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Prompt-based AI Use Training for Research Preparation for Beginner Researchers at the Faculty of Teacher Training and Education, Ahmad Dahlan University, Yogyakarta

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Abstract
The use of prompt-based Artificial Intelligence (AI) has grown rapidly in academia, offering efficiency and improved research quality. However, student researchers as novice researchers still face challenges such as difficulty formulating research problems, finding and summarizing relevant academic sources, and limited skills in writing effective prompts. Furthermore, there is a lack of programs or training specifically teaching the optimal use of AI in a research context. This Community Service (PkM) was implemented to provide a comprehensive understanding of the use of prompt-based AI in the context of preparing academic research critically, creatively, and ethically, and to help students utilize it in complex research stages, such as literature searches, problem formulation, and instrument development. This activity collaborated with students from the Faculty of Teacher Training and Education at Ahmad Dahlan University (UAD) as partners. The training implementation method used a blended learning model (online and offline) and a mixed explanatory method (sequential explanatory) to measure the effectiveness of the training through quantitative data (pre- and post-training surveys) followed by qualitative exploration. The results of the activity showed a significant increase in all aspects of student research competency. Understanding of scientific research procedures improved from "quite capable" to "capable–very capable." Furthermore, their ability to formulate research problems, locate relevant references, and develop scientific article outlines also consistently strengthened. This PkM successfully equipped students to be more independently prepared to initiate and conduct undergraduate research and produced training modules that can be used continuously.

Keywords: Artificial Intelligence (AI); Prompt; Student Academic Research; Community Service (PkM)

INTRODUCTION

The use of artificial intelligence (AI) in academia is growing and plays a crucial role in improving the efficiency and quality of research. Research itself is the foundation for the advancement of science and technology (Amalia, 2024; Juniarti, 2020). For students as novice researchers, AI helps make the research process more effective, including enabling more objective decision-making and adapting automated systems as needed (Wahyudi, 2023; Hidayat, 2024). One widely used form of AI is prompt-based AI, which enables efficient data analysis and the preparation of academic studies through the integration of instructions and user input (Zhao et al., 2023). This method has been shown to increase software development efficiency by up to 41% (Hamdi & Kim, 2023) and is effective in text classification comparable to human judgment (Mayer et al., 2023).

However, novice researchers still face challenges such as difficulty formulating research problems, compiling literature reviews, and developing instruments. Prompt-based AI offers solutions for literature search and analysis, research framework development, and instrument design (Cahyaningrum et al., 2023). AI is also increasingly used in higher education to assist with academic assignment writing (Akhyar, 2023). The Korean Language Education Study Program at the Faculty of

Language and Arts (FPBS) of the University of Indonesia (UPI) has integrated prompt-based AI into research-related courses to guide students in utilizing AI from the topic selection stage to the technical preparation of their research. Collaborative activities with students from the Faculty of Teacher Training and Education (FKIP) of the University of AD (UAD) strengthen their research skills in utilizing AI technology and foster critical and adaptive thinking skills.

However, there are ethical challenges, risks of dependency, and the importance of maintaining human interaction (Yani, 2024). Other barriers include a lack of skills in writing effective prompts and limited training on the use of AI for research. Therefore, training is needed that equips students with practical skills in using prompt-based AI, so they can focus on the analytical aspects while AI handles the technical tasks.

The integration of AI in higher education is showing rapid progress, particularly through intelligent tutoring systems, adaptive learning platforms, and generative AI tools like ChatGPT, which provide personalized learning experiences and increase student engagement (Batsurovska et al., 2024; Gonzales et al., 2024; Deep et al., 2024; Pang et al., 2025). In the research context, AI plays a crucial role as a subset of Machine Learning (ML), capable of systematically analyzing academic data and discovering patterns undetectable through traditional methods (Chounta et al., 2024). This analysis helps educators predict student performance and design more appropriate learning interventions.

AI is also bringing significant changes to academic evaluation, providing instant feedback and automated assessments consistent with human judgment (Hamzaoui et al., 2024; Indu et al., 2024; Jiali et al., 2024). Furthermore, AI algorithms processing large-scale data have proven effective in predicting student performance, thus benefiting both lecturers and students in planning learning strategies and preparing for research (Agarwal & Agarwal, 2023; Mahafdah et al., 2024). Neural network models have also demonstrated high accuracy in academic prediction, opening up opportunities for AI as an early analytical tool in student research. Furthermore, AI supports scientific content production, including abstract generation, academic text translation, and grammar correction, helping students produce more structured scientific papers and access international literature more easily (Zahra & Rautela, 2024).

The problem formulation includes ethical and dependency issues (Yani, 2024), young researchers' lack of understanding of AI's potential in literature research, problem formulation, and instrument development, and students' difficulties in effectively sorting and summarizing literature and writing prompts. The lack of specialized training exacerbates this situation. Collaboration with UAD Faculty of Teacher Training and Education students is crucial for strengthening research competencies and building an academic ecosystem that adapts to digital developments.

The purpose of the community service program is to provide a comprehensive understanding of the use of prompt-based AI in academic research and to train students to use it critically, creatively, and ethically. Collaboration with UAD Faculty of Teacher Training and Education students broadens the program's impact, opens up cross-campus discussion spaces, and enhances student research competencies. This program also aligns with UPI's 2021–2025 strategic goals of improving the quality of community service and utilizing educational innovation. The output of the program includes improved student understanding of the use of AI in complex research, the availability of ongoing training modules, and the creation of cross-campus discussion forums that strengthen academic networks and a culture of innovative research.

METHOD

Explanatory mixed methods can be described in various mixed methods designs, including sequential explanatory, sequential exploratory, concurrent triangulation, and concurrent embedded (Sugiyono, 2012). In the context of this training, the PkM team implemented a sequential explanatory design, in which quantitative evaluation was conducted first, followed by qualitative exploration to gain a deeper understanding of the training's effectiveness. This sequential explanatory approach allowed participants to gain more contextual insights into the challenges and opportunities in applying AI-based technology in research preparation (Mufidah et al., 2024).

The explanatory approach was implemented through two main stages. The first stage was quantitative, in which the PkM team collected data through surveys and pre- and post-training tests to measure participants' initial understanding and skill development. The results of the quantitative analysis provided an overview of the training's effectiveness and areas that still needed strengthening. The second stage was qualitative, aimed at deepening the quantitative findings through observation,

in-depth interviews, and focus group discussions (FGDs). This approach helped identify factors influencing the success and challenges in implementing learning technology and provided a more contextual understanding of the quantitative results.

In its implementation, this explanatory blended method is supported by technology integration through the use of LMSs such as Google Drive and other supporting tools, with synchronous and asynchronous learning sessions. This approach is expected to not only improve participants' skills but also generate evidence-based recommendations for the development of technology-based learning within the Faculty of Teacher Training and Education at Ahmad Dahlan University. The PkM Team used the syllabus as a training guide.

Table 1. Training Syllabus

Time	Training Materials	Media and learning aids	Learning Activities	Learning Mode	Learning Duration
June 11, 2025	Developing Academic and Research Culture	Zoom PPT Slides and other related resources	Soldering Question and answer	Synchronous (virtual face to face)	1JP
June 18, 2025	Research Preparation by Utilizing AI Applications	Zoom PPT Slides and other related resources	Soldering Question and answer Exercise	Synchronous (virtual face to face)	1JP
	Leveraging Prompt Engineering in Using LM Notebook and ChatGPT to Write Scientific Papers	Zoom PPT Slides and other related resources	Soldering Question and answer Exercise	Synchronous (virtual face to face)	2JP

RESULTS AND DISCUSSION

This chapter will describe the location and target audience, activity steps, results achieved, and supporting factors and obstacles of community service activities that have been carried out.

Location and Target Audience

The current target area for the Community Service Program (PKM) is the Faculty of Teacher Training and Education (FKIP) at Ahmad Dahlan University (UAD), Yogyakarta. The PkM team is coordinating with the faculty regarding permits and training preparation. The selection of FKIP UAD as a partner is based on a shared vision for scientific development, particularly in the field of language education, and a shared commitment to enhancing student capacity in facing the challenges of the digital era.

Prior to the Community Service Program (PKM) plan, the team had established good communication and a collaborative relationship with the management of the Faculty of Teacher Training and Education (FKIP) at UAD. This was one of the key reasons why this area was chosen as the location for the community service. Furthermore, FKIP UAD has a reputation for actively promoting learning innovation and cross-disciplinary collaboration, making it the perfect partner for this program.

The target audience for this community service program is students in the Korean Language Education Study Program, Faculty of Teacher Training and Education, UAD. Based on coordination with the faculty, a number of students were determined to be ready to participate in the full training series. Participants are those with a strong interest in research development and the use of technology, particularly AI, to support academic processes.

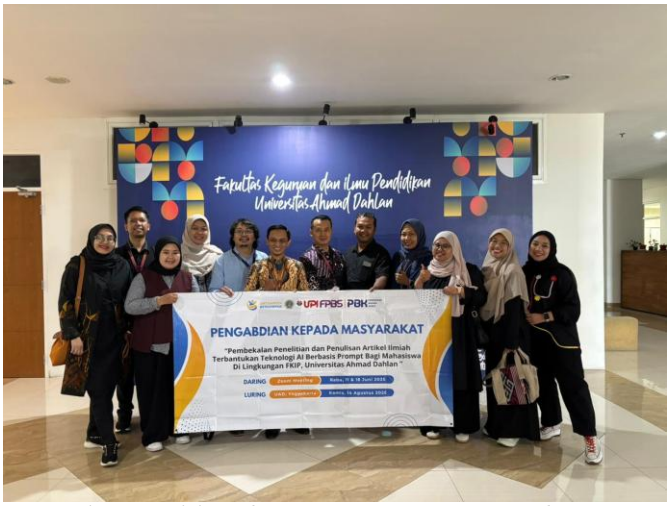

Figure 1. Visit to the FKIP UAD Campus, Yogyakarta

The target participants for this community service activity were set at 30 students from the Faculty of Teacher Training and Education (FKIP) of Ahmad Dahlan University, specifically the Indonesian Language Education Study Program.

Prompt-based AI Use Training Activities for Research Preparation for Beginner Researchers

The training was conducted in two stages, one online via Zoom. This online stage was held in three sessions, with Session 1 held on June 11, 2025, then Sessions 2 and 3 held on June 18, 2025. In Session 1, the speaker was one of the lecturers from the Faculty of Teacher Training and Education, UAD, namely Dr. Yosi Wulandari. The material discussed the research culture that exists in the academic environment of the Faculty of Teacher Training and Education, UAD.

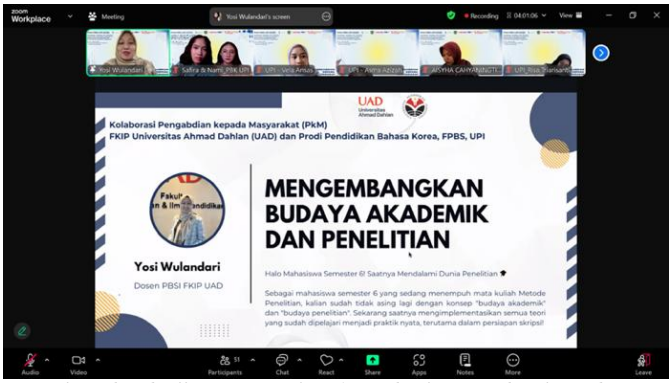

Figure 2. Mrs. Yosi Wulandari's presentation (Developing Academic and Research Culture)

Sessions 2 and 3 were delivered by Korean Language Education Study Program lecturers Jayanti Megasari and Arif Husein Lubis. The two speakers each presented material on research preparation and the scientific paper writing process using AI prompts.

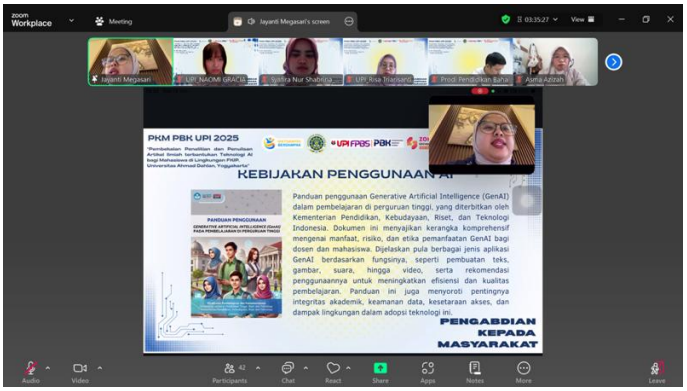

Figure 3. Mrs. Jayanti Megasari's presentation (Research Preparation by Utilizing AI)

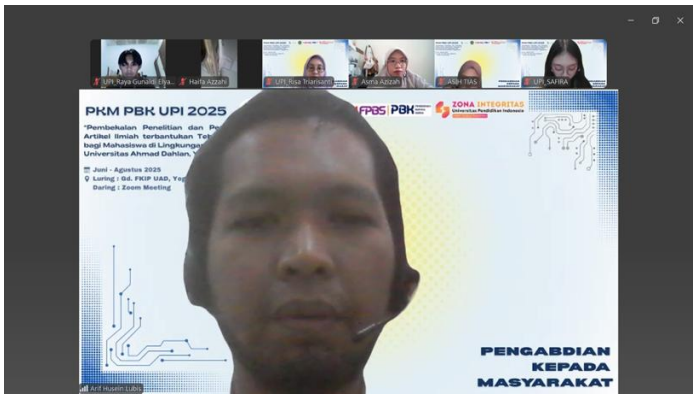

Figure 4. Presentation by Mr. Arif Husein Lubis (AI Prompt for Research)

This online activity is designed to provide hands-on practice for the lessons learned. Following the presentation session, the PkM team conducts an evaluation to assess participant achievement and identify areas for improvement. Additionally, participants receive feedback and motivation to continue their research after the training session concludes.

Participants are also encouraged to develop their skills independently through exercises, online resources, or study groups. All sessions are recorded via Zoom so participants can revisit the material to clarify or deepen their understanding. Each session concludes with a Q&A session, giving participants the opportunity to seek clarification, ask questions, and discuss the material with the instructor and fellow participants. This approach provides flexibility in learning while enriching participant interaction and understanding.

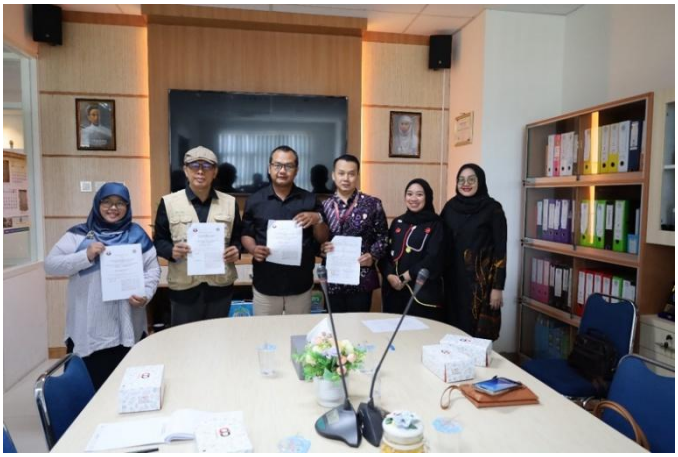
Figure 5. Signing of the memorandum of understanding (MoU) and cooperation agreement

The next stage is the offline activity stage which will be held directly at the FKIP Building of Ahmad Dahlan University (UAD), Yogyakarta on August 14, 2025. This activity is an important moment in the program series because it presents face-to-face interactions between participants,

lecturers, and collaboration partners.

The main agenda of the offline event was the signing of a memorandum of understanding (MoU) and a cooperation agreement between the Korean Language Education Study Program, Faculty of Language and Arts, Universitas Pendidikan Indonesia (UPI), and the Faculty of Teacher Training and Education, UAD. This signing was not merely ceremonial, but rather a concrete commitment from both institutions to strengthen synergy in academics, research, and community service.

The scope of the collaboration includes the implementation of the Tri Dharma of Higher Education. In the field of education and teaching, this collaboration is directed at joint curriculum development, lecturer and student exchanges, and the organization of guest lectures. In the research realm, both institutions are committed to establishing research collaborations in the field of language education, producing joint publications, and providing scientific forums that can involve lecturers and students. Meanwhile, in the area of community service, this collaboration is realized through training programs, workshops, and various community empowerment-based social activities relevant to language education science.

Level of Conformity Between Plan and Realization

The community service implementation team, consisting of lecturers and students of the Korean Language Education Study Program, has attempted to adjust the implementation of the activities to the previously prepared plan.

Table 2. Table of conformity between plans and PkM realization

No	Description	Plan	Realization
1	Time	Online: June 11 & June 18, 2025 Offline: August 14, 2025	Online: June 11 & June 18, 2025 Offline: August 14, 2025
2	Location	Online: Zoom Offline: FKIP UAD	Online: Zoom Offline: FKIP UAD
3	Budget	Rp. 33,750,000,-	Rp. 33,750,000 (100%)
4	Facilities and infrastructure	Korean Language Education Study Program, FPBS UPI Zoom meeting, laptop, and activity banner	Korean Language Education Study Program, FPBS UPI Zoom meeting, laptop, and activity banner
5	HR	3 lecturers, 1 educational staff, and 4 students	3 lecturers, 1 educational staff, and 4 students

The PkM implementation team from the Korean Language Education Study Program, Faculty of Arts and Sciences, University of Indonesia (FPBS UPI), has endeavored to align the implementation of activities with the established plan, and overall, the entire agenda ran according to schedule, despite minor adjustments. The online activities at the Faculty of Teacher Training and Education, University of Indonesia (UAD), planned for June 11 and 18, 2025, were successfully implemented, encompassing academic culture training, research preparation, and the use of AI applications. Attendance was high, and all material presentation sessions, Q&A sessions, and independent practice sessions ran smoothly thanks to effective coordination between the implementation team and partners.

The offline event on August 14, 2025, at the UAD Faculty of Teacher Training and Education Building also proceeded as planned, with the main agenda being the signing of a collaboration agreement between the two institutions, official remarks, academic discussions, and student reflections. Both the online and offline events proceeded without significant obstacles, demonstrating thorough program planning and a strong commitment from both parties to support the success of this Community Service Program.

Obstacles Faced and How to Overcome Them

The use of AI in student research preparation is supported by several important factors. The availability of technology and widespread access to various AI platforms allow students to obtain rapid assistance in formulating topics, developing background information, and locating initial references. The ease of use of AI tools, coupled with institutional support through digital literacy training and policies that encourage technology use, further strengthens its effectiveness. Furthermore, AI can improve time efficiency by providing instant feedback and helping students process information more quickly and in a structured manner.

However, the use of AI also presents several challenges that require attention. Unequal AI literacy makes it difficult for some students to propose appropriate prompts or validate the

information generated. Reliance on AI can reduce critical thinking skills, while the quality of AI output remains vulnerable to inaccuracies and false references. Ethical challenges, such as the potential for plagiarism and a lack of understanding of academic integrity, pose particular challenges. Furthermore, technical barriers related to infrastructure and language skills also impact the optimal use of AI in research preparation.

To overcome these obstacles, improving AI literacy is necessary through regular training on writing effective prompts, verifying information, and using AI platforms appropriately. Strengthening students' critical thinking skills is also crucial to prevent them from relying entirely on AI, for example through analytical assignments and reflective discussions. Furthermore, institutions need to disseminate academic ethics guidelines to prevent plagiarism and ensure the responsible use of AI. Students must also become accustomed to performing manual validation and comparing AI output with credible academic sources. Infrastructure support, such as adequate internet access and technological facilities, along with ongoing support from lecturers or mentors, are also crucial factors in ensuring optimal use of AI in research preparation.

CONCLUSION

AI utilization training has been proven to significantly improve students' research competencies, as seen by comparing pre- and post-training results. Students' understanding of scientific research procedures increased from "quite capable" to "capable-very capable," followed by improved reading skills and identifying the structure of scientific articles. Furthermore, students became more skilled at formulating research problems in a more focused and analytical manner, and were able to utilize AI to find relevant references, expedite the literature review process, and develop scientific article frameworks based on prompting techniques and appropriate academic structure. Overall, this training made students more prepared and independent in initiating and conducting undergraduate research.

Supervisors are advised to participate in similar training to provide research guidance aligned with the latest technological developments. Students also need to be guided to utilize AI not only as a technical tool but also as a means to improve critical and analytical thinking skills. Furthermore, collaboration with the faculty library is crucial to ensure access to international journals that can be combined with the use of AI in research. Students are also encouraged to create an AI-based research logbook to systematically monitor the development of ideas, references, and drafts, ensuring a more focused and well-documented research process.

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