarding their experiences and challenges. This dual evaluation approach ensured not only the acquisition of knowledge during the training but also the sustainability and practical application of AI-enhanced interactive learning in actual classroom settings.

RESULT AND DISCUSSION

Designing Modules

This activity was carried out in response to the educational challenges faced by SLBN Pembina, East Kalimantan, particularly the limited availability of human resources with adequate technological competencies. To address these issues, the team designed instructional modules that could be utilized during the workshop as well as for continuous use in subsequent teaching practices.

Figure 1: Chat GPT and Canva Modules

The modules were designed through a series of preliminary discussions to align with teachers' needs in developing instructional materials. The team curated and prioritized tools considered most relevant and applicable for teachers, specifically focusing on AI- based platforms such as Chat GPT and Canva.

Once the modules were completed and ready for implementation, the team organized a two-day workshop at SLBN Pembina, East Kalimantan, attended by approximately 46 teachers from various educational levels, including elementary, junior high, and senior high schools.

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Workshop

The workshop was held on June 30 - July 1, 2025. The first day of the material was "Teach Smarter with GPT Chat". This workshop began with a pre-test and ended with a post-test. During the material, the speaker explained the basic functions of using AI in learning, and participants were invited to practice directly how to create prompts for literature search needs using GPT chat tools.

Chat GPT, which stands for *Chat Generative Pre-Trained Transformer*, is a tool designed to comprehend, analyze, and generate responses across various narrative patterns based on prompts or instructions provided by users. One of the core materials presented was the construction of prompts using the "CIDI" technique, which consists of:

1. Context: Explaining who is giving the instruction, based on the user's situation (e.g., "I am a teacher…").
2. Instruction: Providing a specific command or request to elicit the desired response.
3. Detail: Supplying additional information to clarify the teacher's needs, such as preferred language style.
4. Input: Stating the main topic for content generation (e.g., "The lesson theme is an introduction to musical instruments").

Figure 2: Implementation of Workshops

During this session, participants were asked to create instructions using the CIDI framework, directly connected to the subjects they teach. This approach enabled teachers to explore learning materials from various sources generated by ChatGPT while simultaneously fostering their critical thinking skills (Leung, 2024; Chang et al., 2024; Karaçay, 2025). Teachers were required to reread, cross-check, and selectively determine which materials were appropriate and which were not.

As a result, the instructional outputs varied across subject areas, including Indonesian language, social sciences, natural sciences, practical skills, mathematics, civic education, culinary arts, and specialized programs for students with autism. After the teacher has mastered the technique of using prompts, the teacher is then taught to use the SciSpace.

Participants were introduced to several features of ChatGPT, one of which was SciSpace, a specialized GPT model developed to assist users in comprehending scientific articles. This tool is capable of simplifying complex paragraphs and providing summaries or reformulations of academic content into more accessible narratives. Such functionality proved particularly useful for participants in producing academic writing. Scispace helps teachers to search for a variety of literature that is used as teaching material. SciSpace aims to make the research process more efficient and effective.

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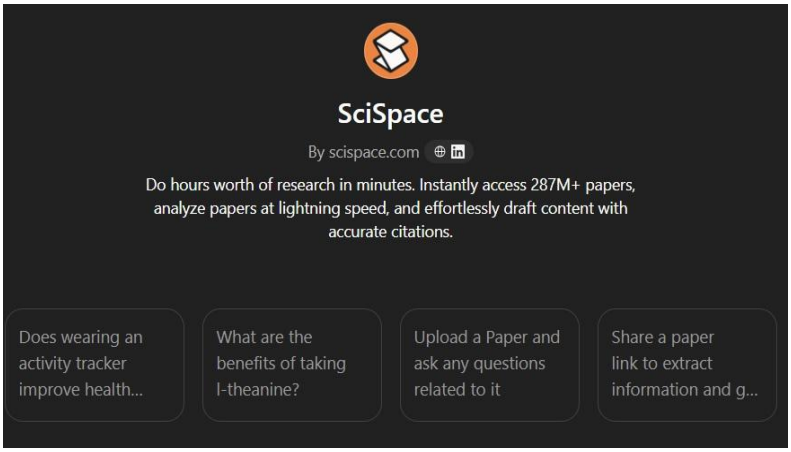
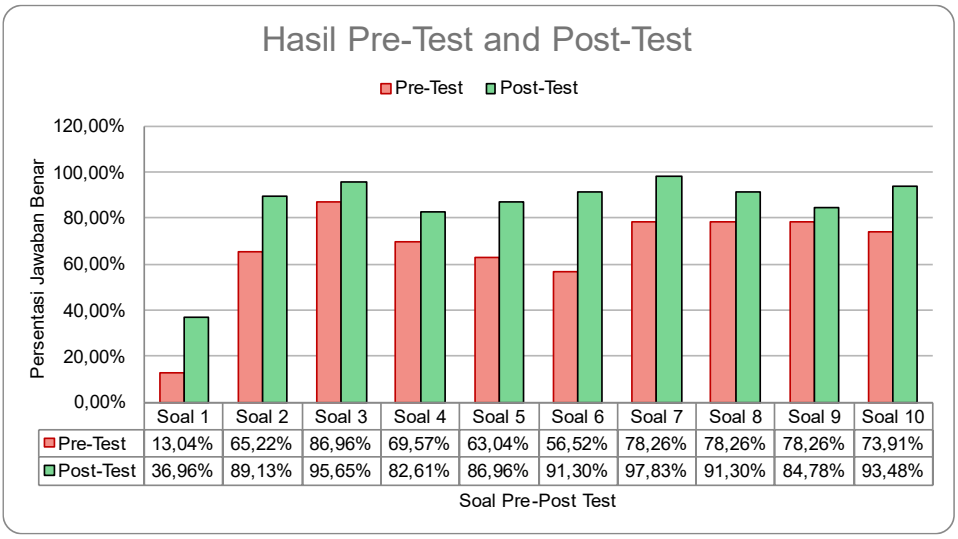


Figure 3: Scispace Feature on Chat GPT

This practice is aligned with the framework of digital literacy, which encompasses four dimensions: digital skills, digital ethics, digital culture, and digital security. Within the pillar of digital ethics, users are required to prioritize ethical values, particularly in the management and dissemination of information.



Figur 4 : Result Pre Test and Post Test Chat GPT

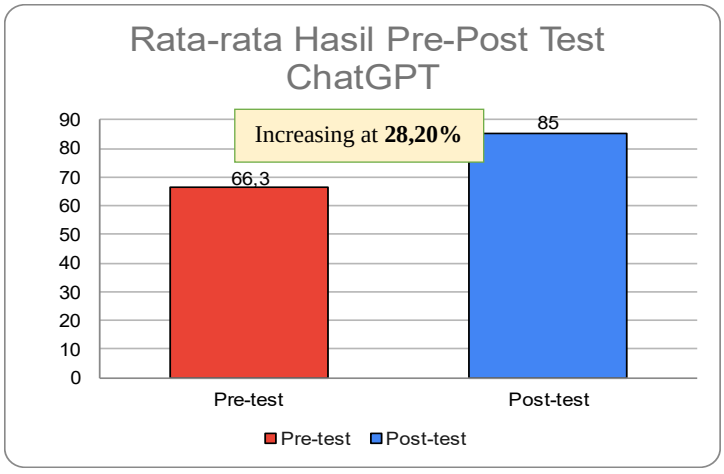


Figure 5. Improvement of Pre-Test and Post-Test Results

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The graphic above shows a 28.20% increase from the pre-test to the post-test. This indicates that providing GPT Chat material can increase teachers' knowledge regarding the functions of the tools in Chat GPT.

Creative Teaching with Canva

After teachers successfully created prompts aligned with their respective subjects and identified relevant instructional materials with the assistance of ChatGPT, they were then guided to transform these materials into more engaging formats using Canva. Teachers were provided with access to Canva Premium, enabling them to directly practice designing content in two formats: slide presentations and educational games.

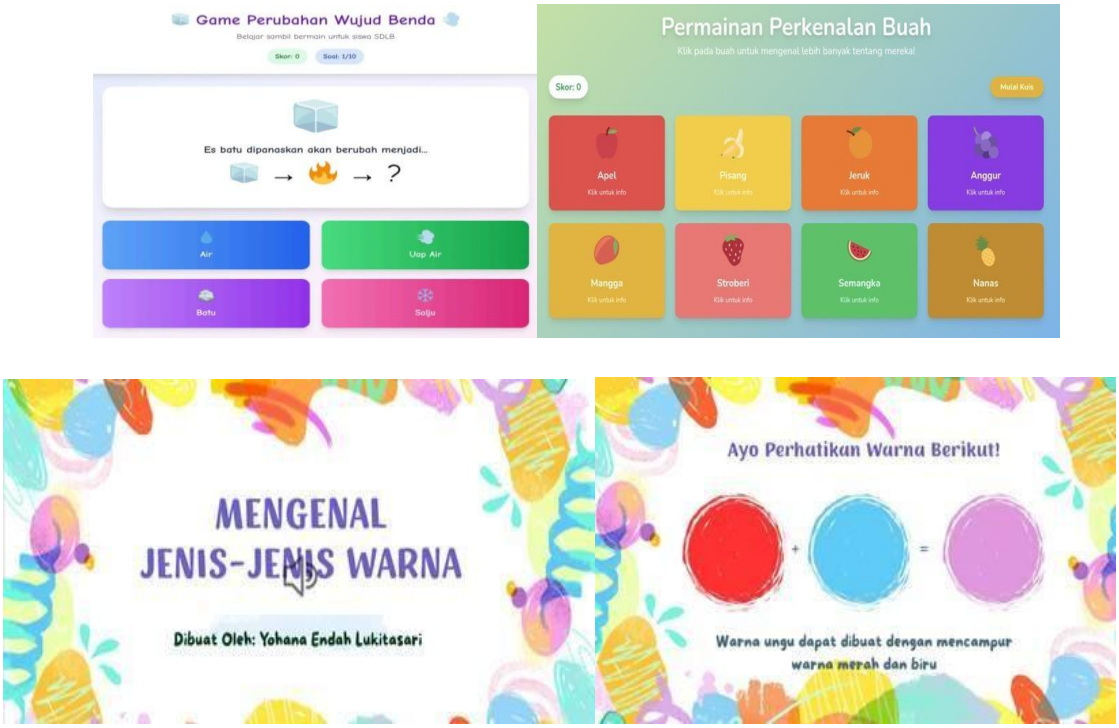

Figure 6. Example of Learning Materials Generated Through Chatgpt and Presented in Slides Using Canva

Games serve as tools that teachers can utilize to enhance classroom learning activities. The instructional links they created could also be shared online by copying and distributing them to students in the classroom for collaborative work. This learning approach fosters active participation and encourages a more collaborative learning environment. Workshop also introduced instructional content on how to design simple educational games using the Canva application. In addition to creating design materials using Canva tools, teachers also learn to create simple games using canva. These games serve to encourage student engagement during the learning process, create a positive competitive climate, and spark student interest in learning.

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Monitoring

Monitoring was conducted on September 18 and 22, 2025. The goal was to ensure that the implementation of the materials created by the teachers was well-received by students. Monitoring went well, with students enthusiastically embracing the learning process using engaging visuals.

Figure 7. Students Listen To AI-Based Lessons During Monitoring Activities

Monitoring materials created with AI can foster greater learning engagement compared to when teachers use oral and written methods. However, ongoing support is still necessary, considering the diverse range of disabilities, such as hearing impairment, physical impairment, and mild autism. These conditions still require intensive teacher support, as each student brings their own unique needs. However, the use of AI to create teaching materials significantly assists teachers in creating more varied visualizations.

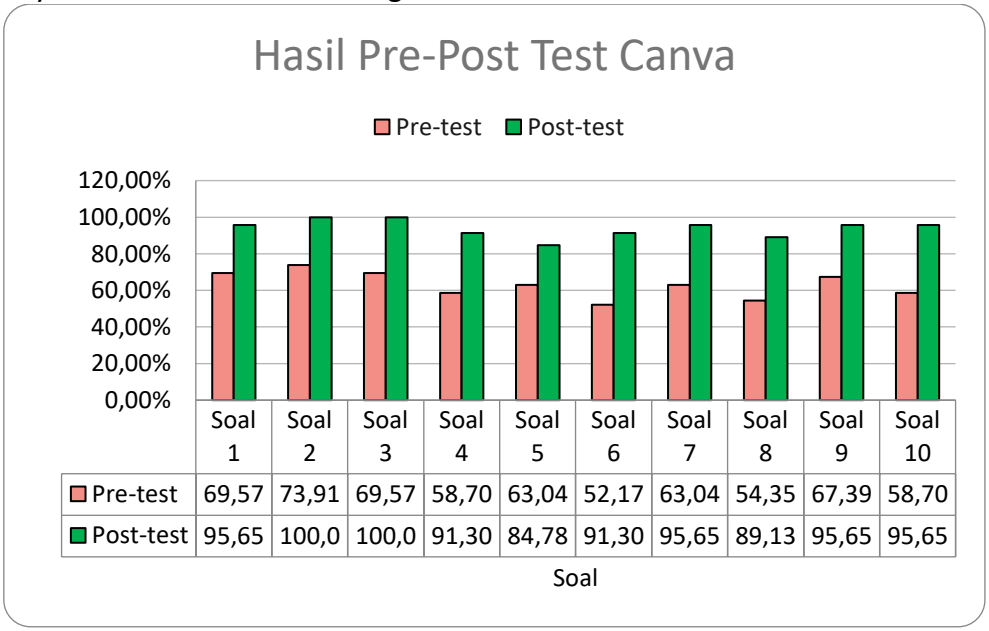

Figure 8. Result Pre Test and Post Test Canva

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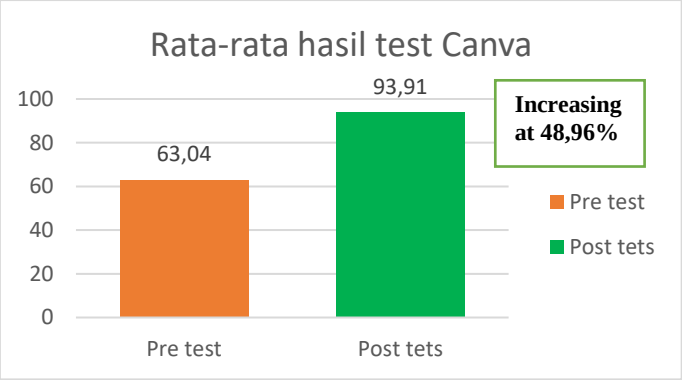

Figure 9. Improvement from Pre-Test to Post-Test Results

Based on the pre- and post-test results for the Canvas material, understanding increased by 48.96%. This data indicates that the provision of materials and practical exercises in the Canva material session effectively increased teachers' competence in utilizing AI to optimize the creation of teaching materials.

DISCUSSION

The findings of this community service initiative demonstrate that structured training in Generative Artificial Intelligence (GenAI) can significantly enhance teachers' digital competence in public special schools (X. Wu & Xu, 2026). The background of this program highlighted a persistent gap between rapid global AI development and its limited implementation in special education contexts (Liang et al., 2026). The results obtained from module development, workshops, and monitoring activities confirm that this gap can be narrowed through systematic, practice-oriented intervention (Qi & Jin, 2026). The module design phase played a crucial foundational role in ensuring the relevance and sustainability of the program (Arones et al., 2026). By aligning the modules with teachers' contextual needs, the training avoided a purely theoretical orientation and instead emphasized direct classroom applicability (Zhu et al., 2026). The decision to focus on ChatGPT and Canva was strategic, as both platforms are accessible, user-friendly, and adaptable to diverse subject areas and student characteristics (Lubis et al., 2019). This contextualized approach reflects the principle that technology integration must be need-based rather than trend-driven (Yu et al., 2026).

The first module, "Smarter Teaching with ChatGPT," demonstrated that prompt engineering skills are central to meaningful AI utilization (Chamola et al., 2026). The introduction of the CIDI (Context, Instruction, Detail, Input) framework provided teachers with a structured cognitive scaffold for interacting with AI systems (Guo et al., 2026). This aligns with cognitive compatibility theories, which emphasize the importance of structured input in optimizing AI-generated outputs (Sullivan et al., 2026). Teachers who initially perceived AI as complex reported greater confidence after mastering this systematic prompt construction method (Pellas, 2026). The 28.20% improvement in pre-test and post-test results for the ChatGPT session indicates measurable knowledge gain. This improvement suggests that teachers previously had limited exposure to AI-assisted instructional design (Ozkara San & Lim, 2026). After the intervention, participants showed better understanding of AI functions, prompt formulation, and academic content exploration. These findings support earlier research emphasizing that AI literacy must begin with foundational operational skills before advancing toward pedagogical innovation (Gong et al., 2026).

An important aspect of the ChatGPT workshop was the emphasis on critical evaluation of AI outputs. Teachers were encouraged to reread, verify, and selectively adopt generated materials (Zhang et al., 2026). This practice reinforces digital ethics and prevents blind dependence on AI-generated content. In special education contexts, where instructional accuracy and clarity are essential, such critical engagement becomes even more significant. The introduction of the SciSpace feature further expanded teachers' academic literacy (Xia et al., 2026). Many participants expressed difficulty in accessing and understanding scholarly literature prior to the workshop (Bawn et al., 2026). By simplifying academic texts, SciSpace functioned as a bridge between research and classroom practice. This outcome aligns with digital literacy frameworks that emphasize not only technical skill but also information evaluation and responsible usage (Y. Zhao et al., 2026).

Subject diversity among participants demonstrated the flexibility of GenAI tools. Teachers from Indonesian language, mathematics, science, civic education, culinary arts, and autism-specific programs successfully generated differentiated materials (Fang & CHIU, 2026). This cross-disciplinary applicability confirms that AI integration is not restricted to STEM subjects but can support inclusive education broadly (T. Wu et al., 2026). The second module, "Creative Teaching with Canva," shifted focus from content generation to content visualization (Handayani et al., 2024). After generating text-based materials through ChatGPT, teachers were guided to transform them into visually engaging slides and educational games (Yoshimori & Bajorath, 2026). This two-step integration of AI-assisted content creation followed by multimedia adaptation illustrates a comprehensive model of interactive instructional design (Cai & Zhou, 2026).

The 48.96% improvement in Canva pre-test and post-test scores indicates even stronger gains compared to the ChatGPT session (Rui et al., 2026). This larger percentage increase may reflect the novelty and immediate visual impact of design-based tools. Teachers quickly recognized the practical classroom benefits of visually appealing materials, particularly for students with attention and sensory processing challenges (Ju et al., 2026). Game-based learning elements created through Canva enhanced teachers' awareness of interactive pedagogy. Educational games foster engagement, encourage participation, and create a positive competitive atmosphere. In special education settings, interactive elements are essential for maintaining focus and supporting diverse learning styles. The workshop demonstrated that even simple digital games can significantly enrich classroom dynamics (Basyoni et al., 2026).

Monitoring results conducted in September 2025 confirmed that teachers applied AI-generated materials in real classroom settings. Observations indicated increased student enthusiasm and participation when lessons incorporated visual and interactive elements . This suggests that the workshop did not merely produce short-term knowledge acquisition but facilitated behavioral change in instructional practice (Kalak et al., 2012). However, monitoring also revealed ongoing challenges. Students with hearing impairments, physical disabilities, and mild autism still required intensive teacher mediation. AI-based materials functioned as supportive tools rather than replacements for teacher interaction. This reinforces the principle that GenAI should serve as a collaborative partner in inclusive pedagogy (Y. Liu et al., 2026).

The dual evaluation model formative during workshops and summative during classroom monitoring strengthened the credibility of the findings. Immediate assessments

captured cognitive improvement, while follow-up visits measured practical implementation (Elgui de Oliveira, 2026). This layered evaluation approach ensures that training outcomes are sustainable rather than superficial. From a broader perspective, the program contributes to reducing the digital divide in special education (De Gagne, 2026). Limited infrastructure and training opportunities often prevent teachers from accessing technological innovation. By facilitating account access and providing hands-on practice, the initiative addressed both structural and competency-related barriers (J. Liu et al., 2026).

The integration of digital ethics discussions further strengthens the pedagogical value of the program. Teachers were reminded to protect student data, verify information, and avoid overreliance on automated outputs (Koivisto, 2026). Ethical awareness is particularly important in special education contexts, where student vulnerability requires heightened responsibility. The results also highlight the importance of contextualized professional development (G. Zhao et al., 2026). Generic AI workshops may not effectively address the nuanced challenges faced by special education teachers. By focusing on adaptive learning materials and differentiated instruction, this program ensured relevance and practical applicability (Liang et al., 2026).

Another significant outcome is the enhancement of teacher confidence. Many participants initially expressed insecurity regarding AI usage. Post-training reflections indicated increased self-efficacy in exploring, experimenting, and innovating with digital tools (X. Wu & Xu, 2026). Confidence is a key factor in sustaining long-term technological integration. The collaborative structure of the workshop, involving lecturers and university students, fostered a supportive learning environment (Qi & Jin, 2026). Student involvement through community engagement activities provided additional technical assistance and reduced participant hesitation. This collaborative model may serve as a replicable framework for similar initiatives (Arones et al., 2026).

CONCLUSION AND SUGGESTION

This community service program concludes that structured training based on Generative Artificial Intelligence (GenAI) significantly enhances the digital competence of Public Special School teachers in designing more interactive, adaptive, and inclusive learning, as evidenced by improved pre-test and post-test results and real classroom implementation. The program not only strengthened teachers' technical skills in using ChatGPT and Canva but also increased their confidence in exploring technology-based instructional innovation. For future research, it is recommended to conduct a longitudinal study with a more rigorous experimental design to examine the long-term impact of GenAI integration on learning outcomes and developmental progress among students with special needs. The implication of this community service initiative highlights that contextual and sustained training models can serve as an effective strategy to bridge the digital divide in special education settings and to systematically promote technology-driven pedagogical transformation.

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