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Exploring University Students' Perceptions of AI: Insights from Indonesia

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Abstract:
Artificial Intelligence (AI) is transforming education massively. As AI increasingly integrates into a learning environment, understanding students' opinions is crucial for optimizing its usage in higher education contexts. This study explores the perceptions and experiences of first-semester university students in Indonesia regarding artificial intelligence within the context of higher education. This research investigates students' views on their motivation to use AI and its perceived advantages and disadvantages. Through a case study approach, this study used semi-structured interviews with 50 first-semester students at a private university In Indonesia. The study reveals a complex insight. This study uncovers students' experience trying AI for their learning and their enthusiasm for re-using it. This study also uncovers students' motivation to use AI. Students recognize AI's potential to enhance learning, simplify academic tasks, and foster lifelong learning. However, they also express concerns about AI's accuracy, the potential for diminished critical thinking skills, ethical implications, and accessibility issues. The findings underscore the need for comprehensive AI literacy education in Indonesian universities, emphasizing technical skills, ethical considerations, critical thinking, and responsible AI usage. Moreover, this contributes to the growing body of knowledge on AI in education and provides valuable insights for educators and policymakers seeking to integrate AI into higher education in Indonesia effectively.

Key words: Advantage, AI, Disadvantage, Motivation, Perception, University Students

Introduction

Modern technology innovation now relies heavily on artificial intelligence (AI), which has an impact on a number of industries, including healthcare, finance, education, and entertainment. There is a lot of interest among academics, decision-makers, and the general public in the quick adoption of AI technologies. Even if the technological developments of AI have received a lot of attention, it is equally important to comprehend how people view and use new technologies, especially in educational settings where future leaders and professionals are being prepared (Zawacki-Richter et al., 2019).

University students, especially first-semester students, represent a unique demographic for studying perceptions of AI. As newcomers to higher education, these students are not only adapting to new academic and social environments but also encountering technologies that will shape their future careers. Their initial perceptions of AI can provide valuable insights into how early experiences with AI influence learning and engagement. In the context of Indonesia, a country with a burgeoning youth population and a rapidly evolving digital landscape, understanding first-semester students' perceptions of AI is particularly relevant. Indonesia's strategic push towards digital transformation, encapsulated in initiatives such as "Making

Indonesia 4.0" (Ministry of Industry, 2019) (Ministry of Industry, 2018), underscores the importance of equipping young people with the skills and attitudes necessary to thrive in an AI-driven world.

The body of research shows that students' perceptions and knowledge of AI are becoming increasingly problematic. According to research, for example, students frequently lack thorough understanding of AI, which might result in misconceptions and worry about how it will affect their academic subjects (Jha et al., 2022). As demonstrated by studies showing that medical students, for instance, are not well-informed on AI's potential applications in healthcare, this knowledge gap is especially noticeable among students from a variety of academic fields (Jha et al., 2022; Mehta et al., 2021). Similarly, a comparative study revealed that students studying management and business administration were more aware of AI applications than their educational counterparts, indicating that perceptions are greatly influenced by disciplinary environment (Almaraz-López et al., 2023). Furthermore, students' perceptions of AI are significantly influenced by sociodemographic characteristics. Studies show that factors like age, gender, and educational background can have a big impact on how students see AI technologies (Pellas, 2023; Alwadani et al., 2024). For example, compared to first-year students and their female counterparts, male students and those in higher academic years exhibit more positive opinions about AI (Alwadani, 2024). This shows how exposure to AI-related content may improve students' comprehension and acceptance of these technologies as they advance in their academic careers.

The educational context in Indonesia presents unique challenges and opportunities for integrating AI into the curriculum. The current educational landscape is marked by a rapid shift towards digital learning environments, accelerated by the COVID-19 pandemic. This transition has necessitated the incorporation of technology in teaching methodologies, yet many students still express apprehension about the implications of technology in their academic pursuits (Batubara et al., 2021). Additionally, the need for effective training and support systems is underscored by findings that indicate students who have undergone AI training exhibit more favorable attitudes toward its use (Pellas, 2023; Kim, 2023). Therefore, it is imperative to explore how educational institutions can facilitate AI literacy among students, particularly in the early stages of their academic careers.

In addition, it is impossible to ignore how experiential learning influences students' views on AI. Students' comprehension and adoption of AI technology can be greatly improved by practical experiences, according to studies (Kim, 2023). This supports the idea that hands-on AI experience can close the knowledge gap between theory and practice, improving students' perspectives. Therefore, the purpose of this case study is to examine how much experiential learning opportunities Indonesian first-semester students have access to and how these experiences affect their opinions about artificial intelligence.

It is therefore pertinent and crucial to investigate how Indonesian university students see artificial intelligence. The purpose of this case study is to explore the intricacies of first-semester students' attitudes and experiences with AI technologies. In addition to adding to the body of literature already in existence, the results will offer insightful information to educators and legislators who are looking to improve the integration of AI in higher education. As the educational landscape changes, it will be crucial to comprehend how students view AI to create an atmosphere that encourages creativity and learning.

Review of Literature

Artificial Intelligence (AI) integration in education has attracted a lot of attention lately, especially as educational institutions look to improve learning outcomes and get students ready for a technologically advanced future. The purpose of this review of the literature is to summarise the body of knowledge regarding how Indonesian first-semester university students interpret artificial intelligence. This study

highlights the gaps that need to be filled by examining several facets of AI literacy, attitudes towards AI, and the implications of AI in educational contexts.

The importance of AI literacy in contemporary schooling is becoming more widely acknowledged. It includes knowledge of the ethical ramifications and societal effects of AI technologies in addition to the technical proficiency needed to use them. According to Khalifa and Albadawy (2024), attitudes towards AI are favourably correlated with knowledge of AI ethics, indicating that promoting AI literacy can have a big impact on students' opinions. Furthermore, teaching students about AI applications and ethical issues is crucial for appropriate use in a variety of settings. Additionally, Almaraz-López et al. (2023)supports actual use cases to boost students' confidence in using AI technology, echoing the need for comprehensive AI education.

The integration of artificial intelligence (AI) in education has emerged as a transformative force, reshaping pedagogical practices, learner interactions, and educational management. This literature review synthesizes recent findings on the implications of AI in educational contexts, focusing on its applications, ethical considerations, and the evolving role of educators. AI's integration into educational frameworks is characterized by its ability to personalize learning experiences, enhance engagement, and improve educational outcomes. For instance, Sari and Purwanta (2021) highlight that AI can effectively support STEM-based creative learning by fostering collaborative environments that adapt to diverse learning needs. Similarly, Makarenko et al. (2024) discusses how AI shapes the learning paths of future professionals, emphasizing the necessity for ethical guidelines to protect student data and ensure transparency in AI algorithms. This ethical dimension is echoed by Seo et al. (2021) who call for clear guidelines to mitigate potential risks associated with AI in education, thereby enhancing trust between students and instructors.

The digital transformation facilitated by AI has led to the emergence of blended learning models that combine online and offline educational experiences. Shenkoya and Kim outline three models of blended learning in higher education, which can be tailored to specific educational outcomes (Shenkoya & Kim, 2023). This flexibility allows institutions to adapt their teaching strategies to better meet the needs of students, a sentiment supported by Zheng (2022), who notes that AI can create multi-dimensional learning scenarios that enhance the timeliness and effectiveness of education. Furthermore, the integration of AI in educational management has been shown to streamline processes and improve decision-making, as discussed by Siminto et al. (2023) in the context of higher education management.

However, the integration of AI is not without challenges. Ethical concerns regarding the use of AI in education are paramount (Klimova et al., 2023). The need for educators to adapt to these technological changes is critical. Teachers are required to develop new skills to effectively harness AI technologies, ensuring that they remain central to the educational process even as AI takes on more instructional roles (Makarenko, 2024). Moreover, the impact of AI on learner-instructor interactions is profound.

Utilization of AI for Education in Indonesia

In Indonesian higher education, improving the learning process is one of the main uses of AI. Isnaini & Muslimin, 2024 highlights the necessity for colleges to overcome reluctance to adopt new technology as she explores how AI may enhance marketing communication within educational institutions. Future efforts to deploy AI in higher education can be informed by the study's highlights of tactics like teaching and training that highlight the advantages of AI. Likewise, Popenici & Kerr (2017) capture wider effects of AI on teaching and learning are examined by Popenici and Kerr (2017), who contend that new developments

in AI may reinterpret the role of teachers and improve student engagement through individualised learning opportunities.

Additionally, Indonesia is using AI technologies to help in language acquisition. Alharbi (2023) gives a summary of automated writing aids and argues for an ecological viewpoint that takes societal and equity factors into account when implementing them. The study highlights how AI can help with language learning while simultaneously addressing the requirement for learner autonomy in the classroom. By showing how AI language models, like ChatGPT, might enhance foreign language writing abilities in multicultural classrooms, Athanassopoulos et al. (2023) provides more evidence in favour of this idea. This incorporation of AI tools creates a more dynamic and engaging learning environment in addition to improving learning results.

Indonesian universities have focused their research on how AI affects academic achievement. To evaluate the impact of AI on learning outcomes in the Scientific Indonesian Language course at PGRI Wiranegara University, Sugianti and Rosidah (2024) use both quantitative and qualitative methodologies. The results show that integrating AI improves students' academic performance, and the qualitative information shows how instructors and students see AI's contribution to education. A thorough grasp of AI's efficacy in improving educational results is provided by this dual approach.

Additionally, ethical issues related to AI in education are receiving more attention. Juanda and Afandi (2024) investigates how Indonesian college students' text comprehension skills are affected by AI-generated content. Concerns are raised by the study regarding how AI might affect academic integrity and the necessity of precise rules for moral AI use in classrooms. This supports Niraula's (2024) findings concerning the value of encouraging academic integrity and deterring plagiarism through the prudent application of AI technologies.

Method

The research design for this study is a descriptive case study, which allows for an in-depth exploration of students' perceptions within their natural educational context. By employing both quantitative surveys and qualitative interviews, the study aims to triangulate data to enhance the validity and reliability of the findings.

Participants

The participants for this study were first-semester University students enrolled in various programs at a private university in Indonesia. A total of 50 students were recruited through purposive sampling. The selection criteria included their intake in the university and their exposure to internet.

Data Collection Methods

Semi-Structured Interviews

Following the completion of the survey, a subset of 50 participants was chosen to participate in semi-structured interviews to gain deeper insights into their perceptions of AI tools in educational contexts. The selection process prioritized diversity in demographic backgrounds, including age, gender, and educational level, as well as varying degrees of familiarity with AI technologies. This approach ensured a broad representation of perspectives, enabling a more comprehensive understanding of how different individuals interact with and perceive AI in educational settings. The interviews were designed to complement the

quantitative data from the survey by providing richer, qualitative insights into participants' experiences and attitudes.

Interview Protocol

The semi-structured interviews were conducted using a carefully designed interview protocol that included a series of open-ended questions. These questions were crafted to encourage participants to share detailed accounts of their experiences with AI tools in education. The protocol focused on several key areas, such as participants' personal experiences using specific AI tools, including ChatGPT and other educational applications. By employing open-ended questions, the interviews allowed participants to elaborate on their thoughts, providing nuanced perspectives that might not have been captured through the survey alone. This approach ensured that the data collected was both comprehensive and reflective of the participants' authentic experiences.

The interviews specifically explored participants' perceptions of the advantages and disadvantages of AI in learning environments. Participants were asked to reflect on how AI tools had impacted their educational experiences, including any benefits they observed, such as enhanced learning efficiency or personalized support, as well as any challenges or drawbacks, such as concerns about over-reliance on technology or ethical considerations. By focusing on these key areas, the study aimed to uncover both the potential and limitations of AI in education, as perceived by those who directly engage with these tools. This qualitative approach provided valuable context to the survey findings, offering a more holistic understanding of the role of AI in modern educational practices.

Data Analysis

The data collected from the semi-structured interviews were analyzed using a thematic analysis approach, which is a widely used method for identifying, analyzing, and reporting patterns within qualitative data. The process began with the transcription of all interview recordings to ensure accuracy and completeness. These transcripts were then systematically coded using an inductive coding approach, allowing themes to emerge organically from the data rather than being predetermined. Initial coding involved breaking down the text into meaningful segments and assigning descriptive labels to capture key ideas, experiences, and perceptions expressed by participants. This step ensured that the analysis remained grounded in the participants' own words and perspectives.

Following the initial coding, the data were further analyzed to identify recurring patterns and connections between codes, which were then grouped into broader themes. These themes reflected the central insights related to participants' experiences with AI tools in education, including their perceived advantages, disadvantages, and personal reflections. To ensure rigor and reliability, the coding and thematic development process involved multiple iterations and discussions among the research team, allowing for cross-verification of interpretations. The final themes were then interpreted in the context of the study's research objectives, providing a nuanced understanding of how participants perceive and interact with AI in educational settings. This qualitative analysis complemented the survey findings, offering a deeper exploration of the complexities and nuances surrounding the use of AI in education.

Findings

Demography of the Participants

The demographic profile of the research participants provides important context for understanding the findings of the study. The study focused on first-year University students, a group typically aged between

18 and 20 years, who were enrolled in Faculty of Education. The study revealed a significant gap in their exposure to and familiarity with artificial intelligence (AI), as highlighted in the chart titled "Sudah pernah coba AI?" (Have you ever tried AI?).

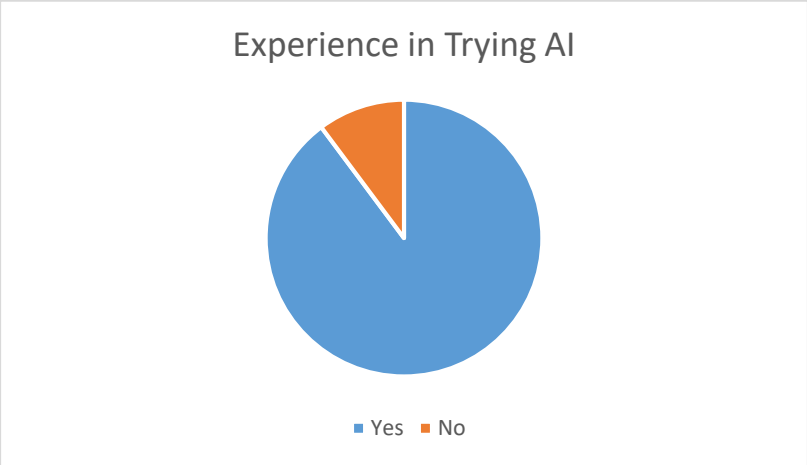

Figure 1. Students' Exposure on AI

Figure 1 reveals insights from a study exploring first-year students' familiarity with artificial intelligence (AI). The responses are split into two groups: those who have tried AI ("Sudah") and

those who have not ("Belum"). The data shows that only **10.2%** of students have engaged with AI, while a striking **89.8%** have not. This indicates that most first-year students have little to no hands-on experience with AI technologies. The low engagement rate points to a possible lack of exposure or understanding, potentially stemming from insufficient inclusion of AI in their coursework or limited opportunities to explore AI tools.

These findings carry significant implications for educational institutions. With such a large percentage of students (89.8%) lacking experience with AI, there is a clear need to prioritize AI education early in their academic journey. Universities could address this by incorporating AI-related content into first-year programs, organizing interactive workshops, and making AI resources more accessible. Such initiatives would help students build a basic understanding of AI, a skill that is becoming essential across numerous disciplines. Bridging this gap is vital to equipping students with the knowledge and tools they need to thrive in an increasingly tech-centric world.

The study also offers valuable insights into students' willingness to continue engaging with AI after their first encounter.

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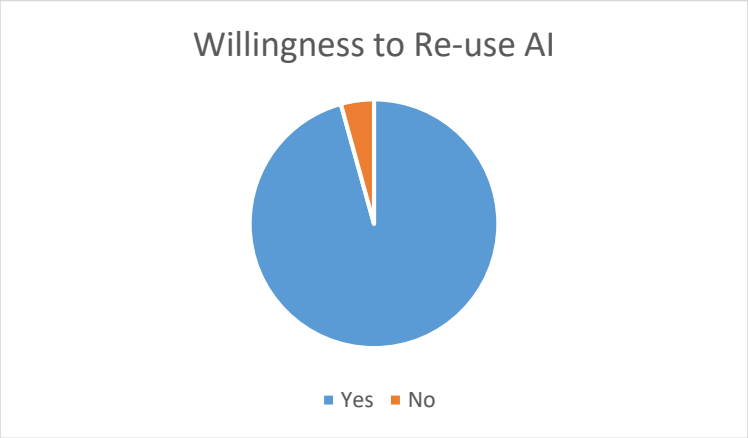

Figure 2. Students' Willingness to Re-use AI

Figure 2 offers valuable insights into students' willingness to continue engaging with artificial intelligence (AI) after their first encounter. The data reveals that an impressive 95,7% of respondents are eager to use AI again, while only a small fraction expressed disinterest. This strong positive response indicates that students who have experienced AI find it compelling and worthwhile. Their enthusiasm likely stems from the practical benefits, innovative features, or user-friendly nature of the AI tools they interacted with, making them keen to explore further.

These findings highlight the importance of creating more opportunities for students to engage with AI technologies. The overwhelming interest in continued use (95.7%) suggests that initial exposure to AI can spark curiosity and appreciation for its potential. Educational institutions can build on this momentum by incorporating AI-related projects, tools, and discussions into their programs. By encouraging regular interaction with AI, schools can help students develop a stronger grasp of its applications and significance. This approach not only enhances learning but also equips students with the skills needed to navigate a future where AI plays an increasingly central role in various fields.

The gathered data offers a multifaceted perspective on Indonesian first-semester university students' perceptions about artificial intelligence (AI). In line with both personal and cultural viewpoints, these results show a variety of expectations and reasons. An explanation of the main topics that emerged from the data, placed within pertinent literature, is provided in the section.

Students' Motivation in Using AI

The research findings provide a comprehensive understanding of how first-semester university students in Indonesia perceive Artificial Intelligence (AI), reflecting a blend of individual aspirations and societal influences. Below is an exploration of the key themes derived from the data, supported by relevant academic insights.

AI as a Catalyst for Knowledge and Learning

Students widely regard AI as a powerful tool for acquiring knowledge and enhancing their educational experiences. Responses such as "searching for references to guide and refine understanding" and "finding answers for assignments" illustrate their appreciation for AI's ability to deliver quick and reliable information. This aligns with studies by Zawacki-Richter et al. (2019), which emphasize how AI-driven

tools can expand access to diverse learning resources and promote independent learning. However, the data also reveal a potential overreliance on AI for task completion, as seen in statements like "helping with assignments" and "making tasks easier." This raises concerns about the risk of superficial engagement with learning materials, a challenge highlighted by Lim and Nguyen (2021), who caution against the uncritical use of AI in education.

Ethical Awareness and Cognitive Growth

The findings also highlight students' emerging recognition of AI's role in fostering critical thinking and ethical reflection. Phrases such as "providing answers to unknown questions" and "supporting learning, reasoning, and self-correction" suggest that students view AI as a collaborative partner in their intellectual development. This perspective resonates with research by Binns (2018), which underscores the importance of integrating ethical considerations into AI education. Nevertheless, the limited discussion of ethical issues in students' responses points to a gap in their understanding of AI's societal implications. Addressing this requires educational strategies that not only teach technical skills but also encourage students to critically examine issues like bias and accountability (Efendi et al., 2021).

AI for Efficiency and Problem-Solving

Students frequently perceive AI as a means to enhance efficiency and address challenges. Statements such as "simplifying work and improving efficiency in various aspects of life" and "making problem-solving easier" reflect their appreciation for AI's practical benefits. These findings align with Zhang and Dafoe's (2019) observations that individuals often see AI as a tool to boost productivity and tackle complex problems. However, this enthusiasm also raises questions about students' ability to critically assess AI's limitations. Overreliance on AI for decision-making could lead to misplaced confidence, especially if students lack the skills to evaluate the accuracy and reliability of AI-generated solutions.

Diverse Motivations for Engaging with AI

The data reveal a wide range of motivations driving students to use AI, from completing academic tasks to exploring new areas of knowledge. Responses like "seeking information and broadening horizons" and "finding explanations for unclear concepts" highlight their curiosity and desire for intellectual growth. This aligns with global trends that position AI as a key enabler of lifelong learning and professional development (Venkatesh & Bala, 2008). In Indonesia, these motivations are particularly relevant given the nation's ongoing digital transformation. By equipping students with the skills to effectively engage with AI, educational institutions can play a crucial role in preparing them for the demands of a rapidly evolving, knowledge-driven economy (Ministry of Industry, 2018).

Discussion

Advantage of AI

The findings reveal that students are increasingly leveraging AI to address a variety of academic and personal learning needs. This section is an in-depth exploration of the advantages AI offers, supported by bilingual excerpts from the data.

Simplifying Academic Tasks and Increasing Efficiency

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AI has proven to be a valuable tool in simplifying academic work, enabling students to complete assignments more efficiently. For instance, students noted:

"Mencari tugas seperti beberapa pertanyaan" (Finding assignments such as specific questions)
"Dalam tugas membuat makalah bagian mencari referensi, AI bisa membantu saya mencari artikel, jurnal, atau buku yang terkait pada tugas-tugas yang dosen berikan" (For tasks like writing papers, AI helps me find articles, journals, or books relevant to assignments from lecturers).

Excerpt 1

Excerpt 1 highlights AI's utility in streamlining tasks like reference gathering and problem-solving. By automating time-intensive processes such as data collection and synthesis, AI allows students to focus on deeper learning and critical thinking. As Zawacki-Richter et al. (2019) explain, AI tools in education enhance productivity by providing personalized and context-aware resources, making academic work more manageable and efficient.

Enhancing Writing and Research Skills
Students frequently use AI to improve their writing and research capabilities. For example, they shared:

"Membantu siswa, penulis blog, dan guru dengan kebutuhan menulis mereka" (Helping students, bloggers, and teachers with their writing needs)
"Pembuatan esai atau artikel, pembuatan riset dan literatur" (Essay or article creation, conducting research, and literature work).

Excerpt 2

Excerpt 2 underscores how AI tools, such as grammar checkers, citation generators, and research assistants, streamline the writing process while enhancing the quality of output. Research by Efendi et al. (2021) supports this, noting that AI-driven tools promote academic rigor by reducing errors and increasing efficiency in scholarly writing. This not only saves time but also helps students produce more polished and well-researched work.

Addressing Complex Subjects

AI is particularly useful in helping students tackle challenging subjects like mathematics and logic. Students mentioned:

"Matematika dan pendidikan lainnya dan untuk mencari jurnal" (Mathematics and other fields, and for finding journals)
"Tugas pelajaran matematika atau logika" (Tasks in mathematics or logic courses).

Excerpt 3

Excerpt 2 reflects AI's ability to provide step-by-step problem-solving approaches and interactive simulations, making complex topics more accessible. Lim and Nguyen (2021) emphasize that AI-powered tools, such as virtual tutors, can demystify difficult subjects, enabling students to grasp concepts that might otherwise seem overwhelming. This capability is especially valuable in STEM fields, where students often struggle with abstract theories and calculations.

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Fostering Lifelong Learning

AI also encourages students to pursue lifelong learning by enabling them to explore knowledge independently. For instance, students stated:

"Tentukan bidang pengetahuan dan keterampilan yang ingin ditingkatkan" (Determine the knowledge areas and skills to improve)
"Untuk membantu kegiatan pembelajaran, penalaran, penampilan, dan keputusan koreksi diri" (To support learning activities, reasoning, performance, and self-correction decisions).

Excerpt 4

Excerpt 4 suggests that students view AI as a tool for self-improvement and intellectual growth. Venkatesh and Bala (2008) describe this as an intrinsic motivation driven by curiosity and the desire to master new skills. By providing personalized learning pathways and resources, AI empowers students to take charge of their education and continuously expand their knowledge.

Supporting Diverse Academic Disciplines

AI's versatility is another key advantage, as it caters to a wide range of academic disciplines. Students highlighted:

"Semua akademik" (All academic fields)
"Pendidikan karakter, sejarah, dan hukum negara" (Character education, history, and state law).

Excerpt 5

Excerpt 5 demonstrates AI's ability to adapt to various subjects, making it an indispensable tool in multidisciplinary learning environments. Binns (2018) suggests that AI can foster interdisciplinary knowledge by bridging gaps between technical and humanities-based approaches. This adaptability ensures that students from diverse fields can benefit from AI's capabilities, whether they are studying science, arts, or social sciences.

Disadavantages of AI

The findings reveal several significant disadvantages of using AI for academic purposes, shedding light on the challenges students face when integrating AI into their learning processes. Below is a detailed exploration of these issues, supported by bilingual excerpts from the data and contextualized within relevant academic literature.

Lack of Accuracy
One of the most prominent concerns students have about AI is its occasional lack of accuracy. Responses such as:
"Terkadang AI memberi jawaban yang kurang valid" (Sometimes AI provides invalid answers)
and
"Kadang jawabannya tidak akurat" (Sometimes the answers are inaccurate)
highlight students' frustration with receiving incorrect or incomplete information.

Excerpt 6

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Excerpts 6 shows that inaccuracies can mislead students, requiring them to invest additional time and effort to verify the information provided by AI tools. This issue is particularly problematic in academic settings, where precision and reliability are crucial. As Zawacki-Richter et al. (2019) emphasize, while AI tools can process vast amounts of data, their outputs are only as reliable as the data they are trained on. This underscores the importance of ensuring that AI systems are built on high-quality, unbiased datasets to minimize errors and enhance trustworthiness.

Reduced Critical Thinking Skills

Another significant drawback of AI is its potential to discourage students from developing their own problem-solving and critical thinking skills. Students expressed concerns such as:
"Membuat kita malas berpikir" (Makes us lazy to think)
"Manusia jadi lebih suka mengambil karya orang lain daripada berpikir" (People tend to take others' work rather than think for themselves).

Excerpt 7

Excerpt 7 reflects a growing apprehension that over-reliance on AI tools may lead to cognitive stagnation, as students become accustomed to receiving quick answers without engaging deeply with the material. This aligns with research by Efendi et al. (2021), which warns that excessive dependence on AI can hinder cognitive growth and creativity, ultimately limiting students' ability to think independently and solve complex problems.

Emotional and Contextual Limitations

AI's inability to understand emotional nuances and complex contexts is another notable limitation. Students pointed out:
"AI mungkin jago dalam menganalisis data, tapi dia tidak punya perasaan atau kreativitas seperti manusia" (AI might be great at analyzing data, but it lacks human feelings or creativity)
"AI masih terbatas dalam hal pemahaman konteks emosional, kreativitas, dan pengambilan keputusan yang kompleks" (AI is still limited in understanding emotional context, creativity, and complex decision-making).

Excerpt 8

Excerpt 8 highlights a critical gap in AI's capabilities, particularly in fields that require empathy, ethical reasoning, and creative problem-solving. As Binns (2018) argues, AI lacks the human qualities necessary for making nuanced decisions, which can be a significant drawback in disciplines that rely heavily on emotional intelligence and contextual understanding.

Dependence and Over-Reliance on AI

Students also expressed concerns about becoming overly reliant on AI, which could undermine their autonomy and critical engagement with academic materials. For example, they noted: *"Ketergantungan pada data"* (Dependence on data)

"Bisa menimbulkan ketergantungan atau kehilangan pekerjaan" (Can lead to dependence or job loss).

Excerpt 9

Excerpt 9 instantiates that such reliance on AI tools may reduce students' motivation to engage deeply with their studies, as they increasingly depend on AI for answers and solutions. This over-reliance could also

lead to skill atrophy, where students lose the ability to perform tasks independently. Research by Zheng (2022) supports this concern, warning that long-term dependence on AI may have detrimental effects on students' ability to think critically and solve problems without technological assistance.

Financial and Accessibility Barriers

The high cost of implementing and accessing advanced AI tools is another significant barrier, particularly for students from underprivileged backgrounds. Students highlighted:

"Biaya implementasi yang tinggi" (High implementation costs)
"Terkadang ada yang bayar AI" (Sometimes, AI requires payment).

Excerpt 10

Excerpt 10 captures that financial barriers exacerbate existing inequalities in education, as only students with sufficient resources can afford to use premium AI tools. This creates a digital divide, where access to AI-driven educational resources is limited to those who can pay, leaving others at a disadvantage. Lim and Nguyen (2021) emphasize that affordability and infrastructure are critical factors influencing the adoption of AI technologies, particularly in regions like Southeast Asia, where economic disparities are pronounced.

Bias and Ethical Risks

AI's reliance on biased datasets is another major concern, as it can perpetuate discrimination and reinforce existing inequalities. Students pointed out:
"Risiko bias dan diskriminasi" (Risk of bias and discrimination)
"Tidak sesuai jawabannya terkadang dengan apa yang kita tanya" (Sometimes the answers do not align with what we ask).

Excerpt 11

Excerpt 11 highlight the ethical challenges associated with AI, particularly when the data used to train AI systems reflects societal biases. Binns (2018) advocates for greater transparency and accountability in AI development to address these issues, emphasizing the need for diverse and representative datasets to minimize bias and ensure fairness.

Conclusion

This study has provided valuable insights into the perceptions and experiences of Indonesian first-semester university students regarding artificial intelligence. The findings reveal a complex interplay of excitement about AI's potential, particularly in simplifying academic tasks, enhancing research, and fostering lifelong learning, coupled with concerns about accuracy, potential for diminished critical thinking, ethical implications, and accessibility. While students recognize the advantages of AI in streamlining their academic journeys and broadening their knowledge, they also express reservations about its limitations, including its inability to grasp nuanced contexts, the risk of over-reliance, and the potential for bias.

The research underscores the urgent need for educational institutions in Indonesia to proactively address the AI literacy gap. Incorporating AI education into the curriculum, not just from a technical standpoint but also with a focus on ethical considerations, critical thinking skills, and responsible AI usage, is crucial. This includes fostering discussions around the potential societal impacts of AI and equipping students with the skills to evaluate AI-generated information critically. Furthermore, ensuring equitable access to AI tools and resources is essential to avoid exacerbating existing disparities within the education system.

The findings also highlight the importance of experiential learning. Providing students with opportunities to engage with AI technologies hands-on, through projects, workshops, and real-world applications, can significantly enhance their understanding and appreciation of AI's capabilities and limitations. Such practical experience can bridge the gap between theoretical knowledge and practical application, fostering a more nuanced understanding of AI.

Moving forward, further research is needed to explore the long-term impact of AI on student learning outcomes, critical thinking abilities, and ethical decision-making. Investigating the role of educators in integrating AI effectively into the classroom and developing pedagogical approaches that leverage AI's strengths while mitigating its weaknesses is also crucial. By addressing these challenges and opportunities, Indonesian universities can empower students to become informed, responsible, and skilled users of AI, preparing them to thrive in an increasingly AI-driven world and contributing to Indonesia's digital transformation goals. Ultimately, a balanced approach that embraces the potential of AI while acknowledging its limitations is essential to ensure that AI serves as a tool for educational advancement and societal good.

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