

Implementation of Artificial Intelligence (AI) in HyFlex-Based Final Project Guidance

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Abstract

This study aims to analyze the application of artificial intelligence (AI) in HyFlex-based final project guidance and identify the challenges experienced by supervisors and students during the process. The research uses a mixed methods approach involving 12 supervisors and 38 students who actively use AI in the preparation of thesis. Data collection was carried out through structured questionnaires and in-depth interviews, then analyzed using descriptive statistics and qualitative analysis techniques of the Miles & Huberman model. The results showed that the majority of students (94.7%) used AI to help prepare thesis, especially in compiling writing frameworks, improving grammar, understanding theory, and speeding up the revision process. Lecturers also use AI, but more carefully, especially to provide examples of writing improvements and help clarify basic concepts. Although AI has been shown to improve the effectiveness of HyFlex tutoring, both groups face different challenges: students tend to face technical barriers such as unstable networks, device limitations, AI answer errors, and difficulty creating precise prompts; while lecturers face academic challenges such as false references, theoretical inaccuracies, and the risk of student dependence on AI. Overall, the study concludes that AI has great potential to improve the quality, flexibility, and efficiency of final project guidance, but its use still requires strong digital literacy, academic verification, and clear ethical guidelines.

Keywords: Artificial Intelligence, Final Project Guidance, HyFlex.

INTRODUCTION

The development of artificial intelligence technology (AI) has brought significant changes in various areas of life, including in the world of higher education. Artificial intelligence is not only a tool in the learning process, but also serves as a strategic instrument in supporting complex academic activities such as research, writing final projects, and student guidance

processes. AI has analytical capabilities that are able to understand, process, and provide data-based recommendations quickly and accurately, thus potentially increasing the effectiveness and efficiency of academic activities (Ningrum et al., 2024). In the context of modern higher education, AI is an essential element in building an adaptive, personalized, and flexible learning system, in line with 21st-century learning principles.

One of the learning models relevant to AI integration is the Hybrid-Flexible (HyFlex) model. This model combines online and offline learning approaches flexibly, giving students the freedom to choose the learning method that best suits their needs and conditions. HyFlex creates a learning space that is not only based on place and time, but also based on choice and technological adaptation. In the context of academic guidance, the HyFlex model can facilitate students and supervisors to interact synchronously or asynchronously with the support of digital platforms. When AI technology is integrated into the HyFlex model, an intelligent, interactive, and efficient guidance system is formed (Azari & Satriyawan, 2024).

The application of artificial intelligence in the final project guidance process is very important because students often face various obstacles in completing their scientific work. Some of the challenges commonly faced include difficulty understanding theory, limitations in finding relevant academic references, and lack of quick feedback from supervisors. AI can serve as a virtual assistant that helps students navigate these difficulties through features such as writing structure recommendations, text quality analysis, and automated literature search. Previous research has shown that the application of AI, such as ChatGPT and other natural language processing-based systems, can improve the efficiency of reference search, speed up the process of preparing academic reports, and increase student satisfaction with the quality of guidance (Hilal et al., 2024).

In addition, the use of AI in final project guidance also has a positive impact on student learning motivation. This technology allows students to get direct feedback, manage guidance timing, and control the progress of preparing final projects independently. This is in line with the findings of Hilal et al. (2024) who affirm that students who utilize artificial intelligence in the thesis preparation process show increased intrinsic motivation and higher confidence in completing their research. Thus, AI not only serves as a technical tool, but also as a psychological catalyst that encourages students to stay consistent and productive.

From the perspective of academic literacy, artificial intelligence also has a significant contribution. Suriani et. al (2025) stated that AI technology is able to help students analyze academic texts, understand literature faster, and adjust learning strategies according to individual understanding levels. In the context of final project guidance, this ability allows students to identify argumentative or logical errors in their writing and correct them independently before obtaining input from the supervisor. This certainly accelerates the revision cycle, improves the quality of scientific papers, and simplifies the evaluation process for supervisors.

In terms of technical implementation, the application of AI in the HyFlex-based guidance model can be realized through a web-based academic guidance information system. Research by (Rosman et al., 2021) developed an online thesis guidance system that allows interaction between students and lecturers without space and time limitations. The integration of AI in the system can expand its functionality through automatic detection of plagiarism, recommendations for writing styles according to academic formats, and automatic warnings against citation errors.

This model not only improves administrative efficiency, but also supports pedagogical effectiveness and academic quality.

Institutional policies also play an important role in the application of this technology. Based on the 2022 Academic Regulations of the State University of Makassar (UNM), Academic Advisor (PA) lecturers have the obligation to guide students in preparing study plans and monitoring their academic development. AI can act as a co-assistant advisor that assists lecturers in providing data-based recommendations, for example by analyzing students' academic tendencies, providing course suggestions that are appropriate to their abilities, and identifying the risk of late completion of studies. In addition, Article 29 of the same regulation stipulates that every student must have two thesis supervisors. In this context, the application of AI can complement the role of the supervisor by providing real-time feedback that accelerates the consultation cycle and reduces the administrative burden on lecturers (UNM Academic Regulations, 2022).

Furthermore, the integration of AI and HyFlex is also aligned with the vision of post-pandemic higher education that emphasizes flexibility, digitalization, and efficiency of academic processes. Universities are now faced with the demand to create a guidance model that is adaptive to the changing learning styles of digital generation students. The AI-based HyFlex model addresses this need by offering a student-centered approach, where interactions not only occur in person but also through intelligent systems that are able to provide personalized feedback and recommendations automatically. Thus, this model does not simply replace conventional interactions, but substantially enriches students' learning experiences (Rahmadani et al., 2022).

In terms of practical benefits, the application of AI in HyFlex-based final project guidance not only accelerates the completion of student studies, but also assists educational institutions in improving the efficiency of academic management. The data obtained from AI-based systems can be used to conduct quality analysis, identify barriers to mentorship, and design policies to improve academic services that are more responsive. (Wahab, 2024) emphasized that the use of AI in the context of higher education is able to encourage a more productive and innovation-based academic culture. Students are no longer completely dependent on face-to-face time, but can instead receive continuous guidance through an interactive digital system.

Based on the description above, the application of artificial intelligence in HyFlex-based final project guidance is a strategic step in realizing digital transformation in higher education. This integration between technology and pedagogy opens up great opportunities to improve the quality, flexibility, and inclusivity of the academic guidance process. This research specifically aims to analyze the implementation of AI in HyFlex-based final project guidance, identify the challenges faced by lecturers and students, and evaluate the impact of its application on the effectiveness, efficiency, and satisfaction of students. Thus, the results of the research are expected to make an empirical and conceptual contribution to the development of modern academic guidance models that are in line with the needs of higher education in the digital era.

METHOD

This study uses a mixed method approach because the data collected comes from a combination of quantitative questionnaires and qualitative open-ended questions. Data was obtained through two Google Form instruments, namely a questionnaire for supervisors (12

respondents) and a questionnaire for thesis guidance students (38 respondents) who were involved in the HyFlex-based guidance process and using artificial intelligence (AI). The instrument contains questions about the use of AI, perceptions of its use in guidance, perceived benefits, technical barriers, and potential misunderstandings. Quantitative data was analyzed using descriptive statistics in the form of frequency and percentage of each answer choice, while qualitative data was analyzed through data reduction and theme grouping according to the Miles & Huberman model to find patterns of experiences and challenges that arose both from the lecturer and student sides (Miles & Huberman, 1994).

Quantitative analysis was carried out using Microsoft Excel to calculate the distribution of answers in each indicator and determine the tendency of the effectiveness of AI implementation. Meanwhile, qualitative analysis was carried out by reviewing respondents' narratives regarding the benefits of AI, such as accelerating corrections, improving guidance efficiency, and ease of understanding the material and obstacles that arise, such as digital literacy, networking, language, and AI misinterpretation. Data validation is carried out through source triangulation, which is comparing findings between groups of lecturers and students to ensure the consistency of the phenomenon. The entire research process follows academic ethics by maintaining the confidentiality of the respondents' identities and ensuring that the data is used only for scientific purposes.

FINDINGS

The results of this study were obtained from two groups of respondents, namely 12 supervisors and 38 students who are undergoing HyFlex-based final project guidance and using artificial intelligence (AI) in the thesis preparation process. This interview consisted of two main questions, namely (1) How to apply artificial intelligence in the guidance of Hyflex-based students' final projects; and (2) What are the challenges experienced by lecturers and students in applying artificial intelligence in Hyflex-based final project guidance? The following are the results of the interview between lecturers and students:

How to apply artificial intelligence in the guidance of final project students based on Hyflex

On the first question:

"Do you use artificial intelligence (AI) in the thesis preparation process? Explain how you use it."

Most students (94.7%) use AI in their thesis preparation to help with various academic needs, such as structuring writing, improving grammar, finding difficult theoretical explanations, drafting arguments, making outlines, and tidying up drafts. Only a few students (5.3%) do not or only minimally use it. These findings show that AI has become an important part of their writing strategy, not only supporting the technical aspects but also helping to speed up revisions and deepen theoretical understanding, thereby improving the quality of writing and making the thesis completion process more efficient.

On the second question:

"How does AI help you in the thesis revision process?"

As many as 34 out of 38 students (89%) stated that AI is very helpful in the thesis revision process, especially in improving grammar, sentence structure, writing logic, as well as tidying up paragraphs and theoretical explanations before being examined by lecturers. Meanwhile, another 4 students (11%) felt that AI only helped in certain situations. Students found that AI speeds up revisions because they can get feedback without waiting for guidance, for example by making sentences more academic or reinterpreting lecturers' directions. These findings show that AI acts as an *effective pre-feedback tool* in helping students prepare a neater thesis draft before consultation with the supervisor.

On the third question:

"How do you apply the HyFlex model (combined online and offline) in the mentoring process?"

Of the 38 students, 29 (76%) applied a combination of online and offline guidance (HyFlex), 8 students (21%) were more dominant in using online, and only 1 student (3%) was completely offline. HyFlex's usage patterns look adaptive, such as sending drafts via WhatsApp, receiving brief revision notes, and then making face-to-face clarifications when needed. Many students explain that they often do tutoring via Google Meet or Zoom when they are unable to attend on campus, but still have in-person meetings for major revisions or in-depth discussions. The students' statements show that the HyFlex approach helps them manage their time, speed up the mentorship process, and still maintain the quality of interaction. These findings confirm that the HyFlex model allows for efficient and flexible communication without eliminating the essence of direct guidance.

Fourth question:

"To what extent does AI replace or complement the role of lecturers in the mentoring process?"

Of the 38 respondents, 36 students (94.7%) affirmed that AI does not replace the role of lecturers, but only helps complete basic explanations, while 2 students (5.3%) assessed that AI can replace a small part of initial functions such as theoretical clarification. Students use AI to understand material and improve writing, but still rely on lecturers for methodological direction, academic decisions, and scientific assessment. Their statement shows the awareness that AI has limitations in understanding the context and ethics of research, so lecturers remain the main reference in the mentoring process.

Fifth question:

"What are the main obstacles you face when using AI in thesis preparation?"

Of the 38 students, the main obstacles in the use of AI were mainly technical. A total of 5 respondents complained about the limitations of devices such as slow laptops or mobile phones, 4 respondents experienced internet network problems, 3 respondents experienced language barriers because AI often answers in formal English, and 1 respondent faced digital literacy constraints, especially in providing the right prompts. Complaints such as "unstable network," "HP is slow to respond," or "AI gives too general answers" indicate that the effectiveness of using AI is greatly influenced by the quality of the device, internet connection, and the ability of students to make optimal use of technology.

Interviews with 12 supervisors were conducted to explore their views on the application of artificial intelligence (AI) in the guidance of HyFlex-based students' final projects.

In the first question, "***Do you use artificial intelligence (AI) in the process of student thesis guidance?***", as many as 10 lecturers stated that they use AI, while 2 lecturers said they do not use it. Lecturers who use AI explained that they use the technology to correct students' language mistakes, help speed up student analysis, and make it easier to give initial directions before face-to-face tutoring sessions are carried out. One of the lecturers said that AI is used to improve grammatical elements and rearrange student sentences that are not well structured. In contrast, lecturers who do not use AI say that they rely more on traditional methods and conventional reference sources.

On the second question, "***What do you think about students using AI in their final assignments?***", all lecturers gave a response that tended to be cautious but accepting. The majority of lecturers are of the view that the use of AI is allowed as long as students continue to validate the results of AI and do not use it as the only source of information. One of the lecturers emphasized that students must remain critical and not rely entirely on AI because this technology does not always provide accurate references or according to the academic context. Another lecturer also said that the use of AI actually helps students understand concepts, but students still have to read original literature so that academic quality is maintained.

On the third question, "***Does AI affect the effectiveness of thesis guidance?***", as many as 11 out of 12 lecturers stated that AI affects the effectiveness of tutoring, especially in terms of accelerating the initial review process and improving the quality of students' thesis language. Some of the answers that are representative include: "It is especially influential in improving grammatical problems," and "AI is quite helpful in making students' writing easier to read." However, a lecturer said that AI is not fully effective because students often do not understand the content of the theory in depth if they only rely on the results of AI.

The fourth question, "***Have you ever found errors or inconsistencies in the work of students who use AI?***", got the answer that all lecturers (12 lecturers) had found the discrepancy. Frequently found errors include inaccurate references, overly general theoretical explanations, and unclear sources of reference presented by AI. One lecturer emphasized that AI often produces fake citations, while another lecturer mentioned that the discussion structure sometimes does not match the academic standards of the department. These findings demonstrate the need for robust digital and academic literacy to verify AI output.

On the last question, "***How do you respond to the integration of HyFlex and AI in the student thesis guidance process?***", most lecturers gave positive responses. Two lecturers stated that the HyFlex integration is very helpful because it allows guidance to take place more flexibly and efficiently through a combination of online and offline. One of the lecturers mentioned that the hybrid model plus the flexibility of AI creates a faster and superior mentoring process. However, there are also lecturers who admit that they still do not understand the concept of HyFlex, and suggest that the use of AI should be accompanied by clear academic ethics so that students do not abuse technology.

Overall, lecturer interviews show that AI has a significant role in supporting the final project guidance process, especially in the technical refinement of student writing and communication efficiency. However, the lecturer still emphasized the importance of manual checking, source

verification, and academic accuracy so that the final thesis results are not only neat in language, but also correct in scientific substance.

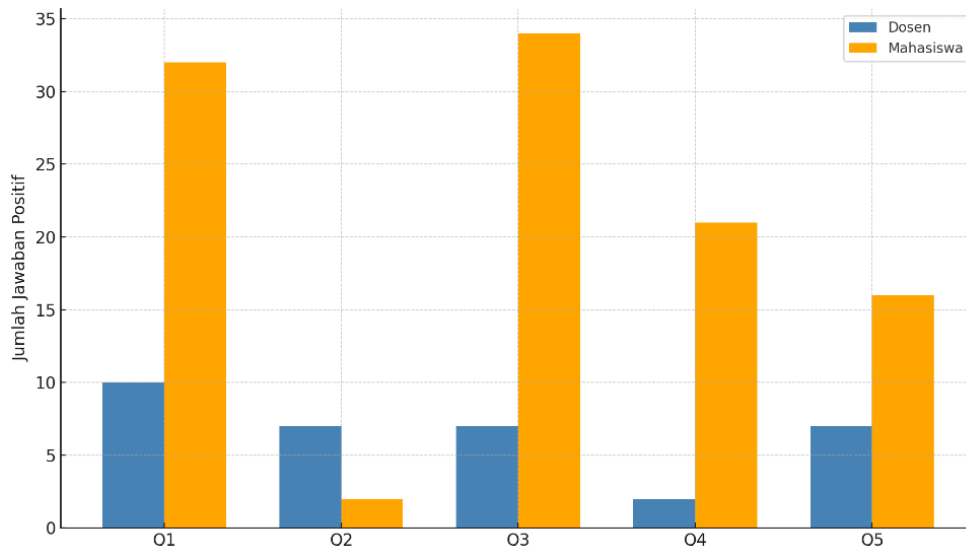


Figure 1. Comparison of Lecturers and Students' responses to the application of AI

The comparison graph shows that students have a much higher tendency to have positive answers than lecturers on five interview questions related to the application of artificial intelligence (AI) in HyFlex-based final project guidance. Students are more likely to use AI to understand theories, improve language, and speed up revisions, while lecturers show a more cautious and critical acceptance, especially regarding the accuracy and ethics of using AI. Students also seem to be more quick to adapt to the integration of AI and the HyFlex model, while lecturers still view AI as a useful tool but still require verification and academic direction. Overall, the graph confirms that the rate of adaptation and acceptance of AI in the tutoring process is much higher in students than in lecturers.

What are the challenges experienced by lecturers and students in applying artificial intelligence in Hyflex-based final project guidance?

The results of interviews with 38 students showed that they faced various challenges in applying artificial intelligence (AI) to the HyFlex-based thesis preparation process. In the first question regarding *"What are your main difficulties when using AI in thesis preparation?"*, most college students say they experience misinformation, incorrect AI answers, or overly generic explanations. Many respondents gave answers such as *"The answer is sometimes wrong"* and *"AI often doesn't fit the context of my thesis"*, which illustrates that the quality of AI output is not always reliable. The second question related to *AI errors or biases* reinforced the findings, as the majority of students admitted to having encountered incorrect theoretical interpretations or invalid references. On the third question, *"Is there a gap in technology knowledge with your lecturers?"*, some students said yes, especially that lecturers understand how to use technology correctly, while students are still learning to optimize prompts and verify AI answers. The fourth question about *technical barriers* shows that students experience the most problems with internet

networks, inadequate devices, and digital literacy, as described in answers such as *"Network and digital literacy"* or *"Inadequate applications"*. Finally, in the fifth question about *misunderstandings due to the use of AI*, most students admitted to having experienced it, for example because AI provides answers that are unclear or different from the lecturer's direction. Overall, these interviews show that although AI helps students in the thesis preparation process, they still face challenges related to the accuracy of AI outputs, technical barriers, and the need to combine technological capabilities with academic guidance provided by lecturers.

The results of interviews with 12 supervisors showed that they faced various challenges in applying artificial intelligence (AI) to the HyFlex-based final project guidance process. In the first question, *"What are your main difficulties when students use AI in thesis preparation?"*, most lecturers stated that students often come with AI results that are not yet understood, such as automatic answers that are directly used as the content of the thesis without analysis. Answers such as *"They immediately ask the AI to make an explanation"* and *"It is difficult to determine the originality"* indicate that lecturers are worried that students are becoming too dependent on AI to ignore academic analysis skills. In the second question about *AI errors or biases*, all lecturers admitted that they had found it, such as false references, inaccurate theories, or writing structures that did not meet standards. The lecturer mentioned, *"I can easily detect student work created by AI,"* suggesting that the use of AI without supervision risks lowering academic quality.

Furthermore, in the third question about *the technology knowledge gap*, some lecturers explained that students often understand the use of AI better than lecturers, but this understanding is not always followed by good academic literacy skills. Regarding the fourth question about *technical obstacles*, the majority of lecturers mentioned obstacles to the internet network, device limitations, and uneven digital literacy of students. Examples of answers that appear include, *"Networks usually lack support"* and *"Students' digital literacy is still low."* In the last question about *misunderstandings that arise due to the use of AI*, almost all lecturers answered that they have never experienced any significant problems, but some mentioned that students sometimes misunderstand guidance instructions because they rely too much on AI answers. Overall, these interviews show that lecturers view AI as a useful tool, but still emphasize the importance of academic control, methodological understanding, and prudence in validating the results provided by AI.

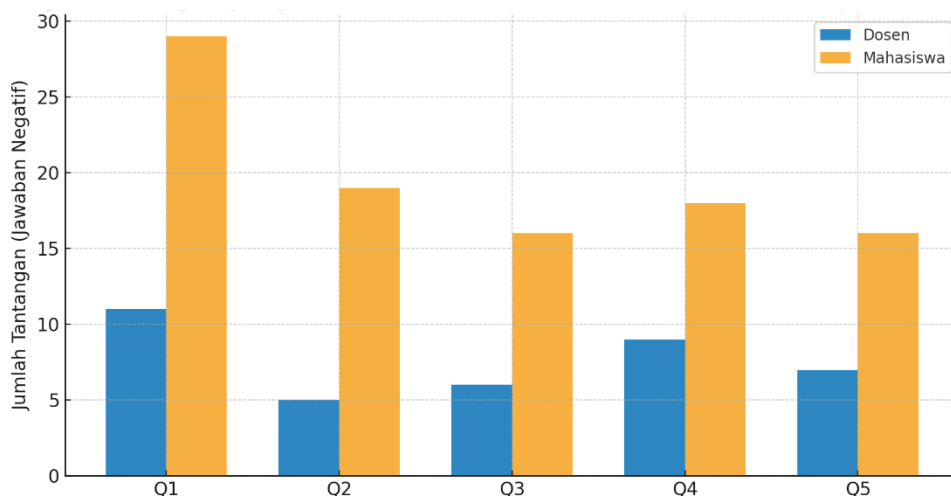


Figure 2. Comparison of lecturer and student responses to challenges in applying AI in HyFlex-based final project guidance

This graph shows that students face higher challenges than lecturers in five interview aspects related to the application of artificial intelligence in HyFlex-based final project guidance. Students reported more obstacles such as AI output errors, answer bias, mismatches in the thesis context, network problems, and device limitations. In contrast, lecturers noted fewer challenges, especially related to the academic validity of AI such as false references and theoretical inaccuracies. In general, students experience technical challenges and practical use, while lecturers focus more on academic and ethical challenges.

DISCUSSIONS

The results show that the application of artificial intelligence (AI) in HyFlex-based final project guidance has had a significant impact on both students and lecturers, despite the differences in the level of utilization and challenges faced by the two groups. The findings show that students use AI more intensively in the thesis preparation process—such as helping them understand theory, improving language, speeding up revisions, and drafting writing frameworks—than lecturers who use AI primarily as a correction and clarification tool. This pattern is in line with research by Ningrum et al. (2024) who found that college students tend to leverage AI to improve academic efficiency and speed up the completion of complex tasks. In addition, the use of AI that is considered to help revisions (89% of students) is in line with the findings of Hilal et al. (2024) who stated that AI strengthens student motivation and productivity in writing final projects.

In the context of HyFlex tutoring, the majority of students (76%) combine online and offline approaches, which suggests that the flexibility of this model matches the needs of current students. This is consistent with the HyFlex concept developed by Beatty (2019), which provides flexible options for students without compromising the quality of learning. AI then plays a role in strengthening HyFlex's flexibility by providing self-access to theory explanations, corrections, and drafting, which makes the mentoring process more efficient.

However, challenges in using AI remain significant. Students face technical obstacles such as inadequate devices, unstable internet networks, AI answer errors, and limitations in providing

the right prompts. Lecturers face different challenges, namely related to academic quality, such as fake citations, inaccurate theoretical concepts, and concerns about students' dependence on AI. This concern is supported by research by Azari & Satriyawan (2024), which confirms that AI has the potential to generate inaccurate information that needs to be verified. Lecturers also emphasized that AI cannot replace their role in methodological aspects, scientific validation, and the formation of students' critical thinking—in line with the view of Rahmadani et al. (2022) who stated that digital technology must remain within the pedagogical control of lecturers.

Meanwhile, both lecturers and students acknowledge the risk of misunderstanding in the use of AI, especially when students interpret AI answers without understanding the context of the research methodology or the lecturer's direction. This underscores the importance of strong digital literacy, especially the ability to assess, validate, and readjust AI answers to academic standards. Research by Suriani et al. (2025) also underlines that the use of AI without adequate academic literacy can reduce the quality of learning outcomes.

Overall, this discussion shows that AI has an important role in increasing the effectiveness of HyFlex-based thesis guidance, especially for students who need technical and conceptual support. However, the effectiveness of using AI still depends on students' ability to verify information, device and network support, and the active role of lecturers in maintaining academic quality. Therefore, the use of AI needs to be balanced with ethical guidelines, increasing digital literacy, and strengthening the role of lecturers as academic directors.

CONCLUSIONS

This study concludes that the application of artificial intelligence (AI) in HyFlex-based final project guidance has a positive influence on the effectiveness of the thesis preparation process, especially for students who use AI to understand theories, improve language, develop frameworks, and speed up revisions. Students show a higher level of adaptation to the use of AI than lecturers, while lecturers view AI as a useful tool but still require academic verification and ethics of its use. Nonetheless, both groups faced different challenges: students were primarily constrained by devices, internet networks, and inaccuracies in AI answers, while lecturers highlighted academic issues such as false references, AI bias, and students' potential dependence.

Overall, this study confirms that AI can be an effective support in the HyFlex guidance model if used proportionately, verified, and guided by lecturers. Strengthening digital literacy, improving understanding of methodologies, and ethical guidelines for the use of AI are needed so that this technology can support the quality of academic guidance without reducing the scientific integrity of students' final projects.

The overall findings demonstrate that AI has become deeply embedded in students' academic workflows, serving not only as a tool for technical improvement but also as a cognitive aid that supports conceptual understanding and independent learning. The high adoption rate among students reflects a growing shift toward technology-assisted academic practices, where AI accelerates task completion and enhances the accessibility of academic resources. Conversely, lecturers' more cautious use indicates an emphasis on preserving academic rigor and ensuring that AI-generated inputs do not compromise methodological depth or theoretical accuracy. This differing level of reliance suggests the need for balanced AI integration that upholds academic standards while leveraging technological efficiency.

Findings from both students and supervisors also emphasize that AI implementation within a HyFlex model is most effective when supported by adequate infrastructure, robust academic verification mechanisms, and active supervisory engagement. The HyFlex system enables flexible interaction, yet its success is highly dependent on stable internet connectivity, device readiness, and strong digital literacy skills. The challenges reported—such as misinformation generated by AI, technical disruptions, and gaps in prompt-crafting abilities—indicate that AI literacy must be treated as a core academic competency. Likewise, the lecturers' concerns regarding false citations and inaccurate theoretical explanations highlight the need for structured guidance and institutional oversight in AI-assisted writing.

This study also underscores the importance of developing institutional policies that regulate ethical AI usage in academic guidance. Clear frameworks are needed to define acceptable levels of AI assistance, establish verification procedures, and prevent overreliance that may hinder students' analytical development. Future implementations should integrate AI not as a replacement for academic mentorship but as a complementary tool that enhances pedagogical effectiveness. Universities should therefore invest in AI literacy training, technological support systems, and standardized evaluation tools to ensure that AI contributes positively to the quality, integrity, and efficiency of final project supervision. These measures will allow the HyFlex-AI model to evolve into a sustainable and academically accountable guidance ecosystem.

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