

WORKSHOP ON DEVELOPING CLASSROOM ACTION RESEARCH PROPOSALS BASED ON ARTIFICIAL INTELLIGENCE

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Abstract. *This community service program aims to implement Artificial Intelligence (AI) as a tool to assist teachers in developing Classroom Action Research (CAR) proposals. The use of AI has significant potential to support a more adaptive, systematic, and efficient proposal-writing process, reducing the time required. Through this technology, teachers are expected to more easily formulate research problems, develop background sections, and design instructional actions for use in the classroom. In addition, the use of AI is expected to enhance teachers' confidence in conducting independent research and to promote continuous improvement in the quality of teaching and learning. The program is carried out through several stages, including a needs analysis to identify teachers' challenges, workshops and mentoring sessions on AI-based CAR proposal development, and evaluation and reflection to assess outcomes and plan future improvements. Through this program, teachers are expected not only to understand the concept of Classroom Action Research but also to be able to develop effective proposals and utilize AI appropriately in their academic activities.*

Keywords: *artificial intelligence, classroom action research, teacher professional development*

Abstrak. Program pengabdian kepada masyarakat ini bertujuan untuk mengimplementasikan kecerdasan artifisial (Artificial Intelligence/AI) sebagai alat bantu bagi guru dalam menyusun proposal Penelitian Tindakan Kelas (PTK). Pemanfaatan AI dinilai memiliki potensi besar dalam membantu proses penyusunan proposal yang lebih adaptif, sistematis, dan efisien, sehingga tidak membutuhkan waktu yang terlalu lama. Melalui penggunaan teknologi ini, guru diharapkan dapat lebih mudah merumuskan masalah, menyusun latar belakang, hingga merancang tindakan pembelajaran yang akan dilakukan di kelas. Selain itu, pemanfaatan AI juga diharapkan mampu meningkatkan rasa percaya diri guru dalam melakukan penelitian secara mandiri serta mendorong peningkatan kualitas pembelajaran secara berkelanjutan. Kegiatan pengabdian ini dilaksanakan melalui beberapa tahapan, yaitu analisis kebutuhan untuk mengetahui permasalahan yang dihadapi guru, pelaksanaan workshop dan pendampingan dalam penyusunan proposal PTK berbasis AI, serta tahap evaluasi dan refleksi untuk melihat hasil dan perbaikan ke depan. Dengan adanya kegiatan ini, guru diharapkan tidak hanya memahami konsep PTK, tetapi juga mampu menyusun proposal PTK secara efektif dan memanfaatkan AI secara tepat dalam kegiatan akademik mereka.

Kata Kunci: kecerdasan artifisial, pengembangan profesional guru, penelitian tindakan kelas

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INTRODUCTION

The rapid development of digital technology today has brought significant changes across various aspects of life, including education (Wang et al., 2024). These changes are reflected in the increasing use of technology in learning processes, including teaching activities, assessment, and classroom management (Kayhan, 2022). Digital technology is no longer merely a supporting tool but has become an essential component in creating more modern and relevant learning aligned with contemporary needs (Kovtoniuk et al., 2022). One of the emerging technologies widely used is Artificial Intelligence (AI). AI is a technology capable of assisting humans in processing information, analyzing data, and providing recommendations or solutions quickly and accurately (Ghosh & Thirugnanam, 2021; Sarker, 2022). This technology is not only utilized



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in industry but is also increasingly being adopted in education to support teachers' tasks more effectively (Almufarreh & Arshad, 2023).

In the field of education, AI can assist teachers in various ways, such as searching and processing information, developing learning materials, creating assessments, and designing more engaging and effective instructional strategies (Chen et al., 2020; Kim et al., 2022; Shah, 2023; Tang, 2024). Additionally, AI can help teachers conduct assessments more quickly and objectively, as well as provide more precise feedback to students (Hooda et al., 2022). AI also enables teachers to tailor instruction to the diverse needs and abilities of students, making the learning process more interactive, personalized, and meaningful (Almuhanna, 2025). With the integration of AI, teachers' workloads can be reduced, as tasks that previously required considerable time can now be completed more efficiently (Haderer & Ciolacu, 2022). This allows teachers to focus more on improving learning quality, mentoring students, and developing innovative teaching practices (Mea, 2024).

Beyond teaching, teachers are also expected to continuously develop their professionalism, one of which can be achieved through research activities. A common form of research conducted by teachers is Classroom Action Research (CAR). CAR is a type of research carried out by teachers in their own classrooms with the aim of improving teaching practices and enhancing student learning outcomes. Through CAR, teachers can identify classroom problems, implement appropriate solutions, and evaluate the outcomes systematically. This activity not only helps teachers gain a deeper understanding of classroom dynamics but also encourages continuous innovation in teaching practices (Pandiangan, 2020; Hasmawaty et al., 2024; Rahayu & Saskia, 2025). Thus, Classroom Action Research (CAR) becomes an important effort in improving the quality of learning as well as teachers' professional competence.

However, teachers now have significant opportunities to overcome challenges in preparing CAR proposals by utilizing Artificial Intelligence (AI) (Pambudi et al., 2023). With the assistance of AI, teachers can manage their time more effectively, access relevant references, and structure academic writing more systematically (Masjudin et al., 2026). AI can also support teachers in identifying research problems, developing background sections, formulating objectives, and designing appropriate instructional interventions based on classroom conditions (Hwang et al., 2020; Shah, 2023). Furthermore, the use of AI can enhance teachers' academic writing skills and broaden their understanding of how digital technologies can be applied in scholarly activities (Kim & Kim, 2022). Thus, the integration of AI can support classroom research to become more effective, efficient, and sustainable.

In response to these conditions, practical and adaptable solutions aligned with technological advancements are needed. One such solution is providing training for teachers on the use of AI in developing CAR proposals (Pambudi et al., 2023; Mayasari et al., 2025). Through such training, teachers are not only introduced to the basic concepts of AI but are also given opportunities for hands-on practice in using AI as a writing support tool (Kim & Kim, 2022). Teachers can learn how to use AI to formulate research problems, develop background sections, define research objectives, and design instructional interventions more effectively (Hwang et al., 2020). Additionally, the training can foster an understanding of the ethical and responsible use of AI in academic contexts (Muarifin, 2024) (Mertler, 2024).

With the support of AI, the process of writing proposals becomes easier, faster, and more systematic, thereby reducing the burden on teachers in producing academic work (AlAfnan, 2025). AI can assist in structuring writing frameworks, generating ideas, and improving grammar and sentence structure to ensure clarity and coherence (Bahari, 2025). Moreover, AI enables teachers to access relevant references quickly, minimizing the time spent searching for sources. This allows teachers to focus more on the content and quality of their proposals. More importantly, the use of AI can increase teachers' confidence in conducting research, as they have access to tools that support each stage of the writing process (Alwaqdani, 2025). Teachers also become more proactive in developing innovative teaching practices, as proposal writing is no longer perceived as a difficult burden. Therefore, the integration of AI can facilitate a more

structured and directed research process (Karolčík & Marková, 2025). Ultimately, the incorporation of AI in research and teaching activities is expected to generate sustainable positive impacts, both in enhancing teachers' professional competence and improving student learning outcomes..

METHOD

This community service activity employed a participatory approach, actively involving teachers in every stage of the program so that they were not merely participants but also directly engaged in the learning and practice processes. The activity was conducted at MTs Al Maarif 01 Singosari, Malang, using an implementation method consisting of several systematic stages: preparation, implementation, and evaluation, all designed to align with teachers' needs. During the preparation stage, the service team conducted a needs analysis to identify the difficulties faced by teachers in developing Classroom Action Research (CAR) proposals. This was carried out through discussions and identification of common issues encountered in proposal writing practices. In addition, the team prepared training materials that were relevant and easy to understand, particularly those related to the use of Artificial Intelligence (AI) as a tool to support the development of CAR proposals.



Figure 1. *The service team conducted a survey and held discussions with mathematics teachers and the principal of MTs Al Maarif 01 Singosari, Malang.*

The implementation stage was carried out through workshops and mentoring sessions. During the workshop, teachers were introduced to the basic concepts of AI, its benefits in education, and examples of its application in academic activities. In the mentoring sessions, teachers were guided directly in developing CAR proposals using AI, starting from formulating research problems, writing the background, determining research objectives, and designing research instruments. At this stage, teachers were also given opportunities to ask questions and engage in discussions to deepen their understanding.

The final stage was evaluation and reflection. In this phase, the service team systematically assessed the teachers' work and provided constructive, targeted feedback on the proposals to enhance their clarity, coherence, and overall quality. Additionally, group discussions were conducted to identify challenges encountered during the activities and to explore practical solutions for future improvement. This reflection process also aimed to measure the extent of teachers' understanding of the materials provided, as well as their ability to apply the concepts in real classroom contexts. Through this method, it is expected that teachers will not only understand the concepts of CAR and the use of AI but also be able to apply them independently and confidently in academic activities. Furthermore, this program is expected to encourage teachers to continuously develop their capacity to utilize technology in a sustainable and reflective manner, ultimately contributing to the improvement of instructional practices and the overall quality of classroom learning.

RESULT AND DISCUSSION

Classroom Action Research (CAR) is understood by teachers as a form of research that focuses on the learning process in the classroom, is conducted directly in real contexts, follows a cyclical nature, and aims to continuously improve the quality of instruction. This cyclical process typically involves stages such as planning, action, observation, and reflection, which are carried out repeatedly to achieve meaningful improvements in teaching and learning. In identifying learning problems, teachers generally engage in reflection on their teaching practices, considering both the strengths and challenges encountered during instruction. This reflection can be further strengthened through systematic observation activities, either conducted independently or collaboratively with colleagues using structured rubrics or observation sheets. Such collaboration also allows for more objective insights and shared professional learning. Observation plays an important role in recording and documenting students' activities, responses, and progress during the learning process, thereby providing valuable evidence that can inform decision-making and the design of subsequent instructional actions.

To ensure that the data obtained are more systematic and accurate, observation activities need to be supported by instruments that are designed to be simple yet effective, making them easy to use in dynamic classroom situations. In addition to observation, teachers' pedagogical experience is also an influential factor in conducting research, as it helps in interpreting data and determining appropriate improvement actions. Another important data source is students' answer sheets, which can serve as portfolios to provide a more comprehensive view of students' learning development. Furthermore, interviews with students can also be used as a data collection instrument, supported by systematically developed interview guidelines. Within the subject context, this entire series of activities forms an integrated research process that supports the continuous improvement of learning quality.



Figure 2. *Presentation of AI assistant material for developing classroom action research proposals*

One of the main strengths of this workshop lies in the practical approach delivered by the keynote speaker. Through the introduction of structured prompts in the use of artificial intelligence, participants gained new perspectives on how to develop research proposals more efficiently while still adhering to sound methodological principles (Mujica-Sequera, 2025). This approach offers a strategic alternative for teachers to optimize technology as an academic support tool that is relevant to the needs of classroom action research. In addition, the emphasis on maintaining a balance between the use of technology and the depth of scientific understanding became a crucial aspect highlighted during the session. This workshop also reflects a concrete practice of knowledge transfer between higher education institutions and schools, where academic insights are not limited to conceptual discussions but are directly implemented to address real challenges in educational settings (Utami et al., 2026). In a broader context, this activity represents a strategic contribution of the Department of Mathematics, Faculty of Mathematics and Natural Science, Malang State University in strengthening an educational ecosystem that is oriented toward innovation and the development of research-based teaching practices.



Figure 3. *Mentoring session on the practical application of AI prompts in developing classroom action research proposals*

The mentoring session on the practical application of AI prompts in developing Classroom Action Research (CAR) proposals was conducted as an effort to enhance teachers' competence in utilizing technology in a precise and purposeful manner. This activity was designed to be interactive, where participants were not only introduced to the concept of effective prompt construction but were also directly guided in applying it to each component of a proposal, including the formulation of the background, identification of research problems, and development of research methodology. Through this mentoring process, teachers gained hands-on experience in optimizing artificial intelligence as an academic support tool, enabling the proposal writing process to become more systematic, efficient, and aligned with scientific principles (Khalifa & Albadawy, 2024). Furthermore, the mentoring emphasized the importance of critical thinking skills in validating AI-generated outputs, ensuring that the resulting proposals are not only produced efficiently but also maintain strong academic quality and credibility (Papaneophytou & Nicolaou, 2025).

The use of AI in this context was framed with a strong emphasis on academic integrity, ensuring that teachers do not rely entirely on technology but remain the primary authors of their ideas and analyses (Upu et al., 2025). AI was positioned as a supportive tool to enhance the thinking process rather than replace the teacher's role in academic writing. In this regard, teachers were encouraged to actively engage with the outputs generated by AI, using them as a starting point for deeper exploration, refinement, and contextual adaptation based on their classroom realities. This approach reinforces the notion that meaningful academic work is grounded in the teacher's own understanding, experience, and critical reflection (Orak, 2025).

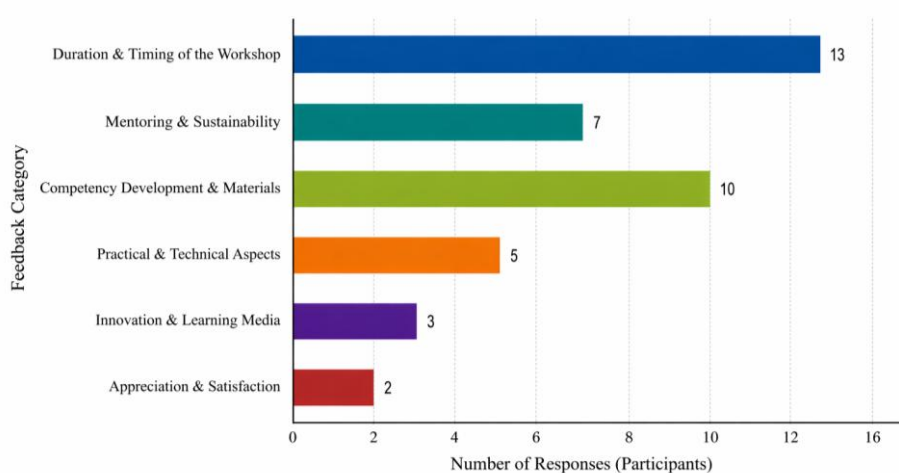
In addition, it is essential for teachers to ensure that all information used adheres to academic standards, including proper citation of sources, consistency in referencing styles, and the avoidance of plagiarism (Kotsis, 2026). Through this approach, the use of AI not only accelerates the writing process but also strengthens teachers' academic literacy and critical thinking skills. It fosters a more reflective and responsible writing practice, where efficiency does not come at the expense of quality. Ultimately, the integration of AI in academic writing supports the development of high-quality, original, and accountable scholarly work, while simultaneously empowering teachers to become more confident and competent researchers in their professional practice (Astuti et al., 2025).

Furthermore, the workshop gained deeper significance through the session on CAR proposal review. In this academic forum, each proposal submitted by participants was examined critically and constructively, fostering a productive space for scholarly dialogue (Meke et al., 2023). The discussions not only broadened participants' perspectives but also contributed to improving the quality of research design developed by teachers (Tupen et al., 2020; Sa'o et al., 2023). This process also underscored the importance of validity, relevance, and meaningfulness in research, particularly in relation to real classroom teaching practices.



Figure 4. Classroom action research proposal review session

This community service activity demonstrated positive outcomes in improving teachers' ability to develop Classroom Action Research (CAR) proposals. Based on the results of the workshop and mentoring sessions, most teachers were able to understand the fundamental concepts of CAR and began to become familiar with using Artificial Intelligence (AI) as a supporting tool in proposal writing. Teachers were able to develop key components such as the background, problem formulation, research objectives, and action plans in a more structured and coherent manner (Mertler, 2024). In addition, the use of AI helped teachers save time and simplify the writing process. Teachers who initially faced challenges in starting their proposals due to time constraints became more confident, as AI provided examples, ideas, and writing structures that they could further develop and adapt to their own research contexts (Ridwan, 2025; Wahibah, 2026).



Note. Data were obtained from the analysis of workshop participant feedback; $n = 40$ (total respondents).

Figure 5. Distribution of workshop participant feedback categories

Based on the analysis of participants' responses to the workshop, the feedback was classified into six main categories: duration and timing of implementation, mentoring and sustainability, competency development and materials, practical and technical aspects, innovation and learning media, as well as appreciation and satisfaction. The results, as visualized in the bar chart, indicate that most respondents emphasized the importance of extending the duration and improving the scheduling of the activities. In addition, the need for strengthening competency development materials and providing continued mentoring also emerged as key concerns among participants. These findings suggest that participants not only

gave positive evaluations of the workshop implementation but also expressed strong expectations regarding program sustainability, improvement in material quality, and optimization of future implementation (Kioupi et al., 2022; Husin et al., 2025).

From the evaluation and reflection results, the workshop and mentoring activities were considered effective in enhancing teachers' technological literacy. The program also encouraged teachers to be more active in developing innovations in teaching through Classroom Action Research (Bhimdiwala et al., 2022; Mertler, 2024; Vorsah, R. E., & Oppong, 2024). Thus, the use of AI not only supports the development of research proposals but also contributes to the continuous improvement of teaching and learning quality.

CONCLUSION

The community service activity conducted through workshops and mentoring on the development of Classroom Action Research (CAR) proposals based on Artificial Intelligence (AI) was successfully implemented and had a positive impact on teachers. Teachers developed a better understanding of CAR concepts and were able to prepare proposals in a more structured and systematic manner. In addition, the use of AI proved to be helpful in simplifying and accelerating the proposal writing process. This activity also increased teachers' confidence in conducting classroom research and encouraged continuous improvement in the quality of teaching and learning. As a follow-up, further mentoring is needed to support teachers in implementing the CAR proposals they have developed into actual classroom practice. Additionally, advanced training on the use of AI should be conducted so that teachers become more skilled and are able to use technology wisely without becoming overly dependent on it. Similar activities can also be expanded to other schools to broaden their impact. Furthermore, the outcomes of this program are expected to be developed into scientific publications and to encourage teachers to continuously engage in research activities.

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