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From Prompting to Digital Instructional Media: Strengthening Elementary Teachers' AI-Assisted Media Development Skills

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Abstract

This community-service program aimed to strengthen elementary teachers' skills in developing AI-assisted instructional media through an integrated Prompt-to-Publication pathway involving prompt formulation, Gemini-assisted content generation, Canva AI-based media development, and web publication. The program was implemented at SD Negeri 4 Metro Timur, Lampung, through needs identification, guided workshop activities, mentoring, and evaluation. Twenty-three teachers completed the pre-test, while 21 participants provided matched pre-test–post-test data for paired analysis. The findings indicated improvements following the program in prompt-formulation competence, which increased from 14.3% to 90.5% (exact McNemar test, $p < .001$), and operational competence in using Gemini, which increased from 38.1% to 81.0% ($p = .012$). Prompt-quality scores also increased from a mean of 1.71 to 3.00 (exact Wilcoxon test, $p = .011$; rank-biserial correlation, rrb = .725). In addition, 14 participants (66.7%) submitted links to published instructional websites, providing evidence of product completion. However, conceptual understanding of prompting strategies remained less developed than practical competence. Overall, the findings indicate changes in teachers' AI-use competencies and digital product completion following participation in the program. Given the one-group pre-test–post-test design without a comparison group, these changes should not be interpreted as causal evidence of the program's effects, and the quality or classroom effectiveness of the resulting instructional media requires further evaluation.

Keywords: Artificial Intelligence, Canva AI, Gemini, Instructional Media, Prompt Formulation

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Abstrak

Program pengabdian masyarakat ini bertujuan untuk memperkuat keterampilan guru sekolah dasar dalam mengembangkan media pembelajaran yang didukung kecerdasan buatan (AI) melalui jalur terintegrasi "Prompt-to-Publication" yang mencakup perumusan prompt, pembuatan konten dengan bantuan Gemini, pengembangan media berbasis Canva AI, dan publikasi daring. Program ini dilaksanakan di SD Negeri 4 Metro Timur, Lampung, melalui identifikasi kebutuhan, kegiatan lokakarya terpandu, pendampingan, dan evaluasi. Sebanyak 23 guru menyelesaikan pretest, sedangkan 21 peserta menyediakan data pretest–posttest yang cocok untuk analisis berpasangan. Temuan menunjukkan adanya peningkatan setelah program dalam kompetensi perumusan prompt, yang meningkat dari 14,3% menjadi 90,5% (uji McNemar eksak, $p < 0,001$), serta kompetensi operasional dalam menggunakan Gemini, yang meningkat dari 38,1% menjadi 81,0% ($p = 0,012$). Skor kualitas prompt juga meningkat dari rata-rata 1,71 menjadi 3,00 (uji Wilcoxon eksak, $p = 0,011$; korelasi biserial peringkat, rrb = 0,725). Selain itu, 14 peserta (66,7%) mengirimkan tautan ke situs web instruksional yang telah dipublikasikan, yang menjadi bukti penyelesaian produk. Namun, pemahaman konseptual mengenai strategi pemberian petunjuk masih kurang berkembang dibandingkan dengan kompetensi praktis. Secara keseluruhan, temuan ini menunjukkan adanya perubahan dalam kompetensi guru dalam penggunaan AI serta penyelesaian produk digital setelah mengikuti program tersebut. Mengingat desain penelitian pretest–posttest satu kelompok tanpa kelompok pembanding, perubahan-perubahan ini tidak boleh ditafsirkan sebagai bukti kausal mengenai dampak program, dan kualitas maupun efektivitas media pembelajaran yang dihasilkan di kelas memerlukan evaluasi lebih lanjut.

Kata Kunci: Kecerdasan Buatan, Canva AI, Gemini, Media Pembelajaran, Perumusan Prompt

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INTRODUCTION

Artificial intelligence (AI) is creating new opportunities for teachers to design learning resources and instructional activities more efficiently and responsively. In elementary education, however, meaningful technology integration requires more than access to digital tools; teachers also need the competence to select and use these tools according to instructional purposes. Studies on digitalisation in elementary education have highlighted both the growing role of technology and continuing challenges related to teachers' digital competence, infrastructure, and adaptation of instructional practices (Jayati et al., 2025; Sabrina & Sa'diyah, 2023). AI consequently offers educational potential, but its use also requires teachers to develop appropriate digital competencies and maintain pedagogical judgment rather than depend uncritically on technology (Pratiwi & Yunus, 2024).

Gemini and Canva AI provide complementary possibilities within this context. Gemini can assist teachers in preparing teaching materials and generating instructional ideas, while Canva AI enables the development of more visual, varied, and adaptable instructional media. Research involving elementary teachers has reported that Gemini can support the preparation of teaching materials and improve work efficiency, although difficulties in constructing effective prompts and limitations in internet access and devices remain important challenges (Mamahit et al., 2026). Similarly, Canva AI has been found useful for teachers with varying levels of digital competence in developing instructional media, while also presenting technical and pedagogical challenges such as connectivity and the need to adapt AI-generated content to students' developmental levels (Puspitasari, 2025).

These challenges were also identified among teachers at SD Negeri 4 Metro Timur, Lampung, the partner community in the present community-service program. The school had 25 classroom and subject teachers, and 23 teachers participated in the baseline assessment. Despite relatively high exposure to AI applications, operational competence remained limited. Twenty-one of the 23 teachers (91.3%) reported familiarity with Canva AI and Gemini, and 19 (82.6%) had previously used these applications. However, only three teachers (13.0%) reported knowing how to formulate clear and specific prompts for instructional-media development, while only eight (34.8%) indicated that they understood how to use Gemini to generate instructional ideas, content, or media designs. Initial responses also indicated difficulties in connecting AI-generated outputs with subsequent stages of media development and web publication. Thus, the central problem was not simply limited awareness of AI but a gap between being familiar with AI tools and being able to use them systematically to produce usable instructional media.

This gap between teachers' familiarity with AI tools and their ability to use them systematically for instructional media development provided the rationale for selecting the teachers of SD Negeri 4 Metro Timur as the assisted community. While previous studies and training programs have demonstrated the potential of AI tools such as Gemini and Canva to support teachers' instructional work, less attention has been given to how teachers can integrate these tools into a coherent process that connects instructional planning, prompt formulation, AI-assisted content generation, media design, and publication. The present program was therefore designed to address this service gap by providing a structured Prompt-to-Publication pathway that supports teachers in progressing from basic familiarity with AI tools toward more systematic and purposeful application in instructional media development. Previous community-service programs have shown the value of practice-oriented AI professional development. Iqbal et al. (2025), for example, trained teachers to use AI for instructional-media development and explicitly identified the absence of standardised prompting practices as one of the problems addressed through the program. Widiyanti et al. (2025) combined Canva for Education and Gemini AI in an upskilling program for elementary teachers, demonstrating the relevance of integrating multiple digital tools within teacher professional development. More recently, Maulida et al. (2026) implemented hands-on Canva AI training for elementary teachers that included interactive-media development and AI-supported production activities. Together, these initiatives show increasing attention to product-oriented AI training for teachers.

Building on these emerging practices, the present program introduces an integrated Prompt-to-Publication pathway that positions AI tool use within a structured teacher competency-development process rather than as a sequence of separate digital applications. The pathway connects four progressively related stages: prompt formulation, Gemini-assisted content generation, Canva AI-based instructional media development, and web publication. Each stage serves a distinct pedagogical purpose. Prompt formulation develops teachers' ability to translate instructional objectives and content requirements into clear and specific instructions for AI; Gemini-assisted generation supports the development and refinement of instructional content; Canva AI-based media development enables teachers to transform generated content into visually organised and learner-oriented instructional media; and web publication extends this process to the completion and sharing of a usable digital instructional product. Thus, the contribution of the program lies not in the combined use of Gemini and Canva AI themselves, but in integrating these stages into a coherent pathway through which teachers progressively develop competencies from specifying instructional needs, generating and refining content, designing media, to producing a shareable digital artefact. This integrated approach is particularly relevant to elementary instructional media development because it connects AI use with the pedagogical and production decisions required to transform instructional ideas into concrete digital learning resources. Participants were guided to identify instructional needs, formulate and refine prompts, use Gemini to generate relevant ideas or content, transform the outputs into digital instructional media through Canva AI, and publish or share the resulting products. The planned change strategy therefore sought to move teachers from relatively sporadic and tool-oriented AI use toward more purposeful, productive, and instructionally oriented practices. Expected changes included greater independence in developing digital instructional media, stronger awareness of the importance of prompt quality, and increased willingness to develop and share digital products within the school community.

Unlike studies that examine individual AI tools or focus primarily on teachers' ability to use a particular platform, this program treats AI-assisted instructional media development as an integrated competency pathway. The novelty therefore lies in the pedagogically structured integration of prompting, content generation, media design, and publication, allowing the development of teachers' AI-use competencies to be examined across the full process of producing an instructional media artefact.

The distinctive contribution of the program therefore lies not merely in introducing Canva AI and Gemini, since similar combinations of AI tools have been used in previous teacher-training programs. Rather, the program structured prompt formulation, generative-AI use, media development, and web publication as a single end-to-end competence pathway and evaluated participants' development using multiple forms of evidence: paired operational-competence indicators, observable prompt quality, and authentic digital products. Accordingly, the program aimed to strengthen elementary teachers' abilities to (1) formulate clear and specific prompts aligned with instructional needs, (2) use Gemini to generate instructional ideas and content, (3) develop AI-assisted instructional media using Canva AI, and (4) publish digital media for potential classroom use.

METHODS

Program Design and Community Engagement

The community-service program used a practice- and product-oriented training and mentoring design to strengthen teachers' operational skills in developing AI-assisted instructional media. The program followed an integrated pathway consisting of prompt formulation, Gemini-assisted content generation, Canva AI-based media development, and web publication. The emphasis was placed on guided practice so that participants could apply each stage to instructional needs relevant to their own teaching contexts.

Planning began with coordination and an initial field survey at the partner school. The service team and school representatives discussed the target participants, major difficulties

experienced by teachers, training focus, schedule, and practical requirements. The needs-identification process showed that teachers were generally familiar with AI applications but experienced difficulties in formulating appropriate prompts, transforming AI-generated outputs into instructional media, and publishing the resulting products digitally. These findings were used to determine the content and practical activities of the program.

The engagement strategy combined demonstration, discussion, problem-solving, guided practice, and mentoring. Participants formulated and refined prompts, used Gemini to generate instructional content, developed media using Canva AI, discussed difficulties encountered during practice, and received assistance toward digital publication. Thus, the program was organised around solving practical problems identified within the partner school rather than merely introducing individual AI tools.

Participants and Setting

The community-service program was conducted at SD Negeri 4 Metro Timur, Metro City, Lampung, Indonesia. The school had 25 teachers, consisting of classroom teachers and subject teachers, who constituted the target community of the program. Twenty-three teachers completed the baseline assessment, while 21 completed the post-test and could be matched with their corresponding pre-test responses. Therefore, baseline descriptive information was based on 23 respondents, whereas paired pre–post analyses were conducted using the 21 participants with complete matched data. Two teachers did not take the post-test because, during the team training session, they had to complete tasks assigned by their school. At the time the data were analysed, the team had not yet received the post-tests completed by the two teachers.

Among the 21 matched participants, 17 (81.0%) were classroom teachers and four (19.0%) were subject teachers. Most were experienced educators: 12 participants (57.1%) had more than 10 years of teaching experience, five (23.8%) had 6–10 years, three (14.3%) had 2–5 years, and one (4.8%) had less than two years of experience. The participants represented different elementary grade levels and subject-teaching responsibilities.

Program Implementation Stages

The community-service program was implemented through seven sequential stages, as illustrated in Figure 1. The first stage involved needs identification and coordination, during which the service team conducted an initial field survey and coordinated with the partner school to identify teachers' main difficulties, determine the target participants, and define the focus of the program. The second stage was program and instrument preparation, including the development of training materials, practical activities, and pre-test–post-test questionnaires. The third stage consisted of the pre-test and participant orientation, which documented participants' initial familiarity with Canva AI and Gemini, prompt-formulation competence, and prior experience in developing AI-assisted instructional media.

The fourth stage was the core workshop and guided practice. Participants practised formulating prompts, using Gemini to generate instructional ideas and content, developing media using Canva AI, and preparing the resulting products for digital publication. Demonstrations were followed by hands-on practice, discussion, problem-solving, and direct mentoring. The fifth stage involved the post-test and product documentation, during which participants completed the post-test and submitted prompts and digital outputs produced during the activity. The sixth stage consisted of follow-up mentoring and monitoring for participants who required additional support in refining media or completing publication. Finally, the seventh stage comprised evaluation and reflection, in which the service team reviewed participants' responses, written prompts, and submitted digital products to identify achievements, remaining difficulties, and areas for further support.

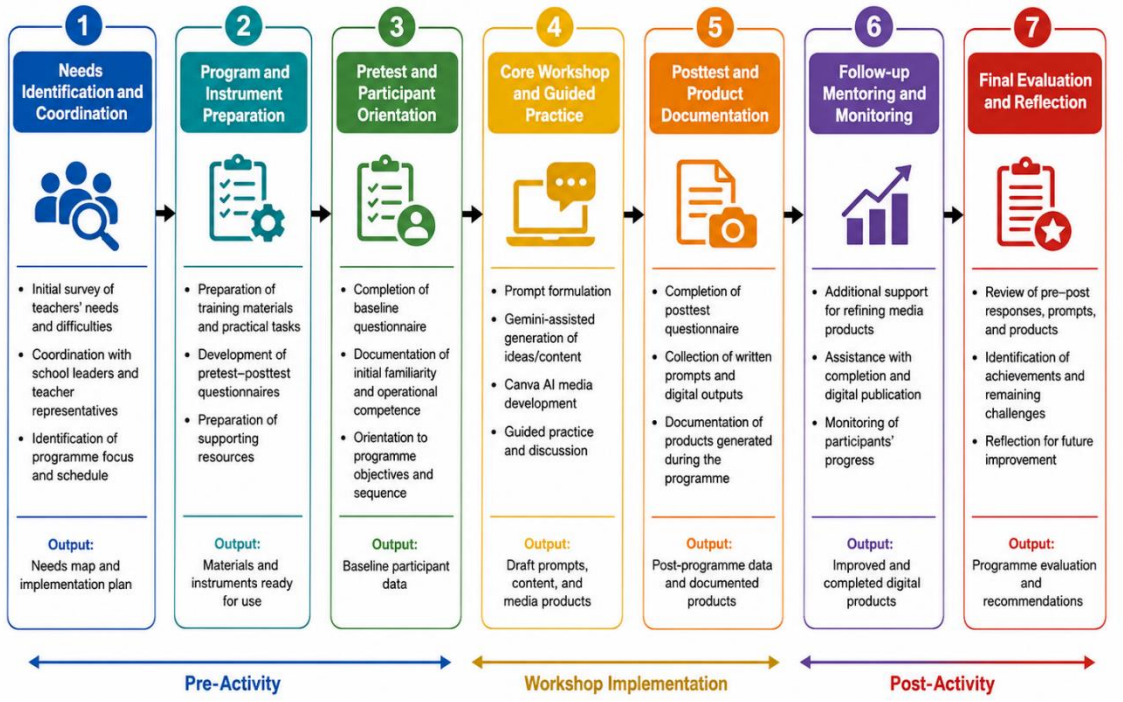


Figure 1. Flow of the Community-Service Program Implementation

Data Collection and Measures

Data were collected before and after the workshop using structured online questionnaires administered through Google Forms. The pre-test documented participants' professional characteristics, prior experience with instructional media, familiarity with Canva AI and Gemini, prompt-formulation competence, and initial understanding of AI-assisted media development. The post-test assessed participants' competence after the workshop, including prompt formulation, use of Gemini for instructional purposes, conceptual understanding of prompting strategies, media-development and publication procedures, and submission of digital product links.

The evaluation used multiple forms of evidence rather than a single total score. Prompt-formulation competence was derived from comparable pre-test and post-test responses indicating whether participants could formulate clear and specific prompts for instructional-media development. Operational competence in using Gemini was assessed based on participants' self-reported responses regarding their ability to use Gemini to generate instructional ideas, content, or media designs.

In contrast, performance-based competence was assessed by examining the quality of the prompts actually produced by participants in both assessments. Thus, operational competence reflects participants' perceived ability to use Gemini, whereas prompt quality provides a more direct, performance-based indication of their competence in applying Gemini effectively. Each prompt was coded for four observable components: (1) instructional context or target learner, (2) specific topic or content, (3) requested output or product, and (4) constraints or specifications. Each component received one point when clearly present, producing a score from 0 to 4. The assessment of the prompts was conducted by two researchers with expertise in the field. They evaluated each prompt on a scale of 0 to 4 using a rubric they had jointly developed. Consistency was ensured by having the researchers conduct independent assessments and then calculating inter-rater agreement—the level of consensus between them based on the same rubric.

Open-ended post-test responses were also coded to examine conceptual and procedural understanding. Knowledge of prompting strategies was classified as accurate when recognised prompting strategies were explicitly identified, partial/vague when responses showed limited but

relevant understanding, platform misconception when applications or platforms were identified as prompt types, and insufficient evidence when no relevant understanding was demonstrated. Publication procedures were classified as adequate when participants described a coherent sequence including media development and publication, partial when only some relevant steps were mentioned, and insufficient when the response did not demonstrate a usable procedure. Submitted links were categorised as a published instructional website, Gemini share link, or no valid digital product URL.

Table 1. Data Sources and Outcome Measures

Data source	Outcome	Measure/evidence	Time
Questionnaire items	Prompt-formulation competence	Comparable binary responses	Pre–post
Questionnaire items	Gemini operational competence	Comparable operational responses	Pre–post
Written prompts	Prompt quality	Four-component score, 0–4	Pre–post
Open-ended response	Prompting knowledge	Accurate, partial, misconception, insufficient	Post–test
Procedure description	Publication competence	Adequate, partial, insufficient	Post–test
Submitted link	Digital product	Website, Gemini share link, or no valid URL	Post–test

Data Analysis

Data analysis combined descriptive statistics, paired inferential tests, and categorical coding of open-ended responses. Frequencies and percentages were used to summarise participant characteristics, baseline responses, conceptual prompting knowledge, publication procedures, and digital product outcomes. Because 23 participants completed the pre-test and 21 completed the post-test, paired analyses were restricted to the 21 participants with matched pre-test–post-test data. No missing-value imputation was performed. The pre-test and post-test questionnaires were not identical; therefore, inferential comparisons were conducted only for domains represented by comparable pre–post measures. The automated Score field generated by Google Forms was not used because it contained zero values for all responses and did not represent participants' performance.

Changes in prompt-formulation competence and operational Gemini competence were analysed as paired binary outcomes using the exact McNemar test. Statistical significance was interpreted as evidence of a change between the pre-test and post-test assessments, rather than as evidence of a causal effect of the training program, given the one-group pre-test–post-test design without a control or comparison group. Prompt-quality scores ranged from 0 to 4 and were treated as bounded paired scores; therefore, pre–post differences were examined using the Wilcoxon signed-rank test with exact two-sided significance. The magnitude of change in prompt quality was quantified using the rank-biserial correlation.

Open-ended post-test responses concerning prompting strategies and publication procedures were summarised according to the predefined coding categories described in Section 2.4. Submitted digital links were also summarised by product category. Statistical significance was evaluated at $p < .05$. Statistical analyses were performed and verified by the authors using IBM SPSS Statistics.

RESULTS AND DISCUSSION

Prompt-to-Publication Pathway as the Program Output

The primary output of this community service program is an integrated "Prompt-to-Publication" workflow for developing AI-based learning media. The activities were designed based on the needs of partner teachers and structured into four interconnected stages: prompt formulation, content creation using Gemini, media development with Canva AI, and web-based

publication. The Prompt-to-Publication workflow serves not merely as a technical sequence for using applications, but also as a framework for teacher competency development—spanning the entire process from defining learning needs to producing shareable digital products. The program therefore connected four competencies that were treated as interrelated stages: prompt formulation, Gemini-assisted generation, Canva AI media development and then web publication.

The first stage required teachers to translate an instructional need into a clear and specific prompt by considering the learner or grade level, learning content, expected output, and relevant specifications. This emphasis is supported by research showing that effective prompt engineering is central to obtaining relevant and contextually appropriate outputs from generative AI for educational purposes (ElSayary et al., 2025; Park & Choo, 2025). Gemini was then used to generate or refine instructional ideas and content. Participants subsequently transformed these outputs into digital instructional media using Canva AI and, in the final stage, prepared the products for digital publication or sharing.

This pathway shifted the focus of training from learning individual application features toward completing an authentic instructional task. Previous studies have emphasised that teacher AI professional development is more meaningful when it combines direct instruction with opportunities to apply AI knowledge to pedagogical problems and authentic teaching contexts (Ding et al., 2024). Similar community-service programs have also highlighted hands-on AI use, instructional-media development, and the integration of Canva and Gemini in teacher professional development (Iqbal et al., 2025; Maulida et al., 2026; Widiyanti et al., 2025). In the present program, prompting, AI-assisted generation, media development, and publication were organised as one continuous workflow, which also served as the framework for evaluating participant development through operational competence, prompt quality, procedural understanding, and digital products.

Dynamics of the Workshop and Mentoring Process

The workshop and mentoring activities operationalised the Prompt-to-Publication pathway in response to the specific needs identified at the partner school. Because most participants were already familiar with Gemini and Canva AI but experienced difficulty connecting separate technical skills into a complete instructional-media development process, the program combined demonstration, discussion, problem solving, guided practice, and direct mentoring at each stage of the pathway. Participants were not only introduced to Gemini and Canva AI but were required to apply both tools to their own instructional needs by formulating prompts, generating instructional content, developing digital media, and attempting publication. This practice-oriented format was important because the initial problem identified in the partner school was not limited access to AI tools, but difficulty in connecting separate technical skills into a complete instructional-media development process. Similar studies have emphasised that teacher AI professional development becomes more meaningful when participants are given opportunities to apply AI knowledge to authentic pedagogical tasks rather than merely learn application features (Ding et al., 2024; Widiyanti et al., 2025).

During the guided practice, changes were observable in how participants approached AI-assisted media development. Some participants who initially produced relatively simple prompts began incorporating grade level, instructional topic, expected output, and additional specifications into their instructions. Participants also moved from using Gemini and Canva AI as separate applications toward applying them sequentially within a complete instructional-media development task. Participants progressed at different rates across the pathway. Some were able to refine simple prompts into more detailed instructions containing grade level, topic, expected output, and additional specifications, whereas others still required support in translating instructional intentions into effective prompts. Technical difficulties also emerged during product development and publication. Post-program responses indicated, for example, that one participant was unable to complete the product because of connectivity problems, while another experienced publication failure related to a suspended platform account. These findings show that successful

AI-assisted media development depends not only on conceptual and technical competence but also on reliable digital infrastructure.

Mentoring therefore played an important role at the transition points between prompting, content generation, media development, and publication. This finding is consistent with community-service programs in which hands-on assistance supported teachers in translating AI use into tangible instructional products (Iqbal et al., 2025; Maulida et al., 2026). Participants' post-program plans to develop additional games, videos, interactive media, and assessment resources further suggest potential for continued use. However, sustained implementation will require continued technical support, peer-sharing opportunities, and reinforcement of prompting concepts so that practical skills can develop alongside conceptual understanding. The following is documentation of the activities, including training, assignments, and presentations of the training outcomes, conducted by teachers at SD Negeri 4 Metro Timur, Lampung.



Figure 1. Community Service Team from Lampung University



Figure 2. Researcher Explained the Material



Figure 3. The Researcher Guided the Teachers Who Practiced Gemini and Canva AI



Figure 4. The Teacher Presented Her Web

Changes in Teachers' AI-Assisted Media Development Competence

Among the 21 participants with matched pre-test–post-test data, clear improvements were observed in both operational competence and prompt-formulation competence. The proportion of participants able to formulate clear and specific prompts increased from 14.3% (3/21) at pre-test

to 90.5% (19/21) at post-test. These improvements indicate a greater capacity to communicate instructional requirements to Gemini, which may support the development of more relevant, specific, and instructionally aligned media. However, because the study did not assess the quality of classroom implementation or student learning outcomes, these findings should be interpreted as evidence of improved AI-use competence rather than evidence of improved educational outcomes. Sixteen participants moved from not yet demonstrated to demonstrated, while none showed a decline. The exact McNemar test confirmed a statistically significant change ($p < .001$). Operational competence in using Gemini also increased from 38.1% (8/21) to 81.0% (17/21). Ten participants improved, while one showed the opposite pattern, resulting in a significant exact McNemar test ($p = .012$).

Table 2. Changes in Participants' Operational Competence and Prompt Quality (N = 21)

Outcome	Pre-test	Post-test	Statistical result
Able to formulate clear and specific prompts	14.3%	90.5%	Exact McNemar, $p < .001$
Operational competence in using Gemini	38.1%	81.0%	Exact McNemar, $p = .012$
Prompt-quality score, mean (SD)	1.71 (1.62)	3.00 (1.45)	Exact Wilcoxon, $p = .011$
Prompt-quality score, median	2	4	$r_{(rb)} = .725$

The improvement was also evident in the prompts participants actually produced. Mean prompt-quality scores increased from 1.71 (SD = 1.62) to 3.00 (SD = 1.45), while the median increased from 2 to 4. Twelve participants obtained higher scores, three obtained lower scores, and six showed no change. The exact Wilcoxon signed-rank test indicated a significant difference, $W = 16.50$, exact two-sided $p = .011$, with a rank-biserial correlation of .725. This performance-based result complements the self-reported competence measures and suggests that prompt construction became more structured after the workshop. This is consistent with studies emphasising that effective prompting is an important component of productive generative-AI use in educational contexts (ElSayary et al., 2025; Park & Choo, 2025).

However, conceptual understanding remained substantially less developed than practical performance. Although 90.5% of participants were able to formulate clear and specific prompts after the training, only four participants (19.0%) accurately identified recognised prompting strategies. This marked gap suggests that procedural competence may develop more rapidly than conceptual understanding, as participants may be able to apply prompting techniques through guided practice and repeated use of Gemini without necessarily developing a systematic understanding of the principles underlying effective prompting. In this context, practical performance may reflect the acquisition of usable procedures, whereas conceptual understanding requires participants to recognise, explain, and differentiate the underlying strategies. This finding highlights an important consideration for AI professional development: training should not focus exclusively on task-based practice but should also incorporate explicit conceptual instruction, opportunities to articulate the rationale behind prompting strategies, and reflection on how prompt characteristics influence the relevance and specificity of AI-generated instructional content. Such an approach may help teachers move beyond merely using AI tools effectively toward developing a more deliberate and transferable understanding of AI-supported instructional design; Five participants (23.8%) demonstrated only partial or vague understanding, nine (42.9%) confused platforms or applications with prompt types, and three (14.3%) provided insufficient evidence of conceptual understanding. Taken together, these findings reveal a substantial gap between participants' practical ability to formulate prompts and their explicit understanding of prompting strategies. One possible explanation is the practice- and product-oriented nature of the workshop. The training emphasised authentic tasks in which participants directly used Gemini to develop instructional content and media, allowing them to learn through guided practice, examples, and repeated application. Such activities may have facilitated the acquisition of procedural knowing-how more rapidly than the development of explicit conceptual knowledge, which requires

participants to identify, explain, and distinguish the principles underlying effective prompting. Thus, participants may have learned what to do when formulating prompts without fully understanding why particular prompting strategies are effective or when they should be applied.

This gap represents an important consideration for the design of AI professional development for teachers. While authentic, product-oriented practice is valuable for developing immediately usable skills, it may need to be complemented by explicit conceptual instruction. Follow-up mentoring should therefore retain opportunities for authentic practice while incorporating structured explanations of prompting strategies, comparison of different prompt types, and reflective activities that require teachers to articulate why a particular prompt is appropriate for a given instructional purpose. Such a combination of procedural practice and conceptual understanding may help teachers develop AI-use competence that is not only immediately applicable but also more deliberate, adaptable, and transferable across instructional contexts.

Digital Outputs and Evidence of Implementation

The program generated tangible digital outputs that provided additional evidence of participants' progression through the Prompt-to-Publication pathway. Of the 21 post-test participants, 14 (66.7%) submitted links to published instructional websites, three (14.3%) submitted Gemini share links, and four (19.0%) did not provide a valid digital product URL. The 66.7% publication rate should therefore be interpreted as an indicator of completion of the digital production pathway rather than as evidence of the pedagogical quality of the resulting instructional media. Because the products were not evaluated using a validated instructional-media quality rubric, no conclusions can be drawn regarding their instructional relevance, content quality, usability, developmental appropriateness, or effectiveness in supporting student learning. These submissions were used as evidence of product completion and access to the resulting digital artefacts, rather than as an indication of their pedagogical quality or effectiveness for classroom use. These results indicate that a substantial proportion of participants progressed beyond AI-assisted content generation to the stage of publishing digitally accessible instructional media.

Participants' procedural understanding showed a similar pattern. Thirteen participants (61.9%) demonstrated adequate understanding of the media-development and publication sequence, five (23.8%) showed partial understanding, and three (14.3%) provided insufficient procedural evidence.

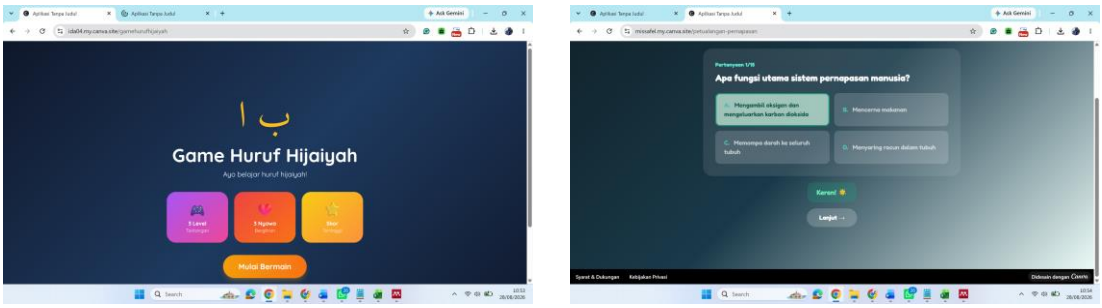
Table 3. Procedural and Digital Product Outcomes After the Program (N = 21)

Outcome	n	%
Publication procedure		
Adequate	13	61.9
Partial	5	23.8
Insufficient	3	14.3
Digital product		
Published instructional website	14	66.7
Gemini share link	3	14.3
No valid product URL	4	19.0

The production of published websites is particularly relevant because publication represented the final stage of the Prompt-to-Publication pathway. Similar community-service initiatives have emphasised the value of product-oriented AI training in supporting teachers in translating newly acquired digital skills into instructional resources (Iqbal et al., 2025; Maulida et al., 2026). In the present program, however, the submitted links were used solely as evidence that participants had progressed through and completed the media-development and publication

process. Accordingly, the publication rate can't be interpreted as evidence of the pedagogical quality, classroom usability, or educational effectiveness of the resulting media. The pedagogical quality of the products was not systematically assessed using a validated instructional-media rubric, and the study did not examine their classroom implementation or their effects on student learning. The present finding is limited to demonstrating participants' ability to complete the digital production and publication pathway. Future evaluations should incorporate validated rubric-based assessment, classroom implementation data, usability evaluation, and measures of student learning outcomes.

Figure 2 presents two representative products developed and published by participants. The first product, Game Huruf Hijaiyah, was designed as a gamified learning activity incorporating levels, lives, and scoring features, while the second product, Petualangan Pernapasan, used an interactive question-and-feedback format to support learning about the human respiratory system. These examples illustrate that participants were able to move beyond AI-assisted content generation toward the development of digitally accessible instructional media with interactive features. The diversity of topics also indicates that the Prompt-to-Publication pathway could be applied across different elementary subject areas.



(a) (b)

Figure 6. Examples of AI-Assisted Instructional Media Published by Participants: (a) an Interactive Hijaiyah Letter Game and (b) an Interactive Respiratory System Learning Quiz

Strengths, Limitations, and Sustainability of the Program

A major strength of the program was its close alignment with the actual needs of the partner teachers. The baseline assessment showed that most participants were already familiar with Canva AI and Gemini, but this familiarity had not yet developed into systematic operational competence. The program therefore responded to a practical gap by linking prompt formulation, AI-assisted content generation, media development, and publication into one coherent pathway. A second strength was its practice- and product-oriented design. Participants were not limited to observing demonstrations; they were guided to develop outputs relevant to their own instructional contexts. The observed gains in prompt-formulation competence, Gemini use, prompt quality, and published digital products indicate that this approach was appropriate for the needs of the partner school. Similar studies have also shown that hands-on, task-based AI professional development is more meaningful when teachers apply new knowledge to authentic pedagogical tasks (Ding et al., 2024; Iqbal et al., 2025).

Nevertheless, several limitations were identified. First, participants did not progress uniformly across all stages of the Prompt-to-Publication pathway. While many completed publication successfully, others remained at the content-generation stage or did not submit a valid product URL. Future programs could address this variation through differentiated mentoring, additional practice sessions for participants requiring more support, and milestone-based monitoring at each stage of the pathway. Second, practical competence improved more strongly than conceptual understanding of prompting strategies. Future training should therefore combine hands-on practice with more explicit instruction on prompting principles, comparative analysis of prompt types, and reflective activities that require participants to explain why particular

prompting strategies are appropriate for specific instructional purposes. Third, although the use of commonly accessible platforms such as Gemini and Canva AI supported implementation, stable internet access and platform reliability remained necessary conditions. Future programs could prepare alternative access strategies, downloadable supporting materials, backup platforms, and additional technical assistance to reduce disruptions caused by connectivity or platform-related problems.

The program also had limitations at the evaluation level. Because it used a one-group pre-test–post-test design without a comparison group, the observed changes should be interpreted as improvements associated with participation in the program rather than definitive causal effects. Future evaluative studies could strengthen the evidence by including a comparison group or employing a more rigorous quasi-experimental design. In addition, submitted links were treated primarily as evidence of process completion, and the pedagogical quality of all products was not assessed using a validated instructional-media rubric. Future evaluations should therefore incorporate a validated rubric and expert assessment to examine dimensions such as alignment with learning objectives, content accuracy, developmental appropriateness, usability, and visual or interactive quality. Finally, the evaluation focused on teachers' competence and product completion rather than on the classroom use of the developed media. The program did not systematically examine how the products were implemented with students, how usable they were in authentic classroom settings, or whether they contributed to student learning. Future studies could therefore include classroom try-outs, teacher and student usability evaluations, classroom observations, and, where appropriate, measures of student learning outcomes.

Discussion

The realisation of the "Prompt-to-Publication" pathway implemented the community empowerment model in a highly structured way, thereby filling the gap between the level of digital literacy among teachers and pedagogical realisation. Consistent with the community services model that is based on practice and task-oriented training for capacity building (Ding et al., 2024; Iqbal et al., 2025), the first phase of the training enabled teachers to move from being passive users to designers of the technology involved. The transition was confirmed empirically through substantial increases in the ability of the participants to formulate prompts (from 14.3% to 90.5%) and their operational capabilities regarding Gemini (from 38.1% to 81.0%). In relation to the theoretical framework described in this study, which states that digital literacy implies the connection of operational capabilities with pedagogical design (Pratiwi & Yunus, 2024), the intervention succeeded in generating procedural readiness among the trainees. At the same time, the deficit in conceptualisation (only 19.0% of the sample recognised formal prompting techniques) indicates one of the typical issues of an empowerment model when practical expertise develops faster than theoretical awareness.

As a result of moving into the final stage of the empowerment process, the project achieved successful implementation of changes in the social and operational environment, shown by 66.7% of the participants developing interactive instructional websites. Based on the principles of the empowerment theory of community service that focuses on sustainability of artefact production and increased competence at the level of the whole community (Maulida et al., 2026; Widiyanti et al., 2025), the digital products (ranging from gamification of language games to interactive science quizzes) prove that the process of scaffolding is an effective tool for digital transformation of the institution. Despite the fact that, due to the one-group pre-test-post-test design, there is no need to draw conclusions about the causality of educational achievements in the absence of a control group, the emergence of such artefacts is a key evolutionary step from personal skills development to community creativity.

CONCLUSION

The findings suggest that the integrated Prompt-to-Publication pathway was accompanied by improvements in elementary teachers' operational skills for AI-assisted instructional media production. By integrating prompt formulation, Gemini-assisted content generation, Canva AI-

based media development, and web publication within a practice- and product-oriented process, the program provided participants with opportunities to engage in more systematic use of AI for instructional media development. Improvements were observed in prompt-formulation competence, operational use of Gemini, prompt quality, and completion of digital media products.

At the same time, participants' conceptual understanding of prompting strategies remained less developed than their practical performance. This finding highlights the importance of balancing hands-on experience with explicit conceptual reinforcement in AI professional development. Future training and mentoring could combine authentic practice with explicit instruction on prompting principles, reflection on prompt choices, peer review, and systematic evaluation of digital product quality.

However, the observed pre-test–post-test improvements should be interpreted as changes over the course of the study rather than as evidence that the training program caused these improvements, given the one-group pre-test–post-test design and absence of a comparison group. Furthermore, the completion or publication of digital products does not by itself demonstrate their pedagogical quality, classroom usability, or effectiveness. The present study did not assess classroom implementation, student responses, or student learning outcomes. Further research should therefore evaluate the developed media in relation to learning-objective alignment, content accuracy, suitability for elementary learners, visual and interactive quality, usability, and actual classroom implementation. Such evaluation would provide stronger evidence regarding how improvements in teachers' AI-use competence translate into the quality and practical usefulness of AI-assisted instructional media.

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DECLARATION OF GENERATIVE AI

During the preparation of this manuscript, the authors used ChatGPT (OpenAI) to assist with manuscript organisation, language refinement, development of the coding framework, preliminary data processing, and presentation of results. ChatGPT was also used to support the visualisation of the program implementation flow presented in Figure 1. All statistical analyses reported in the manuscript were independently verified by the authors using IBM SPSS Statistics based on the original pre-test and post-test datasets. The authors reviewed and revised all AI-assisted outputs and take full responsibility for the accuracy, interpretation, integrity, and final content of the manuscript. The use of Gemini and Canva AI described in this article constituted part of the community-service program itself and is therefore reported separately in the Methods and Results sections.

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