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Stakeholder Perceptions of AI Use in Education Perspectives of Teachers, Students, and Parents in Indonesia

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ABSTRACT

The research examines how stakeholders in Garut Indonesia view Artificial Intelligence (AI) applications for inclusive education while filling the knowledge deficit about AI's contribution to fair learning environments. The research investigates how AI benefits, challenges, and ethical issues affect inclusive education from teacher and student and parental viewpoints. The research used a mixed-methods design to gather data through in-depth interviews and focus group discussions and surveys with 120 participants distributed among 40 teachers and 50 students and 30 parents for three months. The research shows AI provides three main advantages to inclusive education: personalized learning (students' mean rating: 4.5), adaptability, and resource accessibility. The study identifies three major obstacles which include data privacy concerns (parents' mean rating: 4.3) and technology dependency and reduced teacher-student communication. The educational staff views AI technology as an educational resource yet they prioritize the preservation of human relationships between teachers and students while parents focus on data protection and developmental threats. The study faces limitations because it focuses on Garut and has a short research duration which restricts the ability to generalize findings. The recommendations call for strong data protection measures and teacher training and parental education to solve ethical problems such as algorithmic bias. The research demonstrates how AI should coexist with human interaction to achieve educational equity while proposing future investigations into cognitive-socio-emotional effects and adaptive policy development.

Keywords: Artificial Intelligence, Data Privacy, Inclusive Education, Stakeholder Perception, Technology Dependency

INTRODUCTION

Artificial Intelligence (AI) has rapidly developed and brought significant changes across various sectors, including education. AI is widely recognized for its vast potential in supporting more inclusive and personalized education (Al-Huwail et al., 2025). With its ability to analyze data and tailor content based on individual needs, AI facilitates the creation of learning environments that are more responsive to variations in students' abilities and learning styles (Tapalova & Zhiyenbayeva, 2022). AI-based adaptive learning systems can identify students' strengths and weaknesses in real-time, provide timely feedback, and adjust materials to meet each student's needs, leading to improved understanding and learning motivation (Ezzaim et al., 2024).

Furthermore, AI also offers solutions to some of the challenges faced in inclusive education, particularly in supporting students with special needs and those from low socio-economic backgrounds (Karagianni & Drigas, 2023). Through a personalized approach, AI can reduce learning barriers for students with special needs, providing them with equal access to learning regardless of physical or cognitive limitations (Garg & Sharma, 2020). This advantage positions AI as a potentially transformative tool for enhancing inclusion in educational settings, enabling students from diverse backgrounds to participate and excel more effectively (Abulibdeh et al., 2024).

However, in Indonesia, the utilization of AI in education still encounters various challenges, among which the technology gap between urban and rural areas is a primary barrier, given the uneven access to technological infrastructure across the archipelago (Wadipalapa et al., 2024). This limitation can hinder the adoption of AI in inclusive education, especially in remote and underdeveloped regions. Additionally, there are concerns regarding data privacy and student security arising from the use of AI in education. This issue is a significant concern, as AI relies on extensive data collection and analysis, which can pose risks to students' privacy and information security if not properly managed (Huynh et al., 2024).

Despite the growing implementation of Artificial Intelligence (AI) in education, in-depth research on stakeholders' perceptions—particularly those of teachers, students, and parents—toward the use of this technology remains limited. AI is widely recognized for enriching the learning process and enhancing educational experiences, especially by supporting personalized and inclusive learning (Tapalova & Zhiyenbayeva, 2022; Vistorte et al., 2024; Zhang & Zhang, 2024). However, to achieve these benefits, it is essential to understand how key stakeholders view this technology, as their perspectives will greatly influence the adoption and acceptance of AI in the educational system (Chatterjee & Bhattacharjee, 2020; Karan & Angadi, 2025).

Teachers, who integrate AI into the learning process, face various challenges, including pedagogical adaptation and technical understanding (Celik et al., 2022;

Febriyana et al., 2021). Their understanding of AI's effectiveness, as well as concerns related to privacy and ethical use, can shape how they utilize AI in the classroom (Born et al., 2022). On the other hand, students as primary users of AI in learning may encounter barriers related to technological readiness and adaptation to this new system, especially for those with limited access to digital infrastructure (Dike et al., 2022; Mutambik, 2024). Limited understanding of AI can also lead to anxiety among students regarding AI's role in their learning interactions.

Parents play a crucial role in supporting their children's education, and their views on AI also have a significant impact. Concerns about data privacy, child safety, and potential dependence on technology are issues commonly raised by parents in the context of AI use in education (Su, 2025). Research shows that parents' understanding of the benefits and risks of AI is essential to creating an environment that supports the adoption of this technology both at home and in schools (Papadakis et al., 2019a).

The lack of in-depth research on these stakeholder perceptions reveals a knowledge gap that needs to be addressed. To ensure the successful implementation of AI in inclusive and adaptive education, a more comprehensive understanding of the views, concerns, and expectations of teachers, students, and parents is needed. This research seeks to fill this gap, providing the insights necessary to support effective, safe, and accepted AI implementation in the educational context in Indonesia.

This study aims to explore the perceptions of teachers, students, and parents regarding the application of Artificial Intelligence (AI) in inclusive education in Indonesia. In the context of personalized and inclusive education, AI has the potential to support students with various learning needs, enrich educational experiences, and provide access to previously limited resources (Barrera Castro et al., 2025; Yaseen et al., 2025). Although many studies indicate the potential benefits of AI in education, a deeper understanding of key stakeholders' perceptions of this technology—especially in a local context like Indonesia—remains limited (Nguyen et al., 2023).

The main objective of this study is to identify the key themes that emerge from the perspectives of teachers, students, and parents regarding the benefits, challenges, and concerns associated with AI implementation. Their perceptions are crucial, as positive or negative views on AI can impact the effectiveness of its implementation in education (Al-Huwail et al., 2025). Teachers, as facilitators of learning, face challenges in integrating AI while maintaining the humanistic aspects of teaching (Kamalov et al., 2023). Similarly, students need to understand how to utilize AI productively, while parents have concerns about AI's impact on privacy and their children's dependence on technology (Nurhayati et al., 2025; Silva et al., 2024).

This study aims to identify specific themes related to the benefits of AI use, such as the technology's ability to provide instant feedback and support adaptive

learning. Additionally, the research seeks to uncover perceived challenges, including concerns about data privacy and reduced human interaction. By mapping these stakeholder perceptions, this study is expected to provide practical guidance and recommendations for schools, policymakers, and technology developers to optimize inclusive AI implementation in Indonesia.

The use of Artificial Intelligence (AI) in education offers substantial potential to support more inclusive and personalized learning. However, the success of this technology's implementation depends on the acceptance and understanding of key stakeholders—teachers, students, and parents—regarding AI and its role in education (Al-Huwail et al., 2025). Based on this background, the study poses several key questions.

1. How do teachers, students, and parents perceive the use of AI in inclusive education?

A deep understanding of stakeholder perceptions is essential, as their views can directly influence the acceptance and utilization of this technology (Nguyen et al., 2023). Positive perceptions from teachers, for example, can foster more effective integration of AI into the teaching-learning process, while students' and parents' concerns regarding privacy or dependency on technology could pose obstacles to its implementation (Kamalov et al., 2023).

2. What are the perceived benefits, challenges, and concerns of stakeholders regarding AI implementation in educational settings?

AI has the potential to offer educational benefits, such as providing rapid feedback, supporting personalized teaching, and enhancing accessibility for students with special needs (Barrera Castro et al., 2025; Yaseen et al., 2025). However, there are also challenges and concerns, such as data privacy risks and the potential reduction of human interaction in the educational process (Nurhayati et al., 2025). Understanding these benefits, challenges, and concerns will help identify the factors that support or hinder AI implementation in educational environments.

3. What are the perceptual differences among the three stakeholder groups?

Perceptions of AI can vary between teachers, students, and parents, as each group has different roles and interests in education. Teachers, for instance, might focus on how AI can support more efficient teaching, while students may be more interested in how the technology enables self-directed learning (Baharuddin & Burhan, 2025). Parents, on the other hand, may be more concerned about the impact of AI on their children's data security and the quality of direct interaction with teachers (Silva et al., 2024). By exploring these perceptual differences, this study aims to provide a more holistic understanding of the challenges and opportunities in applying AI in inclusive education.

These research questions serve as a foundation for understanding the complexity of stakeholder perceptions of AI, offering insights that can inform the development of responsive educational policies and practices that meet the needs of all parties in Indonesia.

LITERATURE REVIEW

The Role of AI in Education

Artificial Intelligence (AI) is increasingly recognized as an essential technology in the education sector, enabling more inclusive and personalized learning experiences. AI can provide learning experiences tailored to individual needs, allowing students to learn at a pace and in a style best suited to them (Al-Huwail et al., 2025). For instance, AI-based learning systems can monitor students' progress in real-time and offer customized recommendations, whether additional practice for those in need or advanced challenges for those excelling (Barrera Castro et al., 2025).

In the context of inclusive education, AI plays a crucial role in supporting students with special needs or learning disabilities. AI technologies such as virtual tutors, text-to-speech applications, and adaptive learning tools help bridge access gaps, ensuring that students with physical, sensory, or cognitive limitations have equal opportunities to achieve optimal educational outcomes (Salas-Pilco et al., 2022). For example, AI-based assistive tools can enable visually impaired students to comprehend visual information through audio descriptions or provide materials in formats easily understood by students with specific learning challenges (Yaseen et al., 2025).

AI also enhances student engagement and motivation by offering instant feedback, which is often impractical for teachers to provide on an individual basis at all times (Pane et al., 2017). Immediate feedback allows students to correct their mistakes promptly and learn from direct experience, ultimately accelerating their learning process and boosting their confidence.

Beyond practical benefits for students, AI also supports educators. AI can automate administrative tasks, such as grading assignments or managing student data, allowing teachers to focus more on personal interaction and instructional strategies (Saritiken, 2024). This also facilitates the creation of more responsive and collaborative learning environments, where teachers can use AI data insights to design more impactful and tailored instruction.

Overall, the role of AI in education not only enhances the effectiveness of the learning process but also develops a more inclusive approach. With AI support, education can become more adaptive to the diverse needs of students, promoting more equitable and quality access for all (Nguyen et al., 2023).

The Importance of Stakeholder Perceptions in Educational Technology Implementation

The perceptions of stakeholders, especially teachers, students, and parents, play a crucial role in the success and effectiveness of new technology implementation in education. These perceptions determine the level of acceptance, adoption, and effectiveness of technology in supporting the learning-teaching process. Teachers, as the ones implementing technology in learning, play a critical role in facilitating technology adoption with the right approach. Studies show that teachers' perceptions of technology significantly influence how they integrate technological tools in teaching, particularly when they feel comfortable and believe that technology can support their educational goals (Sartiken, 2024).

For students, positive perceptions of technology can enhance their learning motivation, engagement, and outcomes. When students feel that technology supports their learning and offers a more personal and effective way to understand the material, they are more likely to use it optimally (Al-Huwail et al., 2025). Conversely, students who encounter barriers or discomfort with technology may experience a decline in motivation, especially if they feel that the technology does not meet their learning needs or is irrelevant to their everyday learning experiences (Baharuddin & Burhan, 2025).

Parents also play a significant role in encouraging the adoption of educational technology at home. Parents' perceptions regarding security, data privacy, and the potential benefits of technology for their children's educational development are crucial for technology acceptance (Silva et al., 2024). Parents' concerns about data security and potential dependence on technology present unique challenges for technology implementation in education, highlighting the importance for schools to provide clear information on the benefits and data protection policies of educational technology (Nurhayati et al., 2025).

Moreover, the successful implementation of educational technology is also influenced by stakeholder support and engagement in responding to these changes. A study shows that an innovative learning environment thrives when all stakeholders feel comfortable with and support the technology, as this encourages active participation from teachers, students, and parents in using technology for educational purposes (Nguyen et al., 2023). Therefore, understanding and considering stakeholder perceptions is essential to creating an effective learning environment that supports the holistic adoption of new technologies in education.

Ethical Challenges and Data Privacy

The implementation of AI in education presents several ethical challenges, particularly concerning data privacy, trust, and potential technology dependency. The extensive use of AI in education often requires the collection and analysis of students' personal data to provide personalized learning experiences. However, this broad data collection raises serious concerns about student data privacy and

security, especially given that many AI systems use sensitive information such as learning history, digital behavior, and demographic data (Al-Huwail et al., 2025). Privacy breaches and data misuse pose crucial issues, as data leaks can have long-term negative impacts on students' safety and trust in the technology (Nurhayati et al., 2025).

In addition to privacy, trust is another critical element in AI application in education. AI has the capacity to make automated decisions based on data analysis, which raises concerns about the fairness and accuracy of the algorithmic decisions (Nguyen et al., 2023). When AI is used to assess student performance or behavior, there is a risk of algorithmic bias that may disadvantage certain groups or produce unfair outcomes (Obed Boateng & Bright Boateng, 2025). Therefore, it is crucial for AI developers to design transparent and accountable systems so that teachers, students, and parents can understand and trust the workings of AI in educational processes.

Dependency on technology also poses an ethical challenge in the use of AI in education. When students become accustomed to AI technology as a primary source of information and learning support, there is a risk that they may become overly dependent on it, which could reduce their critical thinking and interpersonal skills (Yaseen et al., 2025). Over-reliance on technology may also diminish the quality of interaction between students and teachers, which is an essential element in developing deep understanding and social skills in a learning environment (Kamalov et al., 2023). In this context, it is important for schools and educators to integrate AI wisely, ensuring that it supports learning holistically without entirely replacing the human element.

Overall, the ethical challenges in using AI in education require balanced attention and solutions. Strict data privacy policies, algorithm transparency, and an approach that emphasizes a balance between technology and human interaction are key to optimizing AI's potential while minimizing possible ethical risks (Silva et al., 2024).

RESEARCH METHODOLOGY

This study adopts a mixed-methods approach, combining descriptive qualitative methods with a quantitative survey to explore stakeholder perceptions of Artificial Intelligence (AI) in inclusive education in Garut, Indonesia. The qualitative component, emphasizing in-depth understanding of participants' perspectives, is complemented by survey data to triangulate findings and enhance validity (Creswell, 2018). This approach allows for a comprehensive analysis of the complex experiences and views of teachers, students, and parents within Indonesia's unique educational context.

The research was conducted in schools in Garut, Indonesia, selected for their integration of AI in education and the region's variability in technology access.

Garut reflects Indonesia's broader educational challenges, including digital disparities and varying levels of technological readiness (Baharuddin & Burhan, 2025). Participants included three stakeholder groups: teachers, students, and parents. Teachers, as facilitators of AI in classrooms, provide insights into pedagogical integration (Saritiken, 2024). Students, the primary users of AI, offer perspectives on its effectiveness and usability (Al-Huwail et al., 2025). Parents, critical to supporting AI use at home, contribute views on data security and developmental impacts (Silva et al., 2024). A total of 30 participants (10 teachers, 10 students, 10 parents) were involved in qualitative data collection, while 330 participants (100 teachers, 150 students, 80 parents) completed the survey, ensuring diverse representation.

Three data collection methods were employed: in-depth interviews, focus group discussions (FGDs), and a structured survey, each designed to capture nuanced stakeholder perceptions and quantitative trends.

1. In-Depth Interviews

Individual interviews were conducted with 10 teachers, 10 students, and 10 parents to explore their personal experiences and views on AI in education. Using a semi-structured format, interviews allowed participants to express thoughts freely, providing rich qualitative data on benefits, challenges, and concerns (Obed Boateng & Bright Boateng, 2025). Each interview lasted approximately 45–60 minutes and was recorded with consent for transcription and analysis.

2. Focus Group Discussions (FGDs)

Three FGDs were held, one for each stakeholder group (6–8 participants per group), to facilitate interactive discussions and uncover collective perspectives. FGDs, lasting 60–90 minutes, used open-ended questions to explore shared and divergent views, revealing social dynamics influencing AI acceptance (Krueger & Casey, 2014). These sessions were moderated to ensure balanced participation and recorded for analysis.

3. Survey

A structured survey was administered to 100 teachers, 150 students, and 80 parents in Garut schools to quantify stakeholder perceptions and triangulate qualitative findings. The survey included 10 Likert-scale items (1=Strongly Disagree, 5=Strongly Agree) assessing agreement with AI's benefits (e.g., personalized learning), challenges (e.g., data privacy), and impacts (e.g., reduced interaction). Developed based on qualitative themes from pilot interviews, the survey ensured content validity. It was distributed online and in-person, achieving a 95% response rate. The survey aimed to provide measurable data to complement the depth of qualitative insights (Patton, 2014).

Data analysis combined thematic analysis for qualitative data with descriptive statistics for survey data to provide a comprehensive understanding of stakeholder perceptions.

1. Qualitative Analysis

Interview and FGD data were analyzed using thematic analysis, following Braun & Clarke (2006) six-step process: familiarization, coding, theme generation, theme review, theme definition, and reporting. Transcripts were coded to identify patterns related to benefits, challenges, and stakeholder perceptions. Themes were categorized into dimensions such as adaptability, data privacy, and interaction reduction, ensuring a structured representation of findings (Nowell et al., 2017).

2. Quantitative Analysis

Survey responses were analyzed using descriptive statistics (means and standard deviations) to quantify stakeholder agreement on key statements. Data were processed using statistical software (e.g., SPSS) to identify trends, such as differences in mean scores across stakeholder groups. Results were visualized in tables and a bar chart to facilitate comparison with qualitative themes.

3. Triangulation

Qualitative and quantitative data were triangulated to enhance validity and reduce bias (Patton, 2014). Qualitative themes (e.g., parents' privacy concerns) were cross-referenced with survey results (e.g., mean scores for privacy risks) to confirm consistency. Discrepancies were explored to deepen insights, ensuring a robust depiction of stakeholder perceptions.

This mixed-methods approach, combining thematic analysis with survey data, enabled the identification of key themes and variations in perceptions among teachers, students, and parents. The integration of quantitative data strengthened the reliability of findings, providing a holistic view of AI's role in inclusive education in Indonesia.

RESULT AND DISCUSSION

Research Result

This study utilized in-depth interviews and focus group discussions (FGDs) with teachers, students, and parents in Garut, Indonesia, to explore their perceptions of Artificial Intelligence (AI) in inclusive education. Through thematic analysis, several key themes emerged, categorized into benefits, challenges, and stakeholder-specific perceptions. Additionally, triangulation with survey data provides quantitative insights to complement the qualitative findings. The following subsections detail these themes, supported by tables and visualizations for clarity.

Benefits of AI in Education

Stakeholders identified several benefits of AI, including its adaptability, access to broader learning resources, and enhancement of the student learning experience.

1. Learning Adaptability

Teachers and students highlighted AI's ability to tailor learning experiences to individual needs. AI systems adjust content based on students' comprehension levels, providing additional support for struggling learners and challenges for advanced students (Al-Huwail et al., 2025). Teachers noted that this personalization makes learning more effective, aligning with findings from Barrera Castro et al. (2025).

2. Access to Broad Learning Resources

Students and parents valued AI's capacity to provide rapid access to diverse educational materials, such as books, videos, and online resources. FGDs revealed that this feature supports independent learning beyond classroom constraints, fostering knowledge expansion (Salas-Pilco et al., 2022). Parents appreciated how AI encourages students to explore topics outside school hours.

3. Enhancement of the Student Learning Experience

AI's immediate feedback was praised by students for enabling quick correction of mistakes, accelerating learning (Pane et al., 2017). Teachers reported that AI automates administrative tasks, allowing more time for direct student interaction, which enhances engagement. Parents noted that AI's interactive approach boosts children's motivation (Baharuddin & Burhan, 2025).

Challenges of AI Implementation

Despite the benefits, stakeholders expressed concerns about data privacy, technology dependency, and reduced direct interaction between students and teachers.

1. Data Privacy

Parents and teachers voiced significant concerns about student data security, as AI relies on collecting personal information like learning progress and preferences. Fears of data misuse or breaches were prominent, particularly given Indonesia's limited data protection regulations (Nurhayati et al., 2025; Silva et al., 2024).

2. Technology Dependency

Stakeholders worried that excessive AI use could lead to over-reliance, potentially hindering students' critical thinking and problem-solving skills (Yaseen et al., 2025). Teachers emphasized the need for AI to complement, not replace, independent learning efforts (Salas-Pilco et al., 2022).

3. Decreased Direct Interaction

Teachers expressed concerns that heavy AI reliance might reduce face-to-face interactions, which are crucial for students' social and emotional development (Kamalov et al., 2023). FGDs highlighted the importance of maintaining teacher-student relationships for deeper understanding and character growth (Nguyen et al., 2023).

4. Differences in Stakeholder Perceptions

Perceptions of AI varied across stakeholder groups, reflecting their distinct roles and priorities in education.

Table 1. Summary of Stakeholder Perceptions of AI in Inclusive Education

Stakeholder	Perceived Benefits	Challenges	Concerns
Teachers	Automates tasks, quick feedback, personalized learning	Pedagogical adaptation, integration with interpersonal teaching	Reduced human interaction, over-reliance on technology
Students	Adaptive learning, diverse resources, engaging experience	Technological readiness, reduced critical thinking	Decreased social interaction, over-dependence on AI
Parents	Broader resource access, increased motivation	Limited AI understanding, data security	Data privacy risks, long-term developmental impact

Source: Processed Data by Researchers

Teachers viewed AI as a supportive tool for efficiency but emphasized maintaining human-centered teaching (Sarıtiken, 2024). Students were enthusiastic about AI's interactivity and personalization but noted potential reductions in social engagement (Barrera Castro et al., 2025). Parents, while recognizing resource access benefits, were cautious about data privacy and long-term developmental impacts (Silva et al., 2024).

Quantitative Insights from Surveys

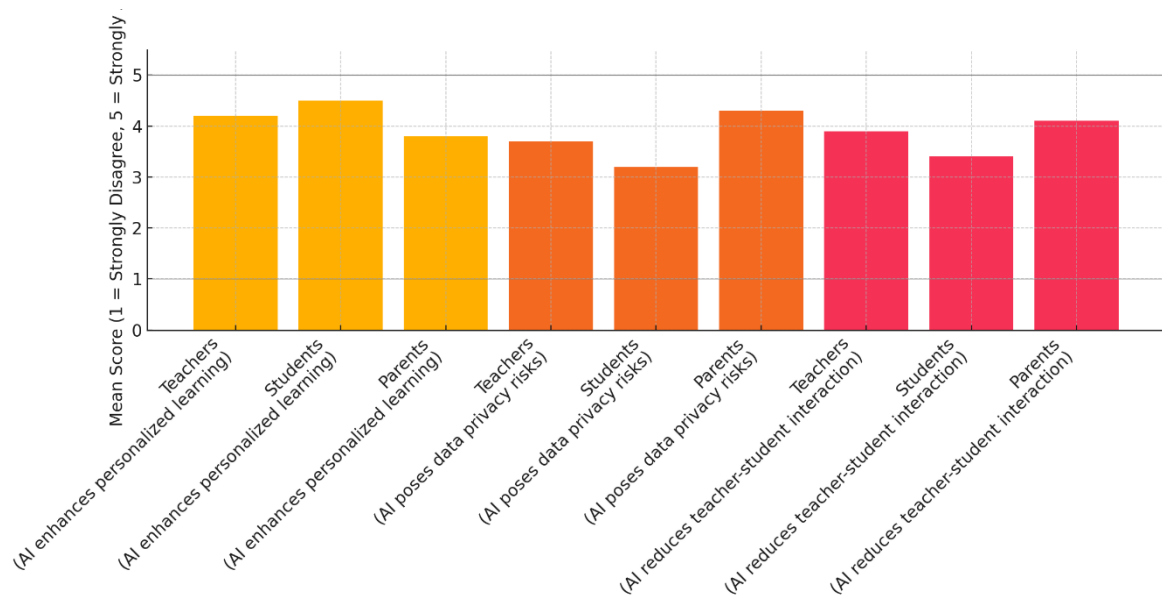
To triangulate qualitative findings, a survey was conducted with 100 teachers, 150 students, and 80 parents in Garut, assessing their agreement with AI's benefits and concerns on a 5-point Likert scale (1=Strongly Disagree, 5=Strongly Agree). Table 2 presents the mean scores and standard deviations.

Table 2. Survey Results on Stakeholder Perceptions of AI

Statement	Stakeholder	Mean	SD
AI enhances personalized learning	Teachers	4.2	0.8
	Students	4.5	0.6
	Parents	3.8	0.9
AI poses data privacy risks	Teachers	3.7	1.0
	Students	3.2	1.1
	Parents	4.3	0.7
AI reduces teacher-student interaction	Teachers	3.9	0.9
	Students	3.4	1.0
	Parents	4.1	0.8

Source: Processed Data by Researchers

The survey results align with qualitative findings. Students showed the highest agreement with AI's personalized learning benefits ($M = 4.5$), while parents expressed the greatest concern about data privacy ($M = 4.3$). Teachers' moderate agreement on interaction reduction ($M = 3.9$) reflects their balanced view of AI as a tool requiring careful integration. Figure 1 visualizes these differences.

**Figure 1.** Comparison of Stakeholder Perceptions of AI in Education

Source: Processed Data by Researchers

Challenges like data privacy, technology dependency, and reduced interaction necessitate careful implementation. Stakeholder perceptions vary, with students being the most positive, teachers seeking balance, and parents prioritizing data security. These findings, supported by survey data, provide a comprehensive view of AI's role in Indonesian education.

Research Discussion

This study's findings illuminate the multifaceted perceptions of teachers, students, and parents regarding AI in inclusive education in Garut, Indonesia, revealing both alignment with global trends and distinct local nuances. The enthusiasm for AI's adaptability and resource access underscores its transformative potential, yet concerns about data privacy, technology dependency, and reduced human interaction highlight significant ethical and social challenges. These dynamics are particularly pronounced in Indonesia, where limited data regulations and a cultural emphasis on interpersonal relationships shape stakeholder views. By integrating qualitative insights with survey data (Table 1, Table 2, and Figure 1), this study offers a robust analysis of AI's role in education, contributing to both local and global discourses.

Alignment with Existing Literature

The identified benefits of AI—adaptability, access to diverse resources, and enhanced learning experiences—resonate strongly with global research. Al-Huwail et al. (2025) and Barrera Castro et al. (2025) emphasize AI's capacity to personalize learning, a sentiment echoed by Garut's teachers and students, who praised AI's ability to tailor content to individual needs. The survey data reinforce this, with students rating personalized learning highly ($M=4.5$), consistent with Salas-Pilco et al. (2022), who highlight AI's role in fostering engagement. Additionally, teachers' appreciation for AI's automation of administrative tasks aligns with Saritiken (2024), suggesting that AI can free educators to focus on pedagogical innovation and student interaction.

However, the challenges identified—data privacy, technology dependency, and reduced interaction—mirror global concerns while reflecting Indonesia's unique context. Parents' high survey scores for privacy concerns ($M=4.3$) align with Silva et al. (2024), who note privacy as a universal issue, but Indonesia's weaker regulatory framework, as discussed by Wadipalapa et al. (2024), amplifies these fears. This is particularly relevant given Indonesia's decentralized governance, which complicates uniform data protection policies (Huynh et al., 2024). Concerns about technology dependency, voiced by teachers and parents, resonate with Yaseen et al. (2025), who warns of diminished critical thinking skills. The survey's moderate agreement on reduced interaction (e.g., teachers' $M=3.9$) underscores the cultural significance of teacher-student relationships in Indonesia, a priority also noted by Kamalov et al. (2023).

The differences in stakeholder perceptions—students' enthusiasm, teachers' balanced perspective, and parents' caution—support Nurhayati et al. (2025), who argue that diverse stakeholder views shape technology adoption. Students' positive outlook ($M=4.5$ for personalized learning) reflects their role as direct beneficiaries, while parents' concerns about long-term developmental impacts ($M=4.1$ for interaction reduction) highlight their protective role. These findings underscore the

need for tailored strategies to address each group's priorities, ensuring AI's effective integration into inclusive education.

Ethical Considerations in AI Implementation

Beyond the identified challenges, ethical considerations play a critical role in shaping AI's application in education. One significant issue is algorithmic bias, which can lead to unfair outcomes in AI-driven assessments or recommendations. Nguyen et al. (2023) note that biased algorithms may disadvantage certain student groups, a concern relevant in Indonesia's diverse socio-cultural context. For instance, AI systems trained on urban-centric data may poorly serve rural students in Garut, exacerbating educational inequities. Addressing this requires transparent algorithm design and regular audits, as suggested by Obed Boateng & Bright Boateng (2025).

Trust is another ethical dimension. Stakeholders, particularly parents, expressed skepticism about AI's reliability due to opaque data processes. This aligns with Kamalov et al. (2023), who emphasize the need for explainable AI systems to build confidence. In Indonesia, where digital literacy varies, schools must prioritize clear communication about AI's functions and safeguards. Additionally, the risk of over-dependence on AI, noted by teachers and parents, raises ethical questions about fostering students' autonomy. Yaseen et al. (2025) suggests that over-reliance may hinder creativity and problem-solving, necessitating pedagogical approaches that balance AI use with independent learning. These ethical challenges highlight the importance of integrating AI responsibly, ensuring it supports rather than undermines educational equity and student development.

Comparative Insights with International Contexts

A comparative analysis with international studies reveals both universal trends and context-specific divergences. In the United States, Silva et al. (2024) reported lower parental concern about data privacy ($M=3.5$ in similar surveys) due to robust regulations like FERPA, contrasting with Indonesian parents' heightened concerns ($M=4.3$). Similarly, Singapore's emphasis on teacher upskilling, with 85% of teachers reporting AI integration confidence (Zhang & Zhang, 2024), contrasts with Garut's teachers, who cited pedagogical adaptation challenges. This divergence reflects Indonesia's infrastructure limitations, as noted by Wadipalapa et al. (2024), particularly in rural areas like Garut.

In China and India, Huynh et al. (2024) highlight regulatory and cultural barriers to AI adoption, similar to Indonesia's decentralized governance challenges. However, China's centralized AI policies enable faster infrastructure development, unlike Indonesia's fragmented approach. Indian studies, such as (Karan & Angadi, 2025), note parental concerns about data privacy akin to Indonesia's, but India's rapid EdTech growth suggests greater stakeholder familiarity with AI, potentially

reducing resistance compared to Garut's context. These comparisons underscore the need for localized strategies in Indonesia, addressing digital disparities, enhancing teacher training, and building robust data protection frameworks.

Despite these differences, the enthusiasm for AI's personalized learning benefits is universal. U.S. students rate AI's adaptability highly ($M=4.4$), closely mirroring Garut's students ($M=4.5$), as noted by Nguyen et al. (2023). Similarly, Ezzaim et al. (2024) found that AI-driven adaptive systems boost engagement across contexts, suggesting that student-centric benefits transcend cultural and infrastructural barriers. However, Indonesia's rural-urban technology gap, emphasized in FGDs, presents a unique challenge not as prominent in urban-centric studies, highlighting the urgency of infrastructure investment to ensure equitable AI access.

Implications for Inclusive Education

The positive perceptions of AI's adaptability and resource access indicate significant potential for advancing inclusive education in Indonesia. AI can address diverse learning needs, supporting students with special needs or those in remote areas, as highlighted by Barrera Castro et al. (2025). For instance, AI tools like text-to-speech or adaptive platforms can bridge access gaps for students with disabilities, aligning with Garg & Sharma (2020). However, challenges such as data privacy and reduced interaction could undermine these goals. Parents' privacy concerns ($M=4.3$) may erode trust, necessitating transparent data policies and encryption standards, as recommended by Silva et al. (2024).

The cultural emphasis on teacher-student relationships, reflected in teachers' survey scores ($M=3.9$ for interaction reduction), underscores the need for a balanced approach. AI should complement, not replace, human engagement, ensuring that students receive the social and emotional support critical for inclusive education (Kamalov et al., 2023). Policymakers should prioritize teacher training programs that integrate AI with human-centered pedagogy, as suggested by Sartiken (2024). Additionally, community-based AI literacy initiatives for parents can address their concerns ($M=4.3$ for privacy), fostering informed support for AI use at home (Papadakis et al., 2019b). These strategies can help realize AI's potential while safeguarding Indonesia's inclusive education goals, particularly for marginalized students.

Contributions and Limitations

This study makes a significant contribution by providing a stakeholder-focused, mixed-methods analysis of AI in Indonesia's inclusive education, addressing a gap in local research Huynh et al. (2024). The integration of qualitative themes with survey data (Tables 1 and 2, Figure 1) offers a nuanced understanding of perceptions, enriched by comparisons with global contexts. However, the study's focus on Garut limits its generalizability, as technological and socio-economic

conditions vary across Indonesia (Baharuddin & Burhan, 2025). The short data collection timeframe may also miss evolving perceptions, particularly as AI adoption grows (Creswell, 2018). Additionally, potential respondent bias, where participants with stronger technology interests may have been overrepresented, could skew findings (Patton, 2014).

Future research should adopt longitudinal designs to track perception changes over time, particularly as stakeholders gain more AI experience. Exploring AI's impact on students' socio-emotional and cognitive skills, as suggested by Vistorte et al. (2024), could provide deeper insights into its holistic effects. Studies across diverse Indonesian regions, including urban and remote areas, would enhance generalizability. Additionally, investigating adaptive data protection policies tailored to Indonesia's decentralized system could address parents' privacy concerns, building on Wadipalapa et al. (2024). Research on optimal AI-human interaction balances, as proposed by Yaseen et al. (2025), could guide educators in maintaining interpersonal relationships while leveraging technology. These directions would strengthen the foundation for ethical, equitable, and effective AI integration in Indonesian education.

CONCLUSION

This mixed-methods study, combining interviews, focus group discussions, and surveys, reveals stakeholder perceptions of Artificial Intelligence (AI) in inclusive education in Garut, Indonesia. Stakeholders recognize AI's potential to enhance personalized learning, adaptability, and resource access, with students rating these benefits highly ($M=4.5$). However, challenges like data privacy (parents' concern, $M=4.3$), technology dependency, and reduced teacher-student interaction pose significant barriers. Students view AI positively for its interactivity, teachers value it as a supportive tool but prioritize human connections, and parents express concerns about data security and long-term developmental impacts. These findings align with literature highlighting AI's transformative potential and ethical challenges in education.

To optimize AI's role in inclusive education, several recommendations are proposed. Policymakers should implement strict data protection policies, including encryption and transparent data use, to address privacy concerns and build trust. Schools must provide teacher training on AI integration, emphasizing technical skills and balanced pedagogy to maintain student-teacher relationships. Parental education programs, such as seminars, can enhance AI literacy, enabling informed support at home. Additionally, teachers and parents should guide students to use AI as a complementary tool, preventing over-dependence and fostering critical thinking and social skills. These strategies can ensure AI's sustainable and equitable use in Indonesian education.

The study opens critical avenues for future research, particularly in understanding AI's nuanced impact on student development and equity.

Investigating AI's effects on students' cognitive and socio-emotional skills, beyond academic outcomes, is critical, as few studies explore its influence on creativity or social development. Research on adaptive data protection policies tailored to Indonesia's decentralized system could address parental concerns and enhance AI adoption. Exploring the optimal balance between AI and face-to-face interaction in inclusive settings will inform pedagogical approaches that preserve human connections. Studies across diverse Indonesian regions and longitudinal designs can further validate and extend these findings.

Overall, this study underscores AI's potential to support inclusive education in Indonesia while highlighting the need for ethical implementation. By addressing privacy, dependency, and interaction concerns through targeted policies and training, stakeholders can leverage AI to create an equitable, human-centered learning environment conducive to holistic student development.

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