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Advanced Prompting Techniques for Artificial Intelligence-Based Learning Innovation

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Abstract

This community service program was designed to strengthen the capacity of teachers and lecturers in utilizing advanced prompting techniques based on Artificial Intelligence (AI) to support instructional innovation. The focus of the training was on two effective methods Chain of Thought (CoT) and Role Prompting which enhance human-AI interaction in educational contexts. The activity was conducted through face-to-face workshops involving 25 participants from various educational institutions, combining theoretical explanations, hands-on practice, and case-based discussions. Participants learned how to construct structured and contextual prompts for teaching applications such as lesson planning, explanation of concepts, and simulation-based learning. Evaluation results showed a significant improvement in participants' understanding and ability to apply prompt engineering strategies, as reflected in both assessment scores and the quality of practical outputs. The program also contributed to raising awareness about ethical AI usage in education and emphasized the role of digital literacy in enabling educators to adapt to the demands of digital transformation.

Keywords*: Artificial Intelligence, Prompt Engineering, Chain of Thought, Role Prompting, Digital Literacy*

1. INTRODUCTION

Teachers must actively participate in the digital transformation of education by learning new technologies. Artificial Intelligence (AI) applications, especially those utilizing Large Language Models (LLMs) like ChatGPT, are among the fastest-growing advancements. Because these models can comprehend and produce text responses that resemble those of a human, they are perfect for use as intelligent learning assistants [1]. But in order to fully utilize LLMs in a learning environment, teachers need to learn how to create precise, organized inputs a process known as prompt engineering. This ability is necessary to guarantee that content produced by AI is accurate, pertinent, and pedagogically sound [2].

Prior to this program, preliminary survey data showed that educators had a substantial lack of awareness about advanced prompting strategies. More than 80% of the 30 respondents, who included university lecturers and high school teachers, acknowledged utilizing AI technologies only in simple ways, including creating summaries or coming up with ideas. Systematic ways that actively assist student learning were unfamiliar to very few. This realization highlighted the critical need for focused training courses that present the theoretical underpinnings as well as real-world uses of sophisticated prompting techniques, especially Chain of Thought (CoT) and Role Prompting [3][4].

The Chain of Thought (CoT) technique helps AI deconstruct answers into sequential reasoning, which makes it ideal for fields like physics, logic, and mathematics that demand analytical thinking [5]. Role prompting, on the other hand, encourages the AI to take on particular personalities or points of view. This can be used to replicate debates, role-plays, or dialogues from historical individuals or fictional characters in language arts, history, and character education. For these approaches to produce logical, context-specific outputs that support learning objectives, a strategic grasp of how to interact with AI systems is necessary [6].

In addition to introducing a new technology, the goal of this community engagement initiative was to raise awareness of the vital role that digital literacy plays in education. The effort sought to develop more dynamic, student-centered learning experiences that match the reality of 21st-century education by giving teachers the skills and mentality they need to incorporate AI into classroom instruction through organized prompting. Additionally, the program serves as a link between academic developments in AI and their practical implementation in educational settings, supporting the larger endeavor of technology transfer and research dissemination. To guarantee long-term effects and equity in digital transformation activities throughout the education sector, such programs must be expanded and institutionalized going forward.

2. METHOD

This community service program was implemented through a full-day, in-person training course. The exercise, which included 25 participants from various educational institutions, was held at the training room of the Faculty of Engineering at Universitas Darma Persada. The workshop, which took place in May 2025, had a structured schedule with four primary parts: group discussion, practical application, conceptual theory, and evaluation. Participants were guaranteed to gain knowledge as well as the chance to apply it in relevant and useful ways thanks to this arrangement. Starting with core prompt engineering strategies like zero-shot and few-shot prompting, the training started with an introductory session. The elements of an effective prompt, variations in language tone and style, and best practices for interacting with AI systems to produce dependable outputs were presented to the participants. The information was presented utilizing live ChatGPT simulations, visual presentations, and an interactive Q&A session that prompted participants to consider how their current procedures would change with the integration of AI.

Advanced prompting techniques, particularly Chain of Thought and Role Prompting, were the main focus of the second session. Every participant was required to create prompt examples that were pertinent to their topic area and based on actual classroom situations. For example, while humanities professors created role-play simulations with national historical personalities, science teachers were encouraged to ask AI to explain Newton's Laws in meticulous detail. After going over these prompts, facilitators offered input on the quality of the AI-generated responses, contextual alignment, and the clarity of the instruction. Participants were able to improve their suggestions and get a deeper comprehension of how organized input affects AI output thanks to this iterative process. A thorough evaluation process that included pre-test and post-test assessments as well as an assessment of the participants' practical outputs marked the end of the session. Increased conceptual knowledge, the capacity to provide structured prompts, and preparedness to apply AI-assisted tactics in real-world teaching situations were among the evaluation indicators. A combination of qualitative reflections and quantitative ratings were used to gather data, enabling a comprehensive evaluation of the program's efficacy. These findings provided the basis for assessing the training's wider effects and directing suggestions for upcoming educational technology capacity-building projects.

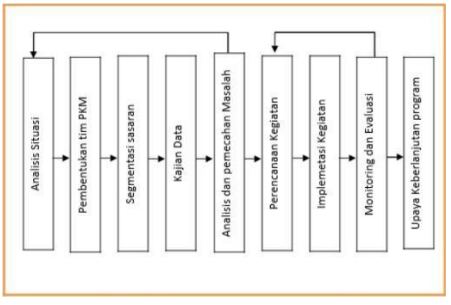

Figure 1. PKM Methodology

3. RESULT AND DISCUSSION

The training program's implementation went well, and participants showed a high degree of involvement and enthusiasm throughout the sessions. The average score rose from 58.4 to 86.2 based on the pre- and post-training evaluation results, demonstrating a considerable improvement in participants' comprehension of quick engineering procedures and their capacity to use them in educational settings. The quality of the prompts produced during the practical sessions also demonstrated this progress, as participants' AI interactions showed improved clarity, structure, and contextual relevance.

In order to solve mathematical problems or explain scientific phenomena, participants in the Chain of Thought technique successfully created prompts that directed AI to describe thinking processes in a step-by-step manner. One such instance was when a science instructor made a prompt requesting the AI to describe the steps involved in photosynthesis in sequential order. The output showed how the technique could help with cognitive scaffolding in STEM education because it was rationally organized, pedagogically sound, and easily understandable by students.

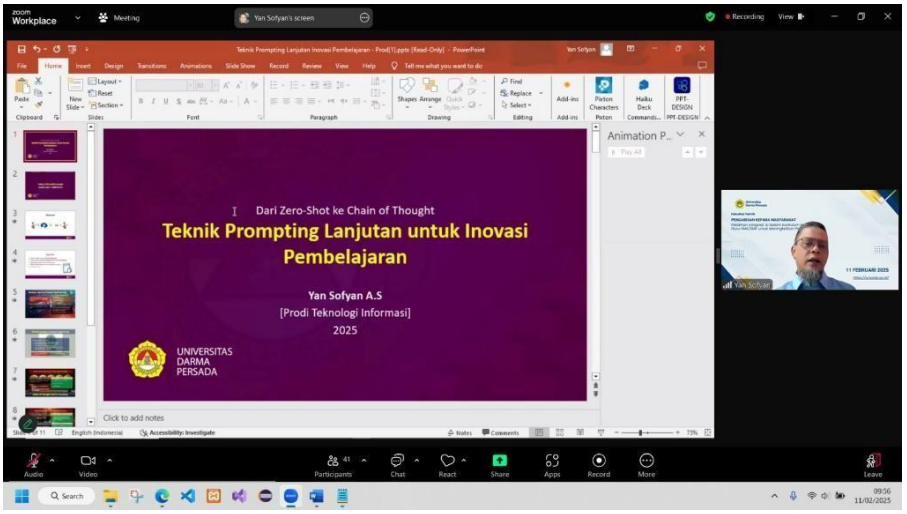

Figure 2. Implementation of PKM Material Presentation

Participants created simulation discussions during the Role Prompting session by adopting the viewpoints of historical personalities or subject matter specialists. One particularly striking example was a prompt that asked the AI to describe the significance of Indonesia's Proclamation of Independence by assuming the role of Bung Karno (Sukarno). Students had a more immersive and contextually engaged learning experience since the response was not only rich in historical facts but also presented in a rhetorical style and emotional tone that fit the persona. New avenues for incorporating narrative-based learning into classroom education were made possible by these simulations.

According to group discussions, participants thought these strategies provided a fresh educational experience that was not usually available through traditional teaching approaches. Nonetheless, several difficulties were identified, like creating prompts that are precise enough to direct the AI while preserving room for original answers and guaranteeing that the generated content is devoid of factual inaccuracies or ingrained biases. Facilitators were crucial in assisting participants in updating their suggestions to conform to educational objectives, inclusion ideals, and ethical standards.

Figure 3. Continuation of PKM Material Presentation

All things considered, the technological literacy of the participants was significantly and instantly improved by this community service activity. Most said they were determined to use AI-assisted prompting strategies in their upcoming lesson plans and teaching resources. In order to expand their knowledge and investigate more sophisticated AI applications in education, several also argued for frequent follow-up training sessions. The initiative's success highlights the need of organized, practical professional development in giving teachers the skills and attitude they need to successfully navigate the digital future of teaching and learning.

4. CONCLUSION

This community service project has effectively improved teachers' comprehension and proficiency with cutting-edge AI-based prompting strategies. When it comes to creating dynamic, contextual, and pertinent instructional innovations that address the changing issues in today's educational environment, the Chain of Thought (CoT) and Role Prompting methodologies both worked well. In addition to providing technical instruction, the program gave educators a platform to raise awareness of the importance of digital literacy in a world that is becoming more and more reliant on technology.

By using CoT techniques, participants were able to create learning strategies based on sequential reasoning, which improved students' ability to think logically and solve problems. By mimicking historical personalities, professional roles, or expert viewpoints, Role Prompting provided a novel, narrative-driven method of content delivery. When combined, these strategies opened up a wealth of possibilities for investigating innovative and flexible technology-enhanced pedagogies, giving teachers the means to transform how they interact with students and deliver learning content.

Despite just lasting one day, the program had a significant impact. According to the participants, their understanding of AI has significantly changed from seeing it as a straightforward auxiliary tool to seeing it as a cooperative collaborator in the teaching and learning process. The enthusiasm displayed by participants strongly shows that the training was relevant, well-targeted, and extremely valuable to their professional development, despite obstacles like limited exploration time and restricted access to premium AI models.

In the future, it is advised that this initiative for community participation be extended to include a larger network of educational institutions in other areas. To encourage long-term learning and autonomous application, the implementation team also plans to provide written manuals and online training courses. For education to undergo a more inclusive, forward-thinking change, cooperation between academic institutions, educational professionals, and technology developers must be strengthened. This will enable educators to lead technological

change in ways that benefit students and society as a whole, in addition to being better able to adapt to it.

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