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Challenges and Strategies of Elementary School Teacher Management in Facing Artificial Intelligence (AI) Disruption in Student Character Education

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ABSTRACT

The disruption of Artificial Intelligence (AI) in the education sector presents a fundamental dualism: as an innovative instrument with transformative potential, but also as a significant challenge to the pillars of character education at the elementary school level. This article systematically examines these issues in the context of education in Indonesia. An in-depth analysis identifies three main dimensions of challenges faced by elementary school teachers: (1) ethical and moral challenges, including the erosion of academic integrity, threats to student data privacy, and algorithmic bias; (2) socio-emotional challenges, including the risk of empathy atrophy, social isolation due to reduced human interaction, and digital dependency; and (3) pedagogical challenges, highlighting the limitations of AI as a moral educator and a shift in learning focus that risks neglecting the affective domain. Facing these multidimensional challenges, the role of teachers undergoes a crucial transformation from information conveyors to digital character architects. Consequently, a strategic and comprehensive teacher management framework is needed. This article proposes a management strategy centered on four pillars: (1) adaptive continuing professional development (PKB) based on the Technological Pedagogical Content Knowledge (TPACK) framework; (2) transformative instructional leadership based on human-centric principles; (3) developing school curricula and policies that are responsive to AI ethics; and (4) strengthening the education ecosystem through synergistic collaboration between schools, parents, and the government. In conclusion, the success of integrating AI without sacrificing character education does not depend on technological sophistication, but rather on the readiness, competence, and resilience of teachers. Therefore, investing in human-centered teacher management is a definitive prerequisite for wisely harnessing the potential of AI while fortifying the foundation of the character of future generations.

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1. Introduction

AI Disruption as an Inevitability in Global and National Education

The contemporary era is marked by the massive penetration of Artificial Intelligence (AI) into various sectors of life, including education (Rif'at Shafwatul Anam Surya Gumilar, 2021). This technology offers various innovative solutions that have the potential to fundamentally improve the effectiveness and efficiency of the learning process (Rif'at Shafwatul Anam Surya Gumilar, 2021). In Indonesia, the urgency and relevance of AI in the educational landscape are reflected in the exponential increase in the number of AI-themed scientific publications. An analysis of SINTA-accredited journals shows a significant surge in publications in the 2024 - 2025 period, indicating increasing academic and institutional interest in this topic (Rif'at Shafwatul Anam Surya Gumilar, 2021). This phenomenon is not merely an academic trend, but is aligned with the national strategic agenda. The Indonesian government, through the document "Indonesia's National Artificial Intelligence Strategy 2020–2045," has designated AI as one of the main pillars to achieve the vision of Golden Indonesia 2045, with the education sector being one of its main focuses. (Waita et al., 2025). Thus, AI disruption in education is not a future possibility, but rather an ongoing inevitability actively driven by national policies.

The Urgency of Character Education at the Elementary School Level

Amidst the wave of technological disruption, character education at the elementary school level (SD) occupies a crucial yet vulnerable position. The elementary education phase is a formative period in which the foundations of an individual's morals, ethics, and social-emotional competencies are laid (Sugiarti, 2011). Character education, defined as a way of thinking and behaving that characterizes an individual for living and working together in society, aims to instill noble values such as honesty, responsibility, discipline, respect, and caring (Sugiarti, 2011). This goal resonates strongly with the national ideal of forming a Pancasila Student Profile, which mandates six main character dimensions: (1) Faith, devotion to God Almighty, and noble character; (2) Independence; (3) Mutual cooperation; (4) Global diversity; (5) Critical reasoning; and (6) Creativity (Widana, 2023).

Character is not formed instantly, but rather through a process of habituation, role modeling, and intensive and continuous social interaction within the school, family, and community environments (Sugiarti, 2011). These fundamental processes are potentially disrupted by AI technology interventions, which tend to mediate and reduce direct human interaction. Therefore, the elementary school level is the most vital arena for study, as the impact of AI at this stage will determine the direction of character development for future generations.

However, there is a significant anomaly in the AI research landscape in Indonesia. Despite a general surge in publications, studies specifically focusing on AI implementation at the elementary and junior high school levels remain extremely rare (Rif'at Shafwatul Anam Surya Gumilar, 2021). This research gap is not simply a matter of omission or methodological delay. The lack of focus on elementary education can be interpreted as a manifestation of deep-seated systemic concerns among academics and practitioners. This suggests an implicit recognition of the higher ethical risks and extraordinary pedagogical

complexities of implementing AI with vulnerable child populations. Various studies have raised serious concerns regarding data privacy, algorithmic bias, and the need for a human - centric approach to AI implementation (Waita et al., 2025). Given that children's character development relies heavily on human interaction, empathy, and role modeling—areas in which AI has inherent limitations and even the potential to undermine it this research gap indicates that the education community is not yet fully prepared or ethically comfortable intervening in this sensitive domain. This situation creates an urgent need for the formulation of a robust conceptual and strategic framework, as attempted in this article.

Problem Formulation and Article Objectives

AI disruption presents fundamental challenges for elementary school teacher management in their role as character educators. Teachers are faced with the dilemma of adopting technological innovation without sacrificing the humanistic essence of education. Based on this background, the main problem formulation in this article is: "How can an effective elementary school teacher management strategy address the challenges of AI disruption to fortify and strengthen students' character education?"

To answer this question, this article has three main objectives:

a. Systematically map the multidimensional challenges posed by AI to the character education of elementary school students, covering ethical, socio-emotional, and pedagogical aspects.
b. Analyze the transformation of roles and competencies required by elementary school teachers to navigate the AI-integrated educational landscape.
c. Formulate a comprehensive and implementable teacher management strategy framework to ensure character education remains a top priority amidst technological disruption.

2. Research Methodology

This study uses a library research method. The library research was chosen because the main focus of this study is to explore, review, and analyze theoretical concepts and empirical findings from various relevant scientific sources related to the role and management of elementary school teachers in facing the disruption of Artificial Intelligence (AI) on student character education.

3. Result and Discussion

The Disruptive Landscape of Artificial Intelligence in Indonesian Primary Education

The Potential of AI in Learning Transformation

Artificial Intelligence promises a revolution in educational practices through a range of capabilities that can transform the learning experience. One of the greatest potentials lies in its ability to enable personalized and adaptive learning. AI-based systems, such as *Intelligent Tutoring Systems* (ITS) and *adaptive learning platforms*, can analyze student performance in *real time* and adjust the material, pace, and learning style to suit each individual's unique needs (Waita et al., 2025). This personalization is especially crucial at the elementary level,

where students' cognitive development and learning characteristics are highly diverse (Untu et al., 2025). By providing instant feedback and relevant content, AI can significantly improve learning effectiveness and student motivation (Untu et al., 2025).

Furthermore, AI has the potential to automate various time-consuming administrative tasks, such as managing student data, scheduling, and grading routine assignments (Rif'at Shafwatul Anam Surya Gumilar, 2021). This automation allows teachers to shift their focus and energy from administrative work to more essential and humanistic aspects of teaching, such as providing personalized guidance, facilitating discussions, and building emotional connections with students (TR, 2025). Furthermore, AI can serve as a bridge to expand access to quality education. Through tools such as *chatbots*, virtual tutors, and intelligent *e-learning* systems, students in remote areas or with disabilities can access high-quality learning content that was previously difficult to reach (Waita et al., 2025).

Implementation Reality: Gaps and Limitations

Despite the promising potential of AI, the reality of its implementation in Indonesia, particularly at the primary education level, faces significant challenges and limitations. The primary obstacle is the "digital divide," *which* manifests itself in disparities in access to adequate technological infrastructure (Waita et al., 2025). Many schools, particularly in remote and underdeveloped areas, still struggle with limited internet connectivity and minimal hardware availability, making the adoption of AI technology a luxury that is difficult to achieve (Jusman & Usman, 2025).

Another crucial challenge lies in the readiness of human resources, namely teachers. The effective implementation of educational technology depends heavily on the digital skills and literacy of educators (Jusman & Usman, 2025) . However, numerous studies show that the level of teacher readiness and skills in using technology pedagogically remains a major obstacle (Ulliyah, 2024). Without adequate and ongoing training, teachers may feel overwhelmed or even resist adopting new technologies (TR, 2025). As previously mentioned, this limitation is exacerbated by the limited focus on research and development of AI applications specifically designed for the context of primary education in Indonesia, where most current discourse and development are still dominated by the context of higher education (Rif'at Shafwatul Anam Surya Gumilar, 2021).

The common narrative that AI will “free up teachers’ time” by automating administrative tasks is an oversimplification that risks obscuring deeper challenges. In reality, AI adoption creates a “competence paradox.” On the one hand, AI can indeed reduce time spent on routine tasks (Waita et al., 2025). However, on the other hand, it drastically increases the demand for entirely different, higher-level competencies for which most teachers are currently unprepared. The time “saved” from administration is not simply freed up. It must be immediately invested in taking on new, far more complex cognitive burdens: redesigning pedagogy to align with AI tools, making careful ethical assessments of each technology used, and facilitating dynamic and safe digital learning environments (Ulliyah, 2024). Thus, the problem shifts from a quantitative issue (lack of time) to a qualitative one (lack of advanced skills). This is a fundamental competency gap, which cannot be addressed by the current

teacher management and professional development systems, which often still focus on basic technical training.

The Multidimensional Challenges of AI to Elementary School Students' Character Education

The integration of AI into the primary education ecosystem not only presents technical challenges but also raises a series of multidimensional challenges that directly threaten the foundations of character education. These challenges can be categorized into ethical, socio-emotional, and pedagogical domains.

Ethical and Moral Challenges of Erosion of Integrity and Privacy

Academic Integrity

One of the most obvious threats posed by generative AI is its potential to facilitate academic dishonesty. Easy access to AI tools that can generate essays, quiz answers, or other work in seconds can erode fundamental character values such as honesty and responsibility (Oktapiani et al., 2025). When students can obtain answers without thinking and effort, the very essence of learning namely, developing persistence and independence is threatened (Sugiarti, 2011. This creates new challenges for teachers to design authentic assessments and instill a deep understanding of academic integrity in the digital age.

Data Privacy and Security

AI-based adaptive learning systems operate by collecting and analyzing vast amounts of student data, ranging from learning histories and interaction patterns to demographic data (Waita et al., 2025). This practice raises a serious ethical crisis regarding data privacy and security, especially when it concerns children (Rif'at Shafwatul Anam Surya Gumilar, 2021). This massive data collection risks creating a surveillance environment *in* the classroom, where every student's actions are tracked and analyzed. Serious concerns arise about who has access to this data, how it is used, and how secure it is from potential misuse or hacking (Waita et al., 2025). Protecting student well-being and privacy is a fundamental principle of educational ethics that is now under significant threat.

Algorithmic Bias

AI is not neutral; it learns from the data it is fed. If the training data used reflects existing societal biases and stereotypes, then the AI algorithm will replicate, or even reinforce, those biases (Rif'at Shafwatul Anam Surya Gumilar, 2021). In the educational context, algorithmic bias can manifest itself in assessment systems that unfairly disadvantage certain groups of students, or in content recommendation systems that limit students' exposure to diverse perspectives. This directly challenges the instilling of values of fairness and respect for diversity, which are at the heart of the Globally Diverse character within the Pancasila Student Profile (Widana, 2023).

Social-Emotional Challenges: Empathy Atrophy and Digital Addiction

Reduction of Human Interaction

Overreliance on individualized and adaptive learning platforms risks reducing face-to-face interactions, which are crucial for children's social-emotional development (Abidin et al., 2025). Direct interactions with teachers and peers are the primary arena in which students learn to negotiate, resolve conflicts, collaborate, and read nonverbal social cues. Learning environments that are overly mediated by technology can create social isolation, hinder the development of collaborative skills (*gotong royong*), and reduce the sense of belonging within the classroom community (Widana, 2023).

Potential for Empathy Degradation

Empathy, the ability to understand and feel the feelings of others, is a key pillar of character. This competency is not learned from textbooks but rather developed through real-life social interactions, where children learn to respond directly to emotional cues, facial expressions, and tone of voice. Learning environments dominated by interactions with screens and digital avatars cannot replicate the richness and nuance of human emotional cues. Consequently, there is a risk that a generation growing up in this digital ecosystem may become less sensitive and less equipped to recognize and respond to the emotional states of others in the real world.

Addiction and Mental Health

The digital age brings with it the risks of technological dependency, exposure to negative content such as cyberbullying , and the promotion of a hedonistic, instant culture (Purba et al., 2016). Character values such as modesty, self-control, and mental resilience become increasingly difficult to instill when students are constantly exposed to instant gratification and social pressures from the virtual world. Teachers and schools now have an added responsibility to equip students with digital resilience *to* navigate the complex and often toxic online environment.

The challenges outlined above are not isolated but interconnected, forming a "negative feedback loop" *that* can systematically undermine character development. For example, the use of AI platforms that reduce direct social interaction leads to deficits in the development of social skills and empathy (Abidin et al., 2025). Character education theory emphasizes that these competencies are forged through direct human contact (Sugiarti, 2011). As students' empathy declines, they become more vulnerable to engaging in destructive online behaviors, such as *cyberbullying*, a key ethical challenge in the digital age (Prasetya et al., 2025). Ironically, AI-driven digital platforms can then algorithmically reinforce and propagate these negative behaviors. Thus, an initial pedagogical choice to use isolating AI tools can trigger social-emotional deficits, which in turn fuel an ethical crisis. This suggests a system of interreinforcing and cascading risks, rather than a list of isolated issues.

Pedagogical Challenges: Limitations of AI as a Moral Educator

The Void of Moral Guidance

While AI can present information about moral values, it is fundamentally incapable of providing authentic moral guidance. AI lacks life experience, consciousness, or the capacity for empathy. Therefore, it cannot replace the role of teachers as role models, mentors, and moral compasses, providing contextual and caring guidance (Waita et al., 2025). Character education requires dialogue, reflection, and a human touch that cannot be programmed into an algorithm. AI can be a source of information, but it can never be a source of character inspiration.

Focus on Cognitive, Ignoring Affective

The design of most current educational AI systems is heavily oriented toward optimizing cognitive outcomes, such as improving test scores or speeding up learning (Widana, 2023). This narrow focus on the cognitive domain risks creating a pedagogical culture that inadvertently marginalizes the affective domain which encompasses attitudes, values, emotions, and feelings. Yet, this affective domain is at the heart of character education (Widana, 2023). If educational success is measured solely by metrics that can be quantified by AI, then immeasurable yet essential aspects of human development, such as integrity, compassion, and wisdom, risk being overlooked.

Transformation of the Role of Teachers

From Information Deliverer to Digital Character Architect

The advent of AI, capable of delivering information instantly and personally, demands a fundamental overhaul of the traditional role of teachers. This disruption is forcing the teaching profession to evolve, shifting from being the primary source of knowledge to a more complex, facilitative, and humanistic role.

The Paradigm Shift of Teachers as Facilitators, Not Sole Sources of Knowledge

In an era where information is abundant and easily accessible through AI, the role of the teacher as a "transmitter of information" is becoming obsolete. The primary function of the teacher is no longer to transfer facts from their head to their students. Instead, the teacher's role has shifted to that of a learning facilitator (Ulliyah, 2024). As facilitators, teachers design learning experiences that stimulate curiosity, encourage inquiry, and guide students to construct their own understanding. Teachers become curators of information, helping students navigate the sea of data, distinguishing between credible information and disinformation, and asking provocative questions that stimulate critical thinking. In a technology-rich ecosystem, teachers are guides who ensure students not only consume information but also learn how to learn.

An Irreplaceable Role: Moral Compass and Role Model

Precisely as technology becomes more dominant, the human aspects of teaching become increasingly invaluable and irreplaceable. AI can answer the "what" and "how," but only a human teacher can inspire the "why." The teacher's role as a moral compass, empathetic

mentor, and living role model is the last line of defense against the potential dehumanization of technology (Waita et al., 2025). When students face ethical dilemmas in the use of AI, they need guidance from a trusted adult. When they feel frustrated or unmotivated, they need encouragement from a caring teacher. Teachers are the living embodiment of the character values they teach integrity, compassion, tenacity, and respect. It is this human touch that instills values and shapes character, a task beyond the reach of any algorithm.

New Competencies for Elementary School Teachers in the AI Era

This role transformation demands a new set of competencies that every elementary school teacher must possess in the AI era. These competencies go beyond operational technical skills and encompass deeper pedagogical, ethical, and socio-emotional dimensions.

a. Critical AI Literacy
   This competency is not simply about how to use AI applications. More importantly, it is the ability to conceptually understand how AI works, recognize its limitations and potential biases, and critically evaluate the ethical implications of any technological tool to be used in the classroom (Nurjolis, 2024). Teachers must be able to ask: "Does this tool support my character education goals? Is this tool fair to all students? What privacy risks does it pose?"
b. Emotional and Social Intelligence
   As AI takes over routine instructional tasks, teachers' ability to connect emotionally with students becomes increasingly vital. Teachers must possess high emotional intelligence to build caring and psychologically safe classroom communities, mediate conflicts, and provide individualized emotional support to students who need it (Widana, 2023).
c. Innovative Learning Design
   Teachers must become skilled designers of learning experiences. This means the ability to creatively and strategically blend *AI* tools with traditional pedagogical methods rich in human interaction. For example, using AI for virtual simulations, followed by collaborative, group-based projects in the real world, or using *chatbots* for basic exercises, freeing up face-to-face time for in-depth discussions and values-based activities (Taufik et al., 2024).
d. Digital Ethics
   Teachers must be both educators and role models for responsible digital citizenship. This includes teaching students about online safety, data privacy, copyright, and how to communicate ethically and respectfully in digital spaces (Purba et al., 2016). Teachers must lead by example in their own digital practices.

Elementary School Teacher Management Strategies for Strengthening Character Education in the AI Era

Facing the multidimensional challenges of AI disruption requires a proactive, systematic, and integrated approach to teacher management. This strategy must go beyond technical training and address fundamental aspects such as professional development, leadership, policy, and ecosystem collaboration.

Adaptive and TPACK-Based Continuing Professional Development (CPD)

The first strategy is to reform the Continuing Professional Development (CPD) model for teachers (Tobondo, 2025). Sporadic training focused solely on how to use specific software is no longer sufficient. A sustainable, adaptive CPD program is needed, grounded in the *Technological Pedagogical Content Knowledge* (TPACK) framework (Taufik et al., 2024). The TPACK framework emphasizes the importance of harmonious integration between three knowledge domains: technology (knowledge of AI tools), pedagogy (knowledge of effective teaching methods), and content (knowledge of character education materials).

TPACK-based training doesn't ask, "How do I use this AI tool?", but rather, "How can I use this AI tool (Technology) with project-based learning methods (Pedagogy) to teach the value of honesty (Content)?". As an implementation example, teachers can be trained to use an AI story generator tool not only to improve literacy, but specifically to create ethical dilemma scenarios. These scenarios are then used as triggers for in-depth classroom discussions, facilitating the development of students' critical reasoning *and* moral reasoning skills. This training model positions technology not as an end in itself, but as a tool to achieve higher pedagogical and character goals.

Transformative and Human-Centric Instructional Leadership

The principal's role as an instructional leader is crucial. The leadership required is not administrative-transactional, but rather transformative. (Ika Anggraheni, 2025). Transformative leaders are able to articulate a clear and inspiring vision, placing human values and character education above mere technological efficiency. They must actively champion a "human -*centric* approach" in every technology adoption decision (Nurjolis, 2024).

This means that any proposed new use of AI must first be evaluated through the lens of its impact on student well-being, social interactions, and character education goals. Transformative leaders must also create a school culture that supports innovation and experimentation, where teachers feel psychologically safe to try new approaches, make mistakes, and learn from them. They are the frontline workers ensuring that schools remain warm and human communities, not just cold technology hubs.

Responsive Curriculum Development and School Policies

Teacher management strategies must be supported by a clear curricular framework and policies at the school level. First, digital citizenship, media literacy, and AI ethics competencies must be explicitly integrated into the elementary school curriculum (Nurjolis, 2024). These materials should not be considered add-ons, but rather as fundamental literacy skills equivalent to reading, writing, and arithmetic in the 21st century.

Second, each school should develop an Acceptable Use Policy *(* AUP) specifically for AI tools. This policy should be formulated collaboratively, involving teachers, parents, and even students, depending on their developmental level. The AUP should explicitly address crucial issues such as academic integrity (e.g., when and how AI may be used in assignments), student privacy and data protection, and ethical online behavior norms to prevent

cyberbullying and other negative interactions (TR, 2025). A clear policy provides practical guidance for teachers in managing the use of AI in the classroom and enforcing consistent standards of behavior.

Strengthening the Synergistic Collaborative Education Ecosystem

Schools and teachers cannot face AI disruption alone. Efforts to strengthen character education require synergistic collaboration across the entire education ecosystem (Waita et al., 2025).

a. The Role of Parents
   Partnerships with parents are key. Schools must proactively educate and empower parents to guide and supervise their children's technology use at home (Fitri Barokah et al., 2024). Programs such as joint workshops on digital safety, discussions on instilling character values, and developing family device use guidelines can align efforts at school and at home, creating a consistent environment for children's character development.
b. Role of Government
   The government plays a vital role in creating enabling conditions. This includes formulating strong national regulations to protect students' personal data, investing in equitable access and digital infrastructure to address inequalities (TR, 2025), and funding the development and deployment of high-quality teacher training programs relevant to local contexts and AI challenges (Ika Anggraheni, 2025). The government can also support teacher learning communities, such as Teacher Working Groups (KKG), to become centers of innovation at the grassroots level, where best practices in ethical AI integration can be shared and developed (Abbas, 2018).

To visualize the relationship between the challenges and the proposed strategies, the following matrix is presented.

Table 1. Matrix of AI Disruption Challenges to Character Education and Teacher Management Mitigation Strategies

Dimensions of Challenge	Specific Threats to Student Character	Relevant Teacher Management Strategies	Practical Implementation Example
Ethical & Moral	Erosion of honesty and responsibility values due to the ease of plagiarism (Oktapiani et al., 2025) .	School Curriculum & Policy Development: Integrating AI ethics and academic integrity into the curriculum.	Teach students how to use AI as a research tool, not as a substitute for thinking, and require citation of AI use in assignments.
	The risk of algorithmic bias that undermines the values of justice and diversity (Rif'at Shafwatul Anam Surya Gumilar, 2021)	TPACK-Based PKB: Training teachers to critically evaluate AI tools, identify potential bias, and choose inclusive platforms.	The teacher facilitates a class discussion about how an AI translator or image recognizer could misinterpret different cultures.
Social-Emotional	Decreased face-to-face interactions hinder the development of empathy and mutual cooperation (Abidin et al., 2025) .	Transformative Leadership: Encouraging a blended learning model that intentionally balances screen time with non-digital collaborative activities.	The principal instituted a “Gadget-Free Friday” policy where learning focused on traditional games, group work, and social projects.

	Increased risk of cyberbullying and exposure to negative content (Fitri Barokah et al., 2024) .	Strengthening the Education Ecosystem: Conducting workshops with parents on digital supervision and strategies for building children's digital resilience.	The school and parent committee jointly compiled a family guide for safe and ethical use of social media.
Pedagogical	Teachers are not ready to transition from teachers to facilitators (Ulliyah, 2024) .	TPACK-Based PKB & Transformative Leadership: Providing ongoing training and instructional guidance on facilitative pedagogy in digital environments.	Experienced senior teachers become mentors for other teachers in designing project-based learning that integrates AI.
	AI is incapable of providing moral guidance and being a character role model (Waita et al., 2025)	Transformative Leadership & Ecosystem Strengthening: Strengthening a school culture that explicitly values and celebrates human interaction, empathy, and teacher role models.	The school's awards program is not only for academic achievement, but also for students and teachers who demonstrate extraordinary acts of empathy and integrity.

4. Conclusions and Recommendations

Synthesis of Findings

The analysis in this article confirms that the disruption of Artificial Intelligence in primary education is not simply a technological challenge, but a fundamental challenge to the essence and purpose of character education. AI presents a stark paradox: on the one hand, it offers unprecedented efficiency and personalization of learning; on the other, it threatens the human interaction, moral guidance, and habituation processes that are the foundation of character formation. The challenges that arise are multidimensional, encompassing complex ethical dilemmas, the risk of socio-emotional degradation, and a shift in pedagogical paradigms that demands radical adaptation from educators.

The key finding of this study is that the key to wisely navigating this disruption lies not in the sophistication of the technology itself, but in the preparedness, competence, and resilience of the people involved namely, the teachers. The role of teachers is crucially transforming into architects of humanistic learning experiences, facilitators of critical thinking, and most importantly, irreplaceable moral compasses and role models. Therefore, any effort to integrate AI must be preceded and accompanied by a massive investment in teacher management and capacity development. Without competent and empowered teachers, AI's potential will remain an empty promise, while its risks to student character will become a devastating reality.

Policy Recommendations

Based on the synthesis of findings, a series of policy recommendations are formulated aimed at various stakeholders to ensure that AI integration can strengthen, not weaken, character education.

For the Ministry of Education, Culture, Research, and Technology:

a. Formulating Teacher Competency Standards in the AI Era
   Develop and establish new national teacher competency standards, which explicitly include critical AI literacy, digital pedagogy, and AI ethics as core competencies for all teachers, especially at the elementary level.
b. Funding the Development of TPACK-Based Training Models
   Allocate a dedicated budget for research, development, and implementation of a national-scale Continuing Professional Development (CPD) program based on the TPACK framework, ensuring that the training provided is practical, contextual, and sustainable (TR, 2025).

For Regional Governments and Education Departments:

a. Prioritize Equitable Digital Infrastructure
   Actively work to reduce the digital divide by prioritizing investment in internet infrastructure and hardware in disadvantaged schools, ensuring that technological innovation does not widen inequalities (Ulliyah, 2024).
b. Revitalizing Teacher Learning Communities
   Provide support and resources to revitalize forums such as Teacher Working Groups (KKG) to serve as hubs for innovation and collaboration. These forums can serve as platforms for teachers to share best practices, address common challenges, and develop local solutions for ethically integrating AI (Ika Anggraheni, 2025).

For Teacher Training Institutions (LPTK):

Revising the Prospective Teacher Education Curriculum

Immediately revise the undergraduate teacher education program (S1 PGSD) curriculum to include mandatory courses that thoroughly discuss pedagogy in the digital age, the ethics of using AI in education, and strategies for strengthening character education amidst technological disruption. Prospective teachers must be prepared from the outset to face the realities of AI-integrated classrooms.

For Further Research

Filling the Research Gap in Elementary Education

Encourage and fund further research that specifically examines the longitudinal impact of AI platform use on the socio-emotional development, critical thinking skills, and character values of elementary school students in Indonesia. Such research is urgently needed to fill significant empirical data gaps and provide a strong evidence base for future policy formulation (Rif'at Shafwatul Anam Surya Gumilar, 2021).

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