

## **ABOUT AI IN ACADEMIA: OBSTACLE OR FACILITATOR?**

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### **Abstract**

Artificial Intelligence (AI) continually introduces new innovations in all aspects of human life. In educational settings, AI offers instant feedback, tailors course materials in real-time, and assesses student engagement using interactive techniques. It enhances teaching methods by providing a distinctive learning experience for students. However, educators using AI in classrooms often fear significant job losses. As automation increases due to the rapid advancement of AI, machines capable of handling complex tasks may eventually replace human workers across various sectors, including education. The loss of employment can adversely affect an individual's livelihood and disrupt the social unity and community sense derived from meaningful employment. Therefore, it is crucial to find a balance between the advantages AI offers and any potential ethical or related challenges. This balance is vital not only for optimizing educational outcomes but also for ensuring that AI serves as a tool for empowerment rather than a source of contention. This study analyzed 16 articles and is particularly interesting for future research using a quantitative approach.

**Keywords:** Artificial intelligence; computers; education; technology; research trends; qualitative.

## 1. Introduction

Artificial intelligence (AI) integrates human cognitive functions into computer systems, enabling them to act and respond in human-like ways. These advances depend on the ability of machines or software to accurately mimic human cognitive processes and behavior (Spatola, & Normand, 2021; Bozkurt et al., 2023; and Chen et al., 2020). The current phenomenon is the increasing incorporation of AI into the world of education, where it is continuously being regenerated or renewed (Bozkurt et al., 2023.; Fitria, 2021).

In the educational environment, the main goal of applying AI is to enhance the learning experience by providing customizable, personalized, and engaging educational interactions for students of all ages (Chen et al., 2020; Fitria, 2021; Liang, 2018; Zhu & He, 2021).

Numerous pedagogical tools utilizing artificial intelligence have substantially improved learning opportunities for students:

### *Duolingo*

As a frontrunner in educational technology, Duolingo offers apps for learning Music, Math, and more than 40 languages, from commonly studied languages like English, French, and Spanish to less frequently taught languages like Welsh and Swahili. Additional offerings include the Duolingo English Test, an online certification system, and Duolingo ABC, a literacy app for young children. As of February 2023, it remains the most downloaded language learning app globally, with nearly 13.4 million downloads that month alone, (Liang, 2018)

Recent studies, such as those by Zhu and He (2021), suggest that AI can greatly assist educators in customizing their teaching to meet the unique needs of each student. Technologies like adaptive learning systems, smart classroom tools, pedagogical agents, and intelligent tutoring systems are prime examples of AI's application in educational environments.

### *HelloTalk*

HelloTalk connects learners with selected native speakers who provide online video lessons, share insights into their languages, and offer a glimpse into their lives abroad. Users can also engage in one-on-one video chats with other learners, facilitating real-world conversation practice and cultural exchange. However, challenges such as varying proficiency levels among users and potential inaccuracies in language corrections remain (Smith & González-Lloret, 2021; Weidinger, et al., 2021). The diagram below showcases the links between these AI-driven educational trends, emphasizing their potential to transform learning environments into more personalized and responsive experiences tailored to individual student needs.

### *Thinkster Math*

Thinkster Math is a tutoring app that integrates personalized teaching with an extensive math curriculum. It employs AI and Machine Learning (ML) to visually map out students' reasoning as they

solve math problems, allowing educators to identify and address areas where students may struggle, providing tailored feedback to foster academic growth (Owan, et al., 2023).

### *Brainly*

Brainly serves as an educational platform where students can submit homework questions and receive verified answers from peers. The platform uses ML algorithms to filter out spam, enhancing learning efficiency for its users (Srinivasa, et al., 2022 and Fitria, 2023). This app allows students from various levels of education to ask homework-related questions and have other users share their opinions on the subject matter. Brainly app supports learning process with its question-answer feature and the help of other students or teachers who provide answers via the app (Fitria, 2023).

### *Gradescope*

Gradescope is an analytical tool that provides data on student performance, pinpointing areas where additional support is needed while significantly reducing grading time for educators—reportedly cutting down grading effort by up to 70% . Gradescope© allows instructors to export all student evaluations, improving critical thinking and saving time (Gonzalez, et al.,2023 and Angra, 2021).

### *Gemini*

Gemini by Google is anticipated as a multimodal tool in generative AI and is believed to be a gateway to a revolutionized educational experience. This app enables users to generate human-like content across a broad range of tasks (Perera & Lankathilake, 2023). Gemini significantly differs from ChatGPT in that it allows users to generate various types of output, including text, images, and videos, requiring cross-modal integration. According to Google's report, Gemini is instructed to use a dataset free of harmful phrases and mitigate risks associated with subversive generation by using a safe dataset (Team et al., 2023).

Additionally, Quizlet is another AI-powered tool that enhances learning through customizable flashcards, games, and tests. It uses machine learning to track learning progress and suggest study paths that optimize student retention. This adaptive approach personalizes learning experiences, making them more effective and engaging (Bernacki, et al., 2021 and Fake & Dabbagh, 2023). *Designing personalized learning experiences: A framework for higher education and workforce training*. Routledge..

Furthermore, Socratic by Google harnesses AI to help students understand complex homework assignments. By simply taking a photo of the problem, students receive step-by-step explanations, key concepts, and videos to enhance their comprehension and problem-solving skills. This tool makes learning more accessible and interactive (Wilson et al., 2023).

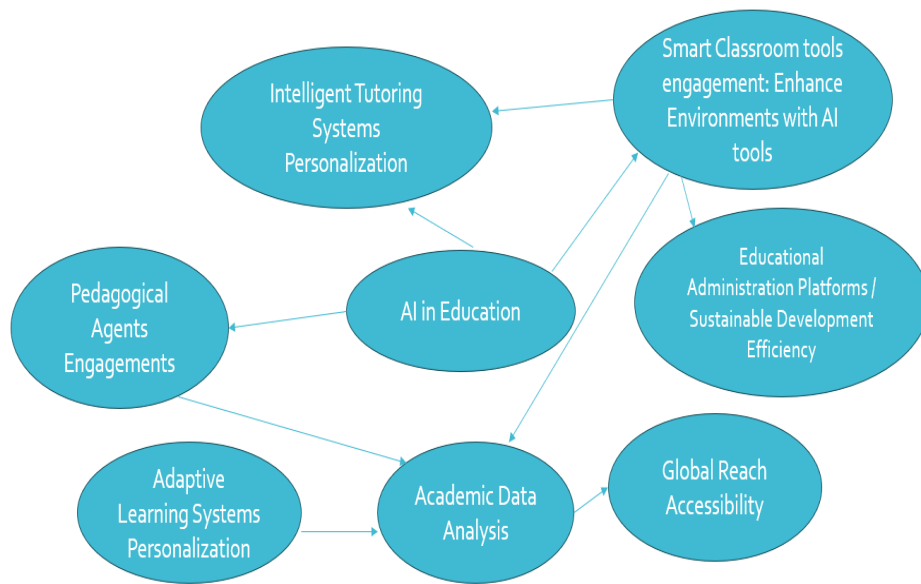


Fig 1. Interconnections of Contemporary Trends in AI within the Educational Sector  
Data were processed based on an analysis of literature review references in this study. (2024)

Human resources are vital within organizational structures as they direct the entirety of human capabilities towards achieving success at both individual and organizational levels. As outlined by Dessler et al., (2017) these components, which encompass time, energy, and human intellectual and physical abilities, should be employed to their fullest potential to enhance organizational benefits. Human Resources (HR) are recognized as the primary element in the development process and the achievement of an organization's objectives (Robbins & Judge, 2018). Regardless of an organization's capital, cutting-edge technology, or natural resource wealth, without competent HR to manage and utilize these assets, organizational goals remain unattainable Dessler et al., (2017). Yusriani et al., 2023 stated that human resources need peer support to have the motivation to learn more and improve digital skills, especially in the context of digital era studies nowadays.

Artificial Intelligence (AI) is revolutionizing the educational sector by introducing a novel perspective for teachers, students, parents, and educational institutions alike. This technological transformation is redefining traditional views on education, offering enhanced teaching methods and improved learning processes. AI in education is primarily aimed at augmenting support for educators and students, boosting both the efficiency and quality of educational services, rather than replacing teachers with robots. Concerns are ongoing about the potential of AI to assume teaching roles, with some research indicating possible risks associated with delegating instructional responsibilities to machines (Bayne, 2015; Humble & Mozelius, 2019).

Education enriches lives, and success in life is heavily dependent on quality education. Globally, constant enhancements are being made in curriculum design and teaching methodologies to upgrade educational systems. AI is a rapidly expanding force across various industries, with significant implications for education. It promises to address some of the most pressing challenges in education

today, fostering innovative teaching methods, enhancing learning experiences, and contributing to the achievement of Sustainable Development Goals (SDGs). However, the swift pace of technological advancements brings with it numerous risks and complexities that often outpace existing regulatory and policy frameworks. To address this, UNESCO is committed to assisting Member States in leveraging AI technology effectively, ensuring that its deployment in education adheres to principles of equity and inclusivity (Floria & Radu, 2019).

According to UNESCO's guidelines, AI should inherently adopt a human-centered approach. This approach aims to mitigate the widening technological divides and address disparities in access to knowledge, research, and cultural diversity. The initiative "AI for All" strives to provide universal access to the benefits of the technological revolution, emphasizing innovation and widespread knowledge dissemination. Furthermore, UNESCO has released a guide for education policymakers as part of the Beijing Consensus to enhance their readiness for integrating AI into educational strategies (Tapalova & Zhiyenbayeva, 2022). This guide, "Artificial Intelligence and Education: Guidance for Policymakers," is designed to foster a shared understanding of the benefits and challenges posed by AI in education, as well as its implications for essential skills in this new era of AI, (Dron, 2022)

Artificial intelligence holds vast potential in reshaping educational landscapes, creating more inclusive and adaptive learning environments that respond dynamically to the needs of all students. As this technology continues to evolve, it will play a pivotal role in defining the future of education worldwide.gi

The research questions in this study are:

- 1) What are the pros and cons of using AI in the educational sector regarding its role as an obstacle or facilitator?
- 2) Regarding users' perceptions, can the use of AI replace the physical presence of teachers and students in the educational context?

## **2. Literature Review**

### **2.1 The Impact of Artificial Intelligence on Education**

The integration of Artificial Intelligence (AI) into the educational sector marks a pivotal transformation in the delivery of educational content and the management of learning processes. This literature review delves into the various roles AI plays in education, showcasing both potential benefits and the challenges it introduces, as evidenced by contemporary academic research (Aleven et al., 2016;Kumar et al., 2019; and Zhou et al., 2020).

#### **1) Enhancing Personalized Learning**

AI's capacity to tailor educational experiences to individual needs and learning styles is well-recognized. Intelligent tutoring systems (ITS) exemplify this by using algorithms that adapt in real-time to students' needs, providing personalized feedback and adjusting learning difficulty, thereby enhancing engagement and retention (Aleven et al., 2016). AI-driven analytics further support this by identifying unique learning patterns, essential for aiding students with special needs (Baker et al., 2016). This

personalized approach is poised to revolutionize educational paradigms by offering more direct and effective learning interventions.

## 2) Automating Administrative Tasks

AI significantly augments institutional efficiency by automating routine tasks like grading, scheduling, and assessments, thus reducing the workload on educators and enabling a greater focus on pedagogical innovation (Zhou et al., 2020). AI's capability extends to the dynamic generation and adaptation of learning materials, reflecting real-time class performance, which optimizes resource utilization and instructional quality (Kumar et al., 2019).

## 3) Bridging Educational Gaps

AI enhances accessibility to quality education by providing remote learning solutions, particularly beneficial for students in geographically isolated or economically disadvantaged areas (Wang et al., 2021). This flexibility ensures that education is inclusive, reaching a broader demographic and fostering a more equitable learning environment (Ferguson, 2019 and Dron, 2022).

## 4) Challenges and Ethical Considerations

The use of AI in education is not without its ethical dilemmas, including concerns about data privacy, potential biases in AI algorithms, and the overarching surveillance it might entail (Saltman, 2020). Furthermore, the fear that AI may marginalize the role of teachers and shift educational paradigms brings to light significant cultural and pedagogical concerns (Bayne, 2015 ; Humble & Mozelius, 2019).

## 5) Future Prospects

AI's role in education is expected to grow, aligning with global initiatives like the Sustainable Development Goals. This growth suggests a shift towards more equitable educational practices that integrate AI without compromising ethical standards or human oversight (Floria & Radu, 2019; UNESCO, 2021).

## **2.2 Educational Sector**

The education sector encompasses both formal, school-based programs and informal, community-based initiatives that aim to teach and impart knowledge. These programs provide crucial information to employers and employees, enabling them to foster self-development and enhance skills (Howard et al., 2022; Humble & Mozelius, 2019 ; Kumar et al., 2019; UNESCO, 2023).

The integration of Artificial Intelligence (AI) within the education sector represents a significant shift towards a more data-driven and automated environment. Whether it involves AI supporting teachers or teachers supporting AI, this transition offers unique opportunities for educational reform. However, it also necessitates careful consideration of the socio-technical implications involved (Kumar et al., 2019). This dual integration highlights the potential for transformative educational practices but also underscores the need for a thoughtful approach to addressing the challenges posed by new technologies.

Benefits of AI in Higher Education, Personalized Learning: AI's major advantage in educational settings is its ability to tailor learning experiences to individual student needs. This adaptability helps accommodate diverse learning styles, potentially leading to improved academic outcomes. Zalte (2023) highlights AI's role in transforming traditional educational models by leveraging data to create customized learning paths and interventions.

Remote studying and working pose challenges to personal development. In this environment, it is very important to improve knowledge sharing, as it is essential for improvement and serves as a vital organizational tool. This research shows the benefits of virtual teams in learning experiences (Yusriani et al., 2024).

### **2.3 FGDs talk about experience in Using AI**

FGD stands for Focus Group Discussion. This is a qualitative research method where a group of people is brought together to discuss a specific topic or set of issues. The discussion is guided by a moderator who facilitates the conversation, ensuring that all participants have an opportunity to share their perspectives (Krueger, 2014). FGDs are commonly used in social sciences, market research, and educational studies to gather in-depth insights and diverse viewpoints on a subject matter (Morgan, 1996).

### **2.4 Obstacle Identification**

Key obstacles identified include the ethical management of AI (Ketaren et al., 2023). Issues such as data privacy and the potential for biased algorithms pose significant challenges (Yusriani et al., 2024). There is a growing concern regarding how AI algorithms handle sensitive data and the inherent biases that may arise from improperly managed datasets (Morgan, 1996). Additionally, there is apprehension about the over-reliance on technology, which might undermine traditional educational values and interpersonal teacher-student relationships (Ketaren et al., 2023)

Ketaren et al. (2023) emphasized the importance of addressing these ethical concerns to ensure that AI integration into educational settings does not compromise the integrity and privacy of the educational environment. They pointed out that effective management and regulatory frameworks are essential to mitigate these risks (Ketaren et al., 2023).

### **2.5 Facilitator Recognition**

AI acts as a facilitator by potentially bridging the gap between educational opportunities and underserved populations through scalable and personalized learning solutions (Yusriani et al., 2024). It offers flexible learning paths tailored to individual student needs, thereby promoting inclusivity and accessibility in education (Krueger, 2014).

Yusriani et al., 2024 highlighted the role of AI in supporting sustainable educational practices. AI technologies align with global educational goals by innovating pedagogical approaches and enhancing resource efficiency (Yusriani et al., 2024). They found that AI-driven educational tools could facilitate knowledge sharing among virtual teams, significantly benefiting learning experiences and improving collaborative outcomes (Morgan, 1996).

Moreover, AI supports lifelong learning and continuous professional development by providing just-in-time learning resources and adaptive learning environments (Yusriani et al., 2024). This adaptability is crucial for catering to the diverse learning needs of students and professionals alike (Krueger, 2014).

### **3. Material and Method**

#### **3.1 Design Study**

This study employs qualitative analysis to explore the development of Artificial Intelligence (AI) over the past eight years, specifically within the context of Generation Z's higher education. The methodology centers around a comprehensive literature review that synthesizes scholarly research and theoretical contributions from various sources (Tracy, 2019). After analyzing the articles, the researchers conducted a focus group discussion (FGD) to delve deeper into the implementation of teaching and learning activities related to the experience of using AI discussed in the articles. The FGD consisted of seven lecturers or teachers who summarized their students' perceptions regarding the second question of this study (Krueger, 2014; Yusriani et al., 2023 ; Ketaren et al., 2023).

#### **3.2 Literature Review Process**

The literature review encompasses a broad range of studies focusing on the integration of AI into higher education. This includes an analysis of both peer-reviewed journal articles and authoritative reports from the period 2015 to 2023. Key sources include works by Howard et al., 2022, which examine the educational sector's adaptation to AI technologies, and studies by Humble & Mozelius (2019) and Kumar et al., (2019), which focus on the pedagogical implications and technological advancements in AI education. Additionally, recent guidelines and findings from (UNESCO, 2023) provide a global perspective on educational policies and AI's ethical implications.

The literature review also draws on seminal works such as the detailed exploration by (Aleven et al., 2016) in the "Handbook of Research on Learning and Instruction," which offers foundational insights into instructional strategies enhanced by AI. Further, Baker et al., (2016) provides a critical examination of the role of educational data mining and learning analytics in shaping student learning pathways. Complementary perspectives are offered by Ferguson (2019), who discusses the broader scope of educational technology and its operational mechanisms within academic settings in his article in "AI & Society."

Additional contributions from Bayne (2015) critically assess the impact of automated teaching tools like Teacherbot on pedagogical practices, while (Floria & Radu, 2019) discuss the potential of AI to advance Sustainable Development Goals through education, as outlined in the "International Review of Education." Moreover, the review includes insights from (Saltman, 2020), who addresses the critical concerns and ethical dilemmas presented by the use of educational technology in his work in "Educational Theory." This diverse array of sources ensures a comprehensive understanding of the multifaceted role of AI in education, emphasizing both its potential benefits and associated challenges.



### 3.3 Data Collection

Data for this review is collected through digital databases and academic libraries, selecting publications that directly address AI's role and impact in higher education. Special attention is given to studies that discuss the specific experiences and impacts on Generation Z, a cohort that has grown up amidst rapid technological change. In addition to the literature review, this research also collects data through Focus Group Discussions (FGDs). FGDs are used as an instrument in social research to understand specific attitudes (Yusriani et al., 2023). A focus group discussion typically comprises 7 to 10 participants selected based on certain characteristics that align with the purpose of this research (Krueger, 2014; Yusriani et al., 2023; Ketaren et al., 2023).

The main question in our discussion regarding the second research question is provided with the following answer choices: *Regarding users' perceptions, can the use of AI replace the physical presence of teachers and students in the educational context?*

1 = strongly disagree

2 = disagree

3 = neutral

4 = agree

5 = strongly agree

Based on previous research (Al-Qaysi et al., 2020; Annansingh et al., 2018; Chen et al., 2020; Ahmad et al., 2021).

### 3.4 Analysis Method

This research was carried out as a review of literature to engage with existing research in the field (Bryman, 2016). The analysis employs a thematic approach where deductive analysis is extracted from the literature collected using Google Scholar, ScienceDirect, and other reliable sources to meet the purpose of this research. The literature is organized around major themes such as "AI and Personalized Learning," "AI and Administrative Automation," and "Ethical Considerations of AI in Education." This method allows an in-depth exploration of how AI technologies are reshaping educational environments and influencing teaching and learning practices (Zawacki-Richter et al., 2019); Saltman, 2020).

## 4. Result

Table 1 summarizes the findings from sixteen previous studies, detailing the pros and cons of using AI in the educational sector: obstacles and facilitators.

*Table 1. Summary of Previous Research.*

No	Article/Literature	Methods	Obstacle	Facilitator
1	Natu & Aparicio (2022). Analyzing knowledge sharing behaviors in virtual teams: Practical evidence from digitalized workplaces	Quantitative method		V

No	Article/Literature	Methods	Obstacle	Facilitator
2	Yousuf, M., & Wahid, A. (2021, November). The role of artificial intelligence in education: Current trends and future prospects. In <i>2021 International conference on information science and communications technologies (ICISCT)</i> (pp. 1-7)	Qualitative descriptive method	V	V
3	Dron, J. (2022). Educational technology: what it is and how it works. <i>AI &amp; SOCIETY</i> , 37(1), 155-166.	Qualitative descriptive method	V	V
4	Chinonso et al., (2023) ChatGPT for Teaching, Learning and Research: Prospects and Challenges. <i>Global Academic Journal of Humanities and Social Sciences</i> , 5(02), 33–40.	Qualitative descriptive method		V
5	Akmese et al. (2021). Use of Machine Learning Techniques for the Forecast of Student Achievement in Higher Education. <i>Information Technologies and Learning Tools</i> , 82(2)	Quantitative method		V
6	Zawacki-Richter et al (2021). Systematic Review of Research on Artificial Intelligence Applications in Higher Education – Where are the educators? <i>Open Learning: The Journal of Open, Distance and e-Learning</i> , 34(3), 312-338.	Qualitative descriptive method	V	V
7	Adams et al. (2022). Ethical principles for artificial intelligence. <i>Computers and Education: Artificial Intelligence</i> , 4, 4221–4241.	Qualitative descriptive method	V	
8	Fitria, T. N. (2023). Utilizing brainly as a social question-and-answer (Q&A) service in english learning materials: benefits and limitations. <i>Journal of English Language and Culture</i> , 14(1).	Qualitative descriptive method	V	V
9	Ahmad et al., 2021 Artificial intelligence and its role in education. <i>Sustainability</i> , 13(22), 12902.	Qualitative descriptive method		V
10	Annansingh, F., Howell, K. E., Liu, S., & Baptista Nunes, M. (2018). Academics’ perception of knowledge sharing in higher education. <i>International Journal of Educational Management</i> , 32(6), 1001–1015.	Qualitative descriptive method using Focus Group Discussion (FGD)	V	V

No	Article/Literature	Methods	Obstacle	Facilitator
11	Howard, S. K., Swist, T., Gasevic, D., Bartimote, K., Knight, S., Gulson, K., ... & Selwyn, N. (2022). Educational data journeys: Where are we going, what are we taking and making for AI? <i>Computers and Education: Artificial Intelligence</i> , 3, 100073.	Qualitative descriptive method. Analyze publicly educational data in Australia	V	V
12	Al-Qaysi, N., Mohamad-Nordin, N., & Al-Emran, M. (2020). Employing the technology acceptance model in social media: A systematic review. <i>Education and Information Technologies</i> , 25, 4961-5002.	Qualitative, analyze 57 research articles focusing on the use of TAM in social media contexts.	V	V
13	Humble, N., & Mozelius, P. (2019, October). Teacher-supported AI or AI-supported teachers. In European Conference on the Impact of Artificial Intelligence and Robotics (ECIAIR 2019) (pp. 157-164).	Qualitative descriptive method		V
14	(Leal-Rodríguez et al., 2023) Digitalization beyond technology: Proposing an explanatory and predictive model for digital culture in organizations. <i>Journal of Innovation &amp; Knowledge</i> , 8(3), 100409.	Quantitative, PLS-SEM.	V	V
15	Saltman, K. J. (2020). The Dangers of Ed-Tech: Critical Questions for Changing Times. <i>Educational Theory</i> , 70(1), 9-27.	Qualitative Method	V	V
16	Chen et al., (2020) Application and theory gaps during the rise of artificial intelligence in education. <i>Computers and Education: Artificial Intelligence</i> , 1, 100002.	Employs a mixed-methods approach.	V	V

(The analysis of the literature review has been processed, 2024)

#### 4.1 The pros and cons of using AI in the educational sector regarding its role as an obstacle or facilitator

Upon examining the referenced studies, a variety of insights pertaining to AI in the educational sector, including obstacles and facilitators, were identified. These findings, categorized under two sections, are described as follows:

## ***Pros of Using AI in Education***

### *Perceived Usefulness and Ease of Use:*

- 1) **Enhancement of Learning Outcomes:** AI has the potential to significantly improve educational outcomes by providing personalized learning experiences, automating administrative tasks, and offering real-time feedback (Dron, 2022; Yousuf & Wahid, 2021).
- 2) **Increased Engagement:** AI-driven educational tools can increase student engagement through interactive and adaptive learning platforms, making learning more engaging and effective (Dron, 2022); Chinonso et al., 2023).
- 3) **Improved Efficiency:** AI can streamline administrative processes, allowing educators to focus more on teaching and less on bureaucratic tasks (Chen et al., 2020; Ahmad et al., 2021).

### *Facilitators of AI Adoption:*

- 1) **Institutional Support:** Strong support from educational institutions, including training and resources, can facilitate the adoption of AI. This includes providing teachers with the necessary tools and professional development to integrate AI into their teaching practices (Dron, 2022; Humble & Mozelius, 2019).
- 2) **Positive Attitudes Towards Technology:** Educators and students who have a positive attitude towards technology are more likely to embrace AI tools, enhancing their overall effectiveness in educational settings (Al-Qaysi et al., 2020; Annansingh et al., 2018).
- 3) **Policy and Infrastructure:** Adequate policies and technological infrastructure are essential to support the integration of AI in education. Effective policies can ensure ethical use and equitable access to AI technologies (Al-Qaysi et al., 2020; Adams et al., 2023).

## ***Cons of Using AI in Education***

### *Obstacles to AI Adoption:*

- 1) **Data Privacy and Security Concerns:** Issues related to the privacy and security of student data can hinder the widespread adoption of AI technologies. Students' personal information and learning data are often collected and stored by third-party companies, raising concerns about data breaches and misuse (Saltman, 2020 ; Howard et al., 2022).
- 2) **Technical Challenges:** The complexity and cost of implementing AI systems can be a barrier, especially in resource-constrained educational institutions. High costs of AI technologies, limited access to necessary hardware and software, and insufficient technical support and maintenance are significant obstacles (Chen et al., 2020; Akmeşe et al., 2021).
- 3) **Resistance to Change:** Teachers and administrators may resist adopting new technologies due to a lack of familiarity or fear of the unknown. This resistance can be a significant barrier to the successful implementation of AI in education (Dron, 2022 ; Al-Qaysi et al., 2020).

*Ethical and Equity Concerns:*

- 1) Commercialization of Education: Ed-Tech and AI often lead to the commercialization of education, where companies prioritize profit over educational outcomes. This can result in over-reliance on proprietary software, increased costs for schools and students, and a focus on metrics and data that may not align with educational goals (Saltman, 2020; Chen et al., 2020).
- 2) Equity and Access: There are significant disparities in access to Ed-Tech and AI, which can exacerbate existing educational inequalities. Students from lower socioeconomic backgrounds may have limited access to necessary devices and internet connectivity, creating a digital divide(Saltman, 2020; Fitria, 2023).

*Facilitators to Mitigate Challenges:*

- 1) Policy and Regulatory Frameworks: Effective policies and regulations can mitigate some of the risks associated with Ed-Tech and AI. These frameworks can ensure that technologies are used ethically and equitably, promoting comprehensive data privacy laws and equitable access to technology (Adams et al., 2023; Saltman, 2020).
- 2) Teacher Training and Professional Development: Providing teachers with adequate training and ongoing professional development can enhance the effective use of AI. Well-trained teachers are better equipped to integrate technology into their teaching in meaningful ways (Humble & Mozelius, 2019; Howard et al., 2022).
- 3) Community and Stakeholder Engagement: Engaging the broader community, including parents, students, and other stakeholders, can help ensure that AI implementations are aligned with the needs and values of the community. This involves involving stakeholders in decision-making processes, ensuring transparency in how AI tools are selected and used, and collaborative efforts to address challenges (Saltman, 2020; Natu & Aparicio, 2022).

**4.2 Regarding users' perceptions**

Educators/Respondent profiles are shown in table 2 below:

*Table 2. Respondents' Profile*

<b>Respondent/ Educators</b>	<b>Age/Gender</b>	<b>Number of students who actively use AI</b>	<b>Duration of teaching</b>	<b>Duration of AI usage</b>
Data R1	40 yo/Female	60	5 years	3 years
Data R2	46 yo/Male	150	10years	3 years
Data R3	48 yo/Male	100	25 years	3 years
Data R4	39 yo/Female	50	6 years	5 years
Data R5	37 yo/Male	25	5 years	1 years
Data R6	31 yo/Male	27	5 years	1 years
Data R7	41 yo/Female	40	8 years	3 years

*Results and descriptions from in-depth interviews and FGDs (Focus Group Discussions) 2024*

**R1 (SY):**

**Personality Type:** Introvert

**Occupation:** Manager in the Service sector, assistant lecturer

**Experience:** "My experience in using the HelloTalk application, e-learning, and AI for translation is that I feel work and teaching-learning activities become more effective and efficient, especially when we can quickly master the use of digital applications. However, I do not agree with the use of AI to replace the physical presence of teachers and students in the educational context. My students also unanimously stated that they do not agree with the notion that the use of AI can replace the physical presence of teachers and students in the educational context."

Total number of students surveyed: 60 students

Number of students actively using AI: 60 students

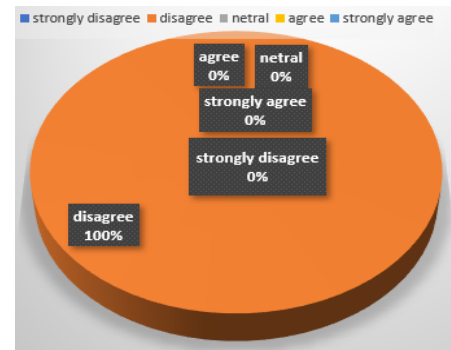
Strongly Agree: 0 student

Agree: 0 student

Neutral: 0 student

Disagree: 60 students

Strongly Disagree: 0 student



**Advantages:**

- 1) Acquired new knowledge in these applications.
- 2) Enhanced digital skills.
- 3) Increased online training.
- 4) Gained a new perspective on more organized multitasking, encompassing roles like being a professional, mother, student, teacher, etc., especially in remote work.

**Limitations:**

- 1) Missing 'face-to-face' situations in the classroom.
- 2) Some projects faced on-site challenges.

**Solution:**

The use of AI in teaching and learning activities should be based on needs and must adhere to applicable policies to maintain integrity in the field of education. I prefer offline activities, but with the rapid development of AI technology, I feel the need to adapt by consistently being able to conduct offline teaching and learning activities. Therefore, I blend them to achieve Work-Life Balance (WLB) in teaching and studying. Despite the rapid technological advancements, I want my students to be happy and have sweet memories of learning with their teacher. As a teacher, I must always be enthusiastic about my passion for teaching. *"I always say, Happy teaching, happy working, and happy learning!"*

**R2 (SP):**

**Personality Type:** Ambivert

**Occupation:** Program Study Leader (Department Head) in the Education sector, senior lecturer.

Experience: Experienced new and highly beneficial adjustments during and after the COVID-19 pandemic in the use of AI, following government directives for remote work as a solution. The team then increased their digital skills with new apps. I disagree with the use of AI replacing the physical presence of teachers and students in the educational context. Among my students, 50% strongly disagree, 10% disagree, 10% are neutral, and 30% agree.

Total number of students surveyed: 150 students

Number of students actively using AI: 150 students

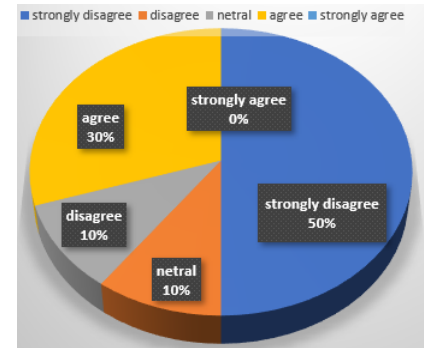
Strongly Agree: 0 student

Agree: 45 students

Neutral: 15 students

Disagree: 15 students

Strongly Disagree: 75 students



#### Advantages:

- 1) Flexible and easy-to-use app.
- 2) More quality time with family due to faster work completion.
- 3) Improved accuracy and self-discipline.

#### Limitations:

- 1) Lack of direct interactions with colleagues and relatives, leading to novel work challenges.
- 2) Project completions slowed down due to the absence of face-to-face meetings.

#### Solution:

Recommendations were made for a hybrid working model. Current discussions within the University lean towards developing a 'Work From Anywhere' (WFA) system. My suggestions include improving case study-based learning and increasing collaboration in scientific papers.

#### R3 (KU):

**Personality Type:** Ambivert

**Occupation:** Senior lecturer.

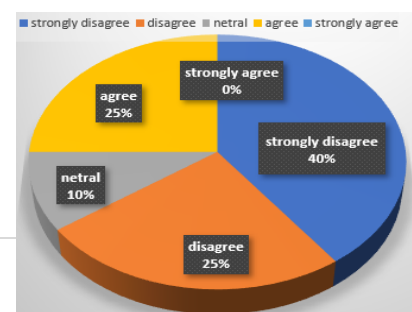
Experience: We experienced significant and highly beneficial adjustments in the use of AI during and after the COVID-19 pandemic, following government directives for remote work as a solution. The team subsequently enhanced their digital skills by utilizing new applications, which facilitated more efficient workflows and improved overall productivity. This period of adaptation underscored the importance of technological proficiency in maintaining operational continuity. I disagree with the notion of AI replacing the physical presence of teachers and students in the educational context. In a survey among my students, 40% strongly disagree, 25% disagree, 10% are neutral, and 25% agree. The results reflect a prevalent sentiment that personal interaction remains crucial in education.

Total number of students surveyed: 100 students

Number of students actively using AI: 100 students

Strongly Agree: 0 student

Agree: 25 students



Neutral: 10 students

Disagree: 25 students

Strongly Disagree: 40 students

**Advantages:**

- 1) The application is flexible and easy to use.
- 2) Faster work completion has resulted in more quality time with family.
- 3) There has been an improvement in accuracy and self-discipline.

**Limitations:**

- 1) There is a lack of direct interactions with colleagues and relatives, leading to novel work challenges.
- 2) Project completions have slowed down due to the absence of face-to-face meetings.
- 3) Sometimes, using the new digital applications is not easy.

**Solution:**

Recommendations were made for a hybrid working model. Current discussions within the University are leaning towards developing a 'Work From Anywhere' (WFA) system. My suggestions include enhancing case study-based learning and increasing collaboration in scientific papers. This approach aims to balance the benefits of remote work or study with the need for direct interaction, thereby fostering a more adaptable and effective learning environment.

**R4 (AE):**

**Personality Type:** Extrovert

**Job:** HR Analyst in Public Sector

**Experience:**

I have experience working as a freelance translator in Hellotalk app for 5 years, providing English-Indonesian in-app translation using Hello Talk CMS (Content Management System). I believe this app helps a lot of students and user to learn language. This app offers their user a private chat room with language tutor from countries across the globe. Therefore, AI can directly impact the way of learning in the digital environment. Although it is not common yet, but there is a plethora type of AI application that provide deep learning algorithms. AI technology considered to provide personalized teaching and feedback to students without a human teacher.

The main problem with AI in education is the difficulty for teachers and students using prompting. Prompting that is not specific/rigid will produce answers that are vague or even inaccurate. Based on my experience providing training for Google users in the early 2010s, many teachers were unable to find accurate answers because of weak prompting when googling. The teachers' English vocabulary or grammar is still below average, while the Indonesian language database available in Chat GPT is not as abundant as in English. I disagree with the use of AI replacing the physical presence of teachers and students in the educational context.

Total number of students surveyed: 50 students



Number of students actively using AI: 50 students

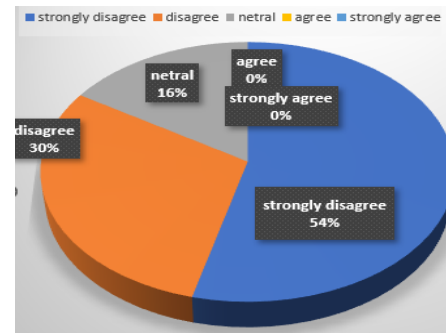
Strongly Agree: 0 student

Agree: 0 student

Neutral: 8 students

Disagree: 15 students

Strongly Disagree: 27 students



### **Advantages:**

- 1) Benefit in a more efficient work i.e. grading automation, support in research, etc.
- 2) Develop a new way of student teacher interaction such as gamification
- 3) Education is now inclusive for all students, especially for student with special needs
- 4) New era of education system that can be accessed remotely so that students from remote area can have equal access to high quality education
- 5) Education can be developed personally to meet students' needs

### **Limitations:**

- 1) AI bias : collaboration between human and machine can produce a lot of bias, such as language bias, bias results, digital bias, gender bias, data and algorithm bias
- 2) Accuracy and risk functional: AI is an unpredictable system, therefore it is hard to totally relied in AI
- 3) Risk in skills development that may cause teacher to be less creative in using various teaching method

### **Solution:**

Define a clear guideline for the use of AI in the education and research sectors. The guide presents examples of the use of AI in education and research sector, such as creating curriculum designs and teaching and learning activities. Government's need to pay attention to the importance of understanding all relevant regulations in the education and research sectors, such as AI ethics and principles, pedagogical suitability, and AI literacy.

### **R5 (KHP):**

**Personality** Type: Introvert

**Job:** Head of the general administration and public services team in the work unit

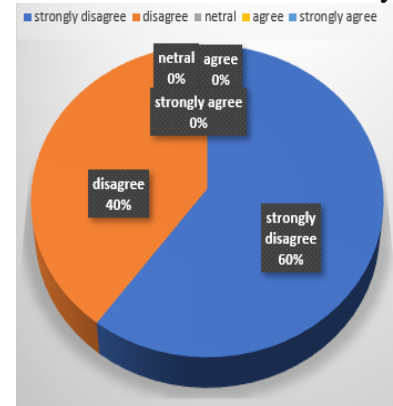
### **Experience:**

AI can be used to automate routine tasks such as document processing, data processing, and policy analysis. This way, government employees can focus on more complex and value-added tasks, while administrative tasks can be completed quickly and accurately by AI systems. This can certainly reduce the time and costs required to carry out government administration, so that existing resources can be allocated more effectively. The use of AI can also improve public services. By utilizing chatbot technology and AI systems based on natural language processing, the government can provide more responsive and faster services to the public. Chatbots can answer general questions and provide needed

information, thereby reducing the workload of public service officers and speeding up responses to public requests. Apart from that, AI can also be used in data analysis to better understand society's needs, so that public policies can be designed based on accurate, up-to-date and reliable data.

However, the use of AI in government also raises several challenges. One of them is the need for clear regulations and adequate privacy policies. In collecting and processing data, the government must ensure that individual privacy is maintained and that data is collected and used safely and ethically. In addition, it is also important to overcome the digital divide and ensure that the use of AI is accessible to all levels of society, so that no group is left behind in the digital transformation of government. I do not agree with the idea of AI replacing the physical presence of teachers and students in educational contexts. In a survey among my students, with the following details:

- Total number of students surveyed: 25 students
- Number of students actively using AI: 25 students
- Strongly Agree: 0 Student
- Agree: 0 student
- Neutral: 0 student
- Disagree: 10 students
- Strongly disagree: 15 students



The results of the survey were that all students surveyed disagreed with the idea of AI replacing the physical presence of teachers and students. This reflects the general sentiment that personal interaction is very important in education. It is important to remember that no matter how much AI assistance impacts a job, it still requires a human touch that can give character and life to the job.

**R6 (IZ):**

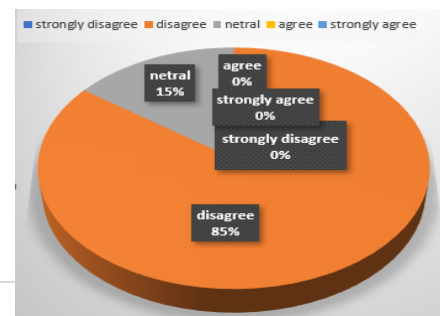
**Personality Type:** Introvert

**Occupation:** Team leader for statistical activities in the district unit; Speaker at several survey and census training sessions

**Experience:**

My experience in using AI for translation has made it easier for me, as I am not very fluent in English. I also use AI to obtain basic inspiration from practical or real-life examples, which I then develop further to present in my presentations. I do not agree with the use of AI to replace the physical presence of teachers and students in the educational context. My students still need the physical presence of teachers in the educational context. However, AI responses can serve as basic inspiration from several case studies, which will then be further developed together by teachers and students

- Total number of students surveyed: 27 students
- Number of students who actively use AI : 10 students
- Strongly Agree: 0 student
- Agree: 0 student
- Neutral: 4 students



Disagree: 23 students  
Strongly Disagree: 0 student

**R7 (MR):**

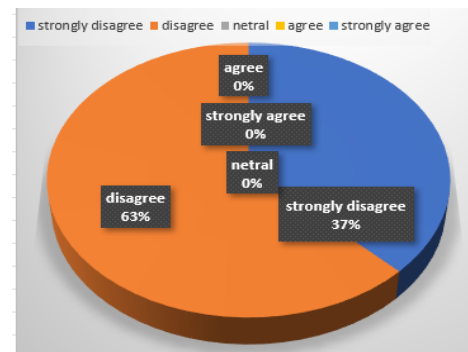
**Personality Type:** Ambivert

**Occupation:** Manager in the Public sector.

**Experience:**

My Experience in using AI and remote work as a solution during and after the COVID-19 pandemic to follow government directives is that I feel work and learning activities become more efficient. My students increased their digital skills with new apps to support their works. I do not agree with the use of AI to replace the physical presence of teachers and students in the educational context. Among my students, 37% Strongly disagree and 63% disagree about AI Replacing the physical presence of teachers and students.

Total number of students surveyed: 40 students  
Number of students who actively use AI : 40 students  
Strongly Agree: 0 student  
Agree: 0 student  
Neutral: 0 student  
Disagree: 25 students  
Strongly Disagree: 15 students



**Advantages:**

- 1) AI is easy-to-use.
- 2) Faster work completion using AI.
- 3) AI enhances digital knowledge and skills

**Limitations:**

- 1) Data security threats
- 2) Lack of direct communications with colleagues and students sometimes making works take longer to complete

**5. Discussion**

The results indicate that the majority of participants strongly disagree with the notion that AI can replace the physical presence of teachers and students in the educational context. A smaller portion of respondents disagree, while a few remain neutral. Only a minority agree with the idea. These findings are consistent with the literature. AI can enhance learning outcomes by providing personalized learning experiences, automating administrative tasks, and offering real-time feedback (Dron, 2022 ;Yousuf & Wahid, 2021). However, significant obstacles to AI adoption include data privacy and security concerns, technical challenges, and resistance to change (Saltman, 2020; Chen et al., 2020; Akmeşe et al., 2021). Ethical and equity concerns, such as the commercialization of education and disparities in access to technology, also hinder the widespread adoption of AI (Saltman, 2020; Fitria, 2023). Effective policies,

teacher training, and community engagement are crucial in mitigating these challenges and ensuring that AI is used ethically and equitably in education ((Adams et al., 2023; Humble & Mozelius, 2019; Natu & Aparicio, 2022).

## **6. Conclusion, Implications, and Recommendations**

This study makes a significant theoretical contribution by demonstrating the multifaceted role of AI in higher education. It highlights both the benefits and challenges of AI integration, emphasizing the importance of personalized learning, administrative efficiency, and increased student engagement. However, it also underscores the obstacles related to data privacy concerns, technical challenges, and resistance to change. The literature presents a compelling case for the cautious yet optimistic incorporation of AI in education. While AI offers substantial potential to enhance and personalize learning, mitigate administrative burdens, and provide global access to educational resources, it also introduces challenges that require careful management. Ongoing research and policy development will be crucial in leveraging AI's benefits while safeguarding against its risks.

### **Implications**

The findings suggest that while AI can greatly enhance educational outcomes, its implementation must be carefully managed to address ethical and equity issues. Educational institutions need to develop robust policies and provide comprehensive training for educators to ensure the effective and ethical use of AI technologies.

### **Recommendations**

- 1) **Policy Development:** Institutions should create and enforce policies that address data privacy, security, and the ethical use of AI in education.
- 2) **Training Programs:** Implement comprehensive training programs for educators on AI tools and their applications to facilitate smooth integration into teaching practices.
- 3) **Community Engagement:** Engage all stakeholders, including students, parents, and educators, in discussions about the use of AI in education to ensure transparency and alignment with community values and needs.
- 4) **Infrastructure Investment:** Invest in the necessary technological infrastructure to support AI implementation, ensuring equitable access for all students.

By addressing these recommendations, educational institutions can leverage AI's potential while mitigating its challenges, leading to a more effective and inclusive educational environment.

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