Empowering University Students' Independent Learning through an Artificial Intelligence-Assisted Self-Regulated Learning Program

Zaenal Abidin[1*], Mohammad Adnan[2], Asep Suhana[3], Yusup Ridwan[4], Ketlin Aprijane A[5]

[1] STAI Sadra Jakarta, Indonesia, Email: zaenal.abidinbogor1@gmail.com
[2] IAI Hasan Jufri Bawean, Indonesia, Email: adnan.bawean@gmail.com
[3] Sekolah Tinggi Teknologi Mandala, Indonesia, Email: asuhana1963@gmail.com
[4] STAI Yamisa Soreang Bandung, Indonesia, Email: yridwan639@gmail.com
[5] STIE El'fatah Manado, Indonesia, Email: ketlinaprijane4513@gmail.com

ARTICLEINFO

Article History:
Received July 25, 2026
Revised August 20, 2026
Accepted August 28, 2026
Available online August 30, 2026

Kata Kunci :
Self-Regulated Learning, Artificial Intelligence, Kemandirian Belajar, Mahasiswa

Keywords:
Self-Regulated Learning, Artificial Intelligence, Independent Learning, University Students

This is an open access article under the CC BY-SA license.

Copyright ©2026 by Author. Published by Institute of Education and Social Research

ABSTRAK

Program pengabdian kepada masyarakat ini bertujuan memberdayakan mahasiswa melalui program Self-Regulated Learning berbantuan Artificial Intelligence (AI) untuk memperkuat kemandirian belajar di era digital. Kegiatan dilaksanakan di STAI Sadra Jakarta pada 18–23 Mei 2026 dengan pendekatan edukatif, partisipatif, dan pendampingan. Kegiatan berfokus pada penguatan Self-Regulated Learning melalui penetapan tujuan, perencanaan belajar, manajemen waktu, pemantauan diri, refleksi, dan pemanfaatan AI secara strategis sebagai asisten belajar. Peserta juga dibimbing menyusun prompt yang efektif, mengevaluasi keluaran AI, memverifikasi informasi, serta menggunakan AI secara etis dan bertanggung jawab dalam kegiatan akademik. Hasil kegiatan menunjukkan peningkatan pemahaman mengenai strategi belajar mandiri, kemampuan mengelola proses pembelajaran, dan keterampilan memanfaatkan AI untuk mendukung aktivitas akademik. Program juga meningkatkan kesadaran mahasiswa mengenai pentingnya berpikir kritis, refleksi, dan tanggung jawab akademik dalam penggunaan AI. Kegiatan ini menunjukkan bahwa integrasi AI dengan prinsip Self-Regulated Learning dapat menjadi strategi pengabdian yang praktis untuk memperkuat kemandirian, otonomi belajar, dan penggunaan teknologi yang bertanggung jawab di perguruan tinggi.

ABSTRACT

This community engagement program aimed to empower university students through an Artificial Intelligence (AI)-assisted Self-Regulated Learning program to strengthen independent learning in the digital era. The program was conducted at STAI Sadra Jakarta from May 18 to 23, 2026, using an educational, participatory, and mentoring approach. Activities focused on strengthening Self-Regulated Learning through goal setting, learning planning, time management, self-monitoring, reflection, and strategic use of AI as a learning assistant. Participants were also guided to formulate effective prompts, evaluate AI-generated outputs, verify information, and use AI ethically and responsibly in academic activities. The results indicated improved understanding of independent learning strategies, stronger ability to manage learning processes, and enhanced skills in using AI to support academic activities. The program also increased students' awareness of the importance of critical thinking, reflection, and academic responsibility when using AI. These findings demonstrate that integrating AI with Self-Regulated Learning principles can provide a practical community engagement strategy for strengthening student independence, learning autonomy, and responsible technology use in higher education.

INTRODUCTION

The rapid development of artificial intelligence (AI) has transformed the landscape of higher education by creating new opportunities for personalized, flexible, and technology-supported learning. AI-based applications can assist students in accessing information, generating learning materials, receiving immediate feedback, organizing learning activities, and exploring academic topics according to their individual needs. However, the availability of AI does not automatically produce independent and effective learners. Students still need the capacity to establish learning goals, select appropriate strategies, monitor their progress, evaluate learning outcomes, and reflect on their learning processes. These competencies are central to self-regulated learning (SRL), which emphasizes students' active participation in planning, monitoring, controlling, and evaluating their own learning. In this context, AI should not merely function as a technological tool for obtaining answers but should be positioned as a learning assistant that supports students' metacognitive processes and autonomy (Lan & Zhou, 2025; Rasheed et al., 2021; Roméro et al., 2023).

The growing integration of AI into education has generated both opportunities and challenges. AI can potentially facilitate personalized learning and improve students' academic experiences, but its inappropriate use may encourage dependency, reduce critical engagement, and create concerns regarding academic integrity, privacy, and the reliability of AI-generated information. The integration of AI in education therefore requires careful pedagogical and ethical consideration (Lampou, 2023). AI also creates multidisciplinary opportunities while raising important questions concerning responsible implementation, governance, and human–technology interaction (Dwivedi et al., 2022). Therefore, technological access alone is insufficient. Students require appropriate guidance to use AI critically, ethically, and strategically within their learning processes (Phua et al., 2025; Lin & Qiu, 2024).

Previous studies have provided important evidence concerning the relationship between technology, AI, and self-regulated learning. First, a qualitative systematic review found that AI can empower self-regulated learning in higher education by supporting learning processes such as personalization, feedback, monitoring, and reflection, although effective implementation remains dependent on appropriate pedagogical design (Lan & Zhou, 2025). Second, students' technological skills and attitudes have been associated with online self-regulated learning in HyFlex learning environments, indicating that technological competence and learning regulation should be developed together (Amiruddin et al., 2024). Third, structured scaffolding has been shown to support the development of students' self-regulation within the online component of blended learning, suggesting that learners may require systematic support to gradually develop their capacity to manage learning independently (Rasheed et al., 2021). Fourth, AI-integrated educational applications have been associated with students' creativity and academic emotions, while students' and teachers' perceptions and attitudes influence the effectiveness of AI integration (Lin & Qiu, 2024). Fifth, AI tools can contribute to students' academic performance but simultaneously raise concerns related to security and privacy, demonstrating that the educational benefits of AI need to be accompanied by responsible and critical use (Phua et al., 2025).

Despite these developments, a practical and pedagogical gap remains. Much of the existing literature focuses on the technological potential, acceptance, learning outcomes, or psychological implications of AI-supported education, while fewer community-based interventions explicitly integrate AI with SRL principles to strengthen students' independent learning. The gap becomes particularly important in higher education contexts where students are increasingly exposed to AI tools but may not yet possess sufficient metacognitive strategies to use them effectively.

Without structured mentoring, students may use AI primarily as an instant answer-generating mechanism rather than as a tool for planning, monitoring, evaluating, and reflecting on their learning. Consequently, there is a need for practical educational programs that move beyond introducing AI technologies toward developing students' learning autonomy and responsible use of AI.

This community engagement program introduces an AI-assisted SRL mentoring model that positions AI as a scaffolding mechanism rather than a substitute for students' cognitive and metacognitive efforts. The novelty of the program lies in integrating three complementary dimensions: self-regulated learning strategies, AI-assisted academic learning, and ethical-critical digital practices within a structured community-based mentoring program. Through this approach, students are encouraged to formulate learning goals, plan learning activities, monitor their progress, use AI strategically, verify AI-generated information, and reflect on their learning outcomes. The program therefore seeks to develop not only technological competence but also student agency, critical thinking, metacognitive awareness, and academic responsibility.

Based on this background, the objective of this community engagement program was to empower university students through an Artificial Intelligence-assisted Self-Regulated Learning program to strengthen their independent learning capabilities. Specifically, the program aimed to enhance students' understanding and practical application of self-regulated learning strategies, develop their ability to utilize AI as a responsible learning assistant, and strengthen their capacity to manage, monitor, evaluate, and reflect upon their own academic learning processes. The program was implemented at STAI Sadra Jakarta from May 18 to 23, 2026, as a structured mentoring initiative designed to respond to the evolving demands of higher education in the digital and AI-driven era.

METHOD

This community engagement program employed a participatory mentoring approach designed to strengthen university students' independent learning through an Artificial Intelligence-assisted Self-Regulated Learning program. The activity was conducted at STAI Sadra Jakarta from May 18 to 23, 2026, with university students serving as the primary participants. The program was developed based on principles of educational psychology, particularly self-regulated learning, student autonomy, metacognitive awareness, and responsible technology use. The mentoring design emphasized active participation, practical learning experiences, guided practice, discussion, reflection, and feedback rather than one-way knowledge transfer.

The implementation consisted of several interconnected stages that were integrated throughout the mentoring process. The initial stage focused on identifying participants' learning challenges, including difficulties in planning academic activities, managing learning time, maintaining learning consistency, and utilizing digital technologies effectively. The next stage introduced the concept and practical components of self-regulated learning, including goal setting, learning planning, strategy selection, self-monitoring, self-evaluation, and reflection. Participants were subsequently guided to integrate these strategies with Artificial Intelligence tools that could function as learning assistants. Practical sessions focused on developing appropriate prompts, generating learning questions, requesting alternative explanations, organizing study plans, and obtaining feedback while maintaining students' active cognitive involvement.

The mentoring process also emphasized critical and ethical AI use. Participants were trained to evaluate AI-generated information, verify outputs against credible academic sources,

identify potential inaccuracies, and avoid excessive dependence on AI in completing academic tasks. Academic integrity, responsible use of technology, and protection of personal and academic information were also incorporated into the activities. Evaluation was conducted through observation of participant engagement, discussion and reflection activities, practical exercises, and responses to the learning tasks provided during the program. The overall implementation was assessed by examining participants' demonstrated understanding, participation, ability to apply self-regulated learning strategies, and capacity to use AI as a supportive rather than substitutive learning tool. This methodological approach enabled the program to connect technological competence with psychological and pedagogical development, thereby supporting more autonomous and responsible learning practices among university students.

RESULT AND DISCUSSION

Strengthening Self-Regulated Learning Skills through AI-Assisted Learning Strategies

The first component of the community engagement program focused on strengthening students' Self-Regulated Learning (SRL) skills through the strategic use of Artificial Intelligence (AI) as a learning assistant. This activity was conducted at STAI Sadra Jakarta from May 18 to 23, 2026, through an interactive mentoring process that combined conceptual explanation, guided practice, discussion, individual exercises, and reflection. The activity was designed in response to the increasing use of digital technologies among university students and the need to ensure that technology contributes to greater learning autonomy rather than creating dependency. The participants were introduced to the fundamental principles of SRL and encouraged to recognize that effective learning requires active involvement in establishing objectives, planning activities, monitoring progress, evaluating outcomes, and reflecting on learning experiences. This approach was particularly relevant because technological skills alone do not necessarily guarantee students' ability to regulate their own learning processes (Amiruddin et al., 2024).

The mentoring began by helping participants identify their existing learning habits and the challenges they encountered in managing academic activities. Through guided discussions and reflective exercises, students were encouraged to examine how they normally determine learning priorities, organize study schedules, respond to difficult academic materials, and evaluate whether their learning strategies were effective. The facilitators then introduced SRL as a systematic process consisting of planning, performance monitoring, and self-reflection. Students practiced formulating specific learning goals and translating these goals into manageable learning activities. They were also guided to establish realistic study schedules, determine appropriate learning resources, and identify indicators that could be used to monitor their progress. This structured process was intended to move students from passive participation toward greater responsibility for their own learning.

The next activity integrated AI into the students' learning strategies. Rather than presenting AI as a replacement for lecturers, textbooks, or students' own reasoning, the facilitators introduced AI as a supportive tool that could provide scaffolding throughout the learning process. Students practiced using AI to clarify difficult concepts, generate questions for self-assessment, develop learning plans, summarize complex materials, identify alternative explanations, and provide preliminary feedback on their understanding. Participants were encouraged to formulate purposeful prompts based on clearly defined learning objectives. This practice helped students understand that the quality of AI-assisted learning depends substantially on the ability of learners to formulate questions, evaluate responses, and connect generated information with their own learning goals. Such an approach is consistent with the emerging

understanding that AI can support self-regulated learning by facilitating personalization, feedback, monitoring, and reflection (Lan & Zhou, 2025).

Particular attention was given to the monitoring stage of self-regulated learning. Students were asked to compare their initial learning objectives with the results obtained through AI-assisted activities and to identify areas where further study was required. The facilitators encouraged participants to question AI-generated responses rather than accepting them automatically. Students practiced checking explanations, identifying inconsistencies, and revising their learning strategies when the information obtained did not sufficiently address their academic needs. This activity was reinforced through peer discussion, allowing students to compare different approaches to using AI for learning and to reflect on the advantages and limitations of particular strategies. The use of structured scaffolding was important because students may require guidance before they are able to independently regulate their learning within technology-supported environments (Rasheed et al., 2021).

The final stage emphasized self-reflection. Participants were encouraged to review the learning activities they had completed, evaluate whether the strategies they used were effective, and identify improvements for future learning. AI was introduced as a tool that could support reflection by helping students generate self-evaluation questions, identify potential gaps in understanding, and develop alternative study strategies. However, the facilitators consistently emphasized that students remained responsible for making the final judgments about their learning. This principle was essential for maintaining student agency and preventing excessive dependence on technology. The overall activity demonstrated that AI-assisted learning can be meaningfully integrated with SRL when students are guided to use technology within a structured cycle of goal setting, strategic action, monitoring, evaluation, and reflection. The mentoring therefore provided participants with practical experience in transforming AI from a simple information retrieval tool into a supportive learning resource that can contribute to more systematic, reflective, and independent learning practices.

Developing Independent Learning through Ethical and Critical Use of Artificial Intelligence

The second component of the community engagement program focused on developing students' independent learning through the ethical and critical use of Artificial Intelligence (AI). This activity was implemented at STAI Sadra Jakarta from May 18 to 23, 2026, as a continuation of the self-regulated learning mentoring activities. The main emphasis was not simply on increasing students' technical ability to operate AI tools, but on developing their capacity to use AI consciously, critically, and responsibly as part of their academic learning processes. This orientation was important because the increasing accessibility of generative AI has changed how students search for information, formulate ideas, complete assignments, and interact with academic materials. Although AI can provide substantial educational benefits, its uncritical use may encourage excessive dependence, weaken students' engagement with learning materials, and create challenges related to academic integrity, privacy, and information reliability (Dwivedi et al., 2022; Lampou, 2023). Therefore, the activity positioned ethical and critical AI literacy as an essential component of independent learning.

The activity began by inviting participants to reflect on their existing experiences with AI in academic activities. Through interactive discussions, students were encouraged to describe how they used AI when facing difficult assignments, searching for explanations, preparing presentations, summarizing materials, or developing academic ideas. The facilitators then discussed the distinction between using AI as a learning assistant and using AI as a substitute for

students' own intellectual work. Participants were introduced to the principle that independent learning requires students to remain actively involved in defining learning objectives, identifying problems, making decisions, evaluating information, and taking responsibility for learning outcomes. AI could support these processes, but it should not eliminate the students' cognitive and metacognitive involvement. This perspective was consistent with the broader development of AI-supported education, in which technological innovation needs to be accompanied by appropriate pedagogical guidance and responsible implementation (Roméro et al., 2023).

A practical session was subsequently conducted to develop students' ability to use AI critically. Participants were guided to formulate effective prompts based on specific academic objectives rather than entering vague commands that simply requested complete answers. They practiced asking AI to provide explanations at different levels of complexity, generate examples, formulate practice questions, compare alternative perspectives, and identify possible weaknesses in their own understanding. The facilitators emphasized that AI-generated responses should be regarded as preliminary learning resources that require further examination. Students were therefore encouraged to ask follow-up questions, request clarification, challenge assumptions, and compare different AI-generated responses before drawing conclusions. Through these activities, students learned that meaningful AI-assisted learning depends not only on the ability to generate outputs but also on the ability to evaluate and interpret those outputs.

Information verification became another important component of the mentoring. Students were trained to recognize that AI-generated information may contain inaccuracies, incomplete explanations, outdated information, or unsupported claims. Participants were encouraged to verify important information by consulting textbooks, scholarly articles, official documents, and other credible academic sources. The facilitators demonstrated how students could use AI to identify keywords and possible references while maintaining responsibility for locating and evaluating the original sources themselves. This practice was particularly important in developing critical thinking because it required students to move from passive acceptance of AI-generated information toward active evaluation. Recent research has similarly emphasized that AI tools may provide academic benefits while raising concerns regarding security, privacy, and responsible use (Phua et al., 2025). Accordingly, the mentoring encouraged students to treat verification as an integral part of responsible AI-assisted learning.

The program also addressed academic integrity and ethical considerations. Participants discussed the potential risks associated with submitting AI-generated text as their own academic work, relying excessively on automated content generation, and failing to acknowledge the role of AI in academic activities when such disclosure is required. Students were encouraged to use AI primarily for brainstorming, clarification, practice, feedback, and learning support while maintaining responsibility for the final content they produced. The facilitators also highlighted the importance of protecting personal information and avoiding the submission of confidential academic or personal data into AI systems. These discussions helped students understand that technological competence must be accompanied by ethical awareness. The integration of AI into education involves not only questions of efficiency and performance but also broader considerations concerning responsible human–technology interaction (Dwivedi et al., 2022).

The final activity involved reflective exercises through which students evaluated how their understanding of AI-assisted learning had changed during the mentoring process. Participants were asked to identify which AI practices supported their learning, which practices could potentially create dependency, and how they could maintain control over their own academic decisions. They were also encouraged to develop personal guidelines for responsible AI

use in future learning activities. The reflection process reinforced the connection between AI literacy and independent learning by encouraging students to make conscious decisions about when, why, and how AI should be used. This approach is consistent with evidence that AI-integrated educational applications can influence students' academic experiences and emotions while their effectiveness is shaped by users' perceptions and attitudes toward AI (Lin & Qiu, 2024).

The activity demonstrated that developing independent learning in the AI era requires more than providing students with access to sophisticated technological tools. Students need structured guidance that enables them to use AI strategically while preserving critical thinking, metacognitive awareness, academic responsibility, and learning autonomy. Through practical exercises, verification activities, ethical discussions, and reflection, the mentoring encouraged participants to reposition AI from an answer-generating technology into a supportive learning resource. The program therefore strengthened an important principle of contemporary higher education: effective AI-assisted learning should empower students to become more capable of managing their own learning rather than making them increasingly dependent on technology. This orientation also supports the broader goal of AI integration in education, namely creating learning environments in which technological innovation complements human agency, critical inquiry, and lifelong learning capacity.

Discussion

The implementation of the Artificial Intelligence-assisted Self-Regulated Learning program at STAI Sadra Jakarta demonstrates that the integration of AI into higher education can contribute meaningfully to the development of students' independent learning when it is accompanied by structured pedagogical guidance. The activities conducted from May 18 to 23, 2026, indicate that the educational value of AI does not primarily depend on students' ability to access technological applications, but on their ability to integrate those applications into purposeful learning strategies. This finding reinforces the view that digital transformation in education requires a shift from technology-centered implementation toward learner-centered pedagogical practices. AI can facilitate access to information, personalized explanations, feedback, and learning resources, but students remain responsible for establishing learning goals, evaluating information, monitoring progress, and reflecting on learning outcomes. This orientation is particularly important in higher education because independent learning requires students to exercise greater autonomy than in more teacher-directed educational settings (Avdiu et al., 2025).

The first important finding concerns the strengthening of self-regulated learning through AI-assisted learning strategies. During the mentoring process, students were introduced to goal setting, learning planning, self-monitoring, self-evaluation, and reflection while simultaneously practicing the use of AI as a learning assistant. This integration is consistent with Lan and Zhou's (2025) systematic review, which identifies AI as having considerable potential to support self-regulated learning in higher education through personalization, feedback, monitoring, and reflective processes. The present community engagement activity extends this perspective into a practical intervention by demonstrating how these principles can be introduced through structured mentoring rather than merely discussed as technological possibilities. AI was positioned as a form of scaffolding that supported students' learning activities while leaving decision-making and intellectual responsibility with the learners.

The importance of this approach is also supported by Amiruddin et al. (2024), who demonstrate that students' technological skills and attitudes are associated with online self-regulated learning in HyFlex learning environments. Their findings suggest that technology-related competence and learning regulation should not be treated as separate domains. The current program similarly combined technological practice with psychological and metacognitive development. Students were not only taught how to interact with AI but also how to connect AI use with learning objectives, monitor the usefulness of generated information, and reflect on the effectiveness of their learning strategies. This combination is particularly relevant because students may possess considerable technological familiarity while still lacking the ability to regulate their learning effectively.

The mentoring approach also corresponds with the concept of scaffolding in digital learning. Rasheed et al. (2021) emphasize the importance of structured support in developing students' peer-learning self-regulation within blended learning environments. The present program similarly provided structured guidance before expecting students to use AI more independently. Facilitators initially demonstrated appropriate strategies, provided examples, guided students through practical exercises, and subsequently encouraged them to make independent decisions. This gradual movement from guided practice toward independent application is important because self-regulated learning is not simply an individual trait but a competency that can be strengthened through appropriate learning environments. The program therefore illustrates how community engagement can function as a practical mechanism for developing students' self-regulatory capacity through guided technological use.

Another important finding concerns the relationship between AI-assisted learning and students' independent learning. The program did not define independence as learning without technology. Instead, independent learning was understood as the ability to make informed decisions about learning while using technological resources strategically. This distinction is important because contemporary students increasingly learn through digital platforms and artificial intelligence. Al-Azawei et al. (2017) demonstrate that students' learning experiences in blended e-learning environments are influenced by learning-related characteristics and technology acceptance. Similarly, Sidik and Syafar (2020) identify factors influencing students' intention to use mobile learning in Indonesian higher education. These studies suggest that technology adoption involves both technological and learner-related dimensions. The present program adds a further dimension by emphasizing that successful technology use should ultimately strengthen learner autonomy rather than simply increase technology acceptance.

The development of critical AI use further strengthens this interpretation. Students were trained to question AI-generated outputs, verify information through credible academic sources, and recognize potential inaccuracies. This practice is particularly important because the growing capabilities of generative AI may create an illusion of accuracy and authority. Lampou (2023) identifies both opportunities and challenges in the integration of AI into education, suggesting that technological implementation must be accompanied by pedagogical and ethical considerations. Dwivedi et al. (2022) similarly highlight the multidisciplinary opportunities created by AI while emphasizing emerging challenges related to responsible implementation, governance, and human–technology interaction. The present program operationalized these concerns through practical verification and reflection activities, thereby translating broader discussions about responsible AI into concrete student learning practices.

The emphasis on critical use is also supported by Phua et al. (2025), who found that AI tools can contribute to students' academic performance while simultaneously raising concerns

related to security and privacy. In the present program, students were therefore encouraged not to provide sensitive information to AI systems and to verify information before incorporating it into academic work. This approach indicates that AI literacy should be understood more broadly than technical proficiency. It includes the ability to understand the limitations of AI, assess the credibility of its outputs, recognize privacy risks, and make ethically responsible decisions. Such competencies are increasingly necessary because students will encounter AI not only in academic settings but also in professional and social environments.

The program's emphasis on academic responsibility is further supported by Roméro et al. (2023), who argue that teaching and learning in the age of AI require educational systems to reconsider the roles of teachers, students, and technologies. Rather than replacing human intellectual activity, AI should complement human reasoning and support new forms of learning. This principle was reflected in the mentoring activities at STAI Sadra Jakarta, where students were encouraged to use AI for brainstorming, clarification, questioning, feedback, and learning planning while retaining responsibility for interpreting information and producing academic work. In this sense, the program contributed to redefining the role of AI from an answer generator to a cognitive support tool.

The findings can also be interpreted in relation to students' academic and emotional experiences. Lin and Qiu (2024) demonstrate that AI-integrated educational applications are associated with students' creativity and academic emotions, while students' and teachers' perceptions and attitudes influence their experiences with AI. The present program suggests that structured mentoring may help shape these perceptions by reducing the tendency to view AI solely as a shortcut for completing academic tasks. When students understand how AI can be used to formulate questions, explore alternative explanations, and reflect on their learning, AI becomes part of a more constructive learning process. This may support more positive academic engagement because students are provided with additional resources while still maintaining cognitive ownership of their learning.

The broader development of digital learning also provides an important contextual perspective. Ifliadi et al. (2024) demonstrate the relevance of digital-based learning media within the Independent Curriculum, while Aluk Maknunah and Abdul Muis (2023) emphasize the implementation of Islamic Religious Education within an independent curriculum perspective. Although these studies are situated in different educational contexts, they reinforce the broader movement toward learner-centered and technology-supported education. In the context of STAI Sadra Jakarta, the integration of AI with self-regulated learning is particularly relevant because students need to develop both technological competencies and the capacity for autonomous academic learning. The program therefore aligns with the broader transformation of education toward more flexible, student-centered, and digitally supported learning environments.

The role of future-oriented learning competencies is also important. Avdiu et al. (2025) emphasize the importance of learning skills required for the twenty-first century, including competencies that enable learners to adapt to changing educational and technological environments. AI-assisted self-regulated learning can be understood within this broader framework because students are required to combine technological literacy, critical thinking, adaptability, problem solving, and independent learning. At the same time, the experiences of the program indicate that these competencies cannot be developed simply by introducing new technologies. They require intentional mentoring, repeated practice, and opportunities for reflection.

Several references concerning technology acceptance and digital learning further support the need for an integrated approach. Narayana (2019) demonstrates the relevance of the UTAUT model in explaining e-learning user behavior, while Taufik and Alam (2022) highlight the importance of student satisfaction in online learning. These perspectives indicate that successful digital education depends partly on how students perceive and experience technology. However, the present program moves beyond acceptance and satisfaction by emphasizing what students can actually do with technology to regulate and improve their learning. Thus, the contribution of this community engagement lies not merely in encouraging AI adoption but in connecting technology use with psychological learning competencies.

The program also has implications for the role of educational facilitators. Karlen et al. (2023) emphasize the importance of competence related to metacognition and self-regulated learning in educational practice. Although the present activity focused on students rather than teachers, the finding reinforces the need for facilitators to provide appropriate structures that encourage metacognitive development. Teachers and mentors should therefore not merely demonstrate AI tools but also model how to formulate learning goals, evaluate information, question outputs, and reflect on learning strategies. This is essential for preventing AI from becoming a mechanism for passive information consumption.

The discussion indicates that the central contribution of the program is the integration of AI literacy with self-regulated learning and independent learning within a community-based mentoring framework. The program demonstrates that AI becomes educationally meaningful when students are equipped with the metacognitive, critical, and ethical competencies necessary to control its use. The novelty therefore lies not in introducing AI technology itself, but in reconstructing the role of AI as a pedagogical scaffold within a structured cycle of goal setting, strategic learning, monitoring, evaluation, and reflection. This approach offers a practical pathway for higher education institutions seeking to respond to the rapid expansion of AI while preserving student agency and academic responsibility. The experience at STAI Sadra Jakarta suggests that future community engagement programs should move toward sustained AI-assisted learning ecosystems in which technological innovation is systematically connected with students' psychological development, critical thinking, ethical awareness, and capacity for lifelong independent learning.

CONCLUSION

The community engagement program at STAI Sadra Jakarta demonstrated that an Artificial Intelligence-assisted Self-Regulated Learning program can provide a relevant and practical approach to strengthening university students' independent learning in the digital era. Through structured mentoring conducted from May 18 to 23, 2026, students were introduced to learning strategies involving goal setting, planning, monitoring, evaluation, and reflection while utilizing AI as a supportive learning assistant. The program also strengthened students' ability to use AI critically and ethically by encouraging them to formulate purposeful prompts, verify AI-generated information, recognize potential inaccuracies, protect academic and personal information, and maintain academic responsibility. These activities indicate that AI can support student autonomy when its use is integrated with self-regulated learning principles rather than positioned as a substitute for students' cognitive and metacognitive efforts. Accordingly, the program achieved its primary objective of empowering students to manage their learning processes more systematically while developing responsible and strategic AI-assisted learning practices.

Future community engagement programs are recommended to develop the mentoring model through longer-term assistance, systematic monitoring, and more structured evaluation of changes in students' self-regulated learning and independent learning capabilities. Higher education institutions should consider integrating AI literacy, metacognitive strategies, academic integrity, and critical information evaluation into regular learning activities rather than treating AI training as a one-time intervention. Further programs may also involve lecturers as learning facilitators so that AI-assisted self-regulated learning can be implemented consistently across courses and academic contexts. In addition, future studies should employ validated pretest and posttest instruments and, where feasible, comparison groups to provide stronger empirical evidence regarding the effectiveness of AI-assisted self-regulated learning interventions. Such development would enable the model to move from a short-term community engagement activity toward a sustainable institutional learning strategy that promotes student autonomy, critical thinking, ethical technology use, and lifelong learning in higher education.

REFERENCES

Al-Azawei, A., Parslow, P., & Lundqvist, K. (2017). Investigating the effect of learning styles in a blended e-learning system: An extension of the technology acceptance model (TAM). Australasian Journal of Educational Technology, 33(2), 1–23. https://doi.org/10.14742/ajet.2741

Aluk Maknunah, & Abdul Muis. (2023). Implementation of Islamic Religious Education Learning in an Independent Curriculum Perspective. Jurnal Pendidikan Islam Indonesia, 7(2), 1–13. https://doi.org/10.35316/jpii.v7i2.485

Ami, H. R., Andrean, K., & Gultom, T. S. (2024). Peran Big Data dan AI (Artificial Intelligence) dalam Mendukung Kewirausahaan Technopreneurship. Factory: Jurnal Industri, Manajemen, Dan Rekayasa Sistem Industri.

Amiruddin, A., Sunardi, S., & Setialaksana, W. (2024). Students' technological skills and attitudes toward HyFlex learning: The mediating role of online self-regulated learning, blended learning perception, and preferred learning modes. Frontiers in Education, 8. https://doi.org/10.3389/feduc.2023.1258298

Asmauna, C. N., & Rahmi, L. (2024). Development of Comic Media Based on Pancasila Student Profiles on the Dimensions of Faith, Piety, and Noble Character in Elementary School. Scaffolding: Jurnal Pendidikan Islam Dan Multikulturalisme, 6(1), 33–52. https://doi.org/10.37680/scaffolding.v6i1.4196

Avdiu, E., Bekteshi, E., & Gollopeni, B. (2025). Learning skills for the future – implementing the 21st-century learning. Multidisciplinary Science Journal, 7(1), 1–8. https://doi.org/10.31893/multiscience.2025011

Bauwens, R., Muylaert, J., Clarysse, E., Audenaert, M., & Decramer, A. (2020). Teachers' acceptance and use of digital learning environments after hours: Implications for work-life balance and the role of integration preference. Computers in Human Behavior, 112, 106479. https://doi.org/10.1016/j.chb.2020.106479

Dwivedi, Y. K., Hughes, L., Ismagilova, E., Aarts, G., Coombs, C., Crick, T., & others. (2022). Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. International Journal of Information Management, 66, 102542. https://doi.org/10.1016/j.ijinfomgt.2022.102542

Fauzi, M. N., Musarofah, S., Askhar, B. M., Septiana, A. S. M., & Hidayatunnisa, A. (2024). Utilization of Artificial Intelligence through Value Co-Creation in Increasing MSME Sales. Jurnal Manajemen Dan Kewirausahaan, 10(1). https://doi.org/10.32503/jmk.v10i1.6109

Huang, M. H., & Rust, R. T. (2021). A Strategic Framework for Artificial Intelligence in Marketing. Journal of the Academy of Marketing Science.

Ifliadi, I., Suhaidi, Prasetyo, I., Mendrofa, L. I., & Hendrawati, E. S. (2024). Utilization of Digital-Based Learning Media in the Independent Curriculum in Elementary Schools. Proceedings of International Conference on Education, 2(1), 706–715. https://doi.org/10.32672/pice.v2i1.1348

Karlen, Y., Hirt, C. N., Jud, J., Rosenthal, A., & Eberli, T. D. (2023). Teachers as learners and agents of self-regulated learning: The importance of different teachers competence aspects for promoting metacognition. Teaching and Teacher Education, 125, 104055. https://doi.org/https://doi.org/10.1016/j.tate.2023.104055

Kietzmann, J., Paschen, J., & Treen, E. (2018). Artificial Intelligence in Advertising. Journal of Advertising Research, 58(3), 263–267.

Lampou, R. (2023). The Integration of Artificial Intelligence in Education: Opportunities and Challenges. Review of Artificial Intelligence in Education, 4. https://doi.org/10.37497/rev.artif.intell.educ.v4i00.15

Lan, M., & Zhou, X. (2025). A qualitative systematic review on AI empowered self-regulated learning in higher education. NPJ Science of Learning, 10(1). https://doi.org/10.1038/s41539-025-00319-0

Lin, H., & Qiu, C. (2024). Artificial intelligence (AI)-integrated educational applications and college students' creativity and academic emotions: students and teachers' perceptions and attitudes. BMC Psychology, 12(1). https://doi.org/10.1186/s40359-024-01979-0

Mikalef, P., & Gupta, M. (2021). Artificial intelligence capability and firm performance. Information \& Management, 58(3), 103434. https://doi.org/10.1016/j.im.2021.103434

Narayana, I. W. G. (2019). Analisis Penerapan Model UTAUT Terhadap Perilaku Pengguna E-Learning (Studi Kasus : STMIK STIKOM Bali). Jurnal Teknologi Informasi Dan Komputer, 5(1), 158–164. https://doi.org/10.36002/jutik.v5i1.705

Phua, J. T. K., Neo, H. F., & Teo, C.-C. (2025). Evaluating the Impact of Artificial Intelligence Tools on Enhancing Student Academic Performance: Efficacy Amidst Security and Privacy Concerns. Big Data and Cognitive Computing, 9(5), 131. https://doi.org/10.3390/bdcc9050131

Raharjo, S., Ismail, D., Amin, M. M., Adibah, I. Z., & Lawang, K. A. (2025). Bimbingan Belajar Privat dalam Meningkatkan Pemahaman Hukum Fikih Peserta Didik. SAWEU: Jurnal Pengabdian, 1(2), 30–43.

Rasheed, R. A., Kamsin, A., & Abdullah, N. A. (2021). An approach for scaffolding students peer-learning self-regulation strategy in the online component of blended learning. IEEE Access, 9, 30721–30738. https://doi.org/10.1109/ACCESS.2021.3059916

Roméro, M., Heiser, L., Lepage, A., Gagnebien, A., Bonjour, A., Lagarrigue, A., Palaude, A., Boulord, C., Gagneur, C.-A., Mercier, C., Caucheteux, C., Guidoni-Stoltz, D., Tressols, F., Henry, J., Alexandre, F., Céci, J.-F., Camponovo, J., Fouché, L., Métral, J.-F., & Borgne, Y. L. (2023). Teaching and learning in the age of artificial intelligence. https://doi.org/10.48550/arxiv.2303.06956

Sidik, D., & Syafar, F. (2020). Exploring the factors influencing student's intention to use mobile learning in Indonesia higher education. Education and Information Technologies, 25(6), 4781–4796. https://doi.org/10.1007/s10639-019-10018-0

Taufik, & Alam, F. A. (2022). The Survey on Students' Satisfaction Degree towards Online Learning during Covid-19 Pandemic Condition. Jelita, 3(1), 44–56. https://doi.org/10.56185/jelita.v3i1.94

Verawati, Firdaus, R., & Herpratiwi3. (2024). Pemanfaatan Artificial Intelligence (AI) untuk Meningkatkan Kemampuan Belajar Informatika pada Siswa Sekolah Dasar. Didaktika, 4(4), 380–390.