

Balancing the Positive and Negative Impacts of AI in Education Through a Capacity Development-Centered Approach

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Abstract

The rapid development of artificial intelligence (AI) has significantly transformed the education sector. AI can be both an opportunity and a major challenge as time goes on, especially in education. The positive opportunities for AI in education are significant enough to enhance the learning process for both educators and students. On the other hand, there are also concerns about the negative impact of AI, which is a major challenge for academic integrity in the future. There is a need to enhance the positive potential of AI while mitigating the negative impact of AI itself. This research aims to explore effective alternative solutions to overcome the debate about the positive and negative impacts of AI in education. The research method used in this study is a capacity building approach, based on the UN SDG 2017 framework. Capacity building itself has three levels that need to complement each other, referring to the individual, institutional and enabling environment levels. At the individual level, AI literacy and lifelong learning are vital for adapting to technological changes. Institutionally, integrating AI into education and providing adequate training for educators are key. At the enabling environment level, supportive policies and fair regulations are necessary for ethical and inclusive AI implementation in education. The application of capacity building as an implication of artificial intelligence at the three levels must take place simultaneously. The interconnection between these three levels is the key to successfully managing the balance between the positive and negative impacts of AI in the world. The results provide actionable recommendations for policymakers and educational institutions to design strategies that optimize AI's potential while minimizing its risks. By offering a novel application of the capacity building framework, this study contributes to academic discourse on AI and education and serves as a practical reference for creating sustainable and equitable educational systems globally.

Keywords: *Capacity Development, Artificial Intelligence, Education*

1. Introduction

The development of artificial intelligence (AI) technology has brought about major changes in various sectors, including education. AI is now an important element in supporting the learning process, improving efficiency, and providing access to a wider range of educational resources. Various AI like Generative AI, have been widely used by educators and students to support academic activities, ranging from assistance in essay writing to complex data analysis.

Generative AI is designed to create text, provide explanations, and assist in complex problem-solving through natural language (Stryker & Scappichio, 2024). However, as with any technological innovation, the use of AI in education is contentious. On the one hand, AI is considered a revolutionary technology that can improve the quality of education and expand its accessibility, but on the other hand, there are concerns that AI has the potential to undermine academic integrity and reduce students' critical thinking skills.

A key issue in this emerging debate is how to capitalise on the positive potential of AI while mitigating its negative impacts. Some previous studies have explored the benefits of AI in education, such as increased efficiency in education administration and personalisation of learning (Mairisiska and Qadariah, 2023). However, other research has pointed out risks such as over-reliance on technology, decreased analytical skills,

and potential breaches of academic integrity such as cheating on academic assignments (Oravec, 2023). Various approaches have been proposed to address these challenges, including stricter policy settings, the development of an ethics of AI use, and improving digital literacy among students and educators (Miao et al, 2021. Birks & Clare, 2023. Darajati et al, 2023). This research seeks to answer this question by employing a capacity development-centered approach as outlined in the UN Sustainable Development Goals 2017 framework. Unlike previous studies that primarily focus on the technological or ethical aspects of AI, this research highlights the importance of building capacity at three levels: individual, organizational, and environmental, to create a balanced and sustainable integration of AI in education.

This paper aims to explore how a capacity building approach based on the UN SDG 2017 framework can be an effective alternative solution to address the debate on the positive and negative impacts of AI in education. Using a descriptive literature review method, this study will analyse relevant literature to identify capacity building strategies that can be applied at all three levels. This study also aims to provide recommendations for policy makers in designing regulations that support capacity building at the enabling environment level, thus creating an educational ecosystem that is adaptive to technological developments.

The novelty of this paper lies in its application of the capacity building approach in the utilisation of AI in education, which has rarely been explored in depth. Thus, this paper not only contributes to the academic literature on AI and education, but is expected to be a reference for educational institutions, educators, students, and policy makers in designing sustainable capacity building strategies, so that AI can be optimally utilised to improve the quality of education in Indonesia and at the global level.

2. Methods

The study utilized a literature review to examine how capacity-building approaches can address the impacts of AI in education. According to Synder (2019), literature reviews provide a foundation for knowledge development, establish guidelines for policy and practice, and offer evidence of effects. Data collection involved sourcing relevant peer-reviewed articles, policy reports, and empirical studies from academic databases such as Google Scholar, ScienceDirect, and MDPI. The gathered literature was thematically coded, focusing on the three capacity-building levels defined by the UN SDG 2017 framework: individual, organizational, and enabling environment. The data was analyzed using thematic analysis, which allowed the researchers to systematically organize and interpret the literature to uncover meaningful patterns and themes. This approach facilitated a comprehensive synthesis of findings. The analysis categorized data into the three capacity-building levels and synthesized results to highlight recurring themes, identify research gaps, and propose practical recommendations. This structured method ensured a thorough exploration of how capacity-building strategies can enhance AI implementation while mitigating its risks in educational contexts.

3. Result and Discussion

Three Levels of Capacity Building

Addressing capacity building at all levels can ensure that AI's influence on education is not only functional but also fair, ethical, and in line with the long-term goals of education. To be more specific, I will break it down by each level of capacity:



Figure.1 Capacity Building

1. Individual Capacity Development: Empowering Learners and Educators

The rapid development of AI requires upskilling to ensure that individuals, in this case students and teachers, can adapt and thrive in an AI-influenced educational environment. Therefore, capacity building

at the individual level should focus on how students and teachers have the skills and knowledge needed to use AI effectively. According to Joyce and Cruz in *Sociology of AI* (2024), AI practitioners are good at making moral claims against the use of AI in academia. Therefore, students and teachers should be provided with digital literacy that includes not only the technical skills of using AI, but also the critical thinking skills to assess the ethical issues of using AI.

According to Long and Magerko (2020), AI literacy is the competencies that individuals need to use AI effectively while critically evaluating its use. Things that must be present in AI literacy are how algorithms work, biases in AI, and the use of AI for personalized learning.

There have been many studies that prove that the use of technology, including AI, reduces human critical thinking. The problem is of course that it is difficult for individuals not to use AI because those who do not use AI will be disrupted by those who use AI. In order to overcome this, individuals need to be encouraged to continue learning amidst the convenience that AI provides. There is a relevant concept in this regard, namely "Lifelong Learning". According to Poquet and de Laat (2024), encouraging a culture of Lifelong Learning is essential for the adaptability and competitiveness of individuals.

2. Organizational Capacity Development: Transforming Educational Institutions

Capacity building is focused on transforming educational institutions to effectively integrate AI technologies while maintaining their core mission of providing quality education. Educational institutions should develop strategic plans to integrate AI into their curriculum, administration, and research activities. This includes investing in AI infrastructure, forming partnerships with technology providers, and aligning AI initiatives with educational goals. The potential for AI to exacerbate inequality (Kim, 2024. Bulathwela et al., 2024) means that institutions should design AI systems that are accessible to diverse student populations, especially those from marginalized backgrounds.

In addition, educational institutions should provide continuous professional development for educators to ensure they can effectively utilize AI tools in their teaching practices. This can be done through training in instructional design, data analysis, and ethical use of AI in education. According to Helmiatin et al (2024), this rush to AI adoption will likely result in more change-resistant users, and even well-implemented facilitation conditions may not be able to fully overcome this resistance. Therefore, the adoption of AI in educational institutions needs to be done slowly and carefully to allow time for students and educators to adapt.

3. Enabling Environment: Creating Supportive Policies and Frameworks

Enabling Environment is the supportive legal and policy framework as well as its implementation and enforcement. Not to be confused with institutions, the enabling environment focuses on ecosystem conditions, including external factors such as the legal framework, political stability, social support, and access to resources. Whereas institutions are only oriented towards specific structures and actors that carry out specific policies or functions.

The capacity of the enabling environment is very relevant when it comes to the phenomenon of students using ChatGPT to cheat or commit plagiarism in academic assignments which is increasingly rampant. This can happen because until now there is no clear regulation regarding the use of AI in education. Until now, the Ministry of Education and Culture has only issued guidelines for the use of generative AI for lecturers and students. In fact, educational institutions must also have regulations and policies to regulate and provide certainty for the use of AI, not just guidelines (Ramli, 2024).

The capacity of the enabling environment in this case should focus on strengthening policies and regulations as well as partnerships that facilitate the sustainable integration of AI. Therefore, the government as a policy maker must create clear policies that address data privacy, ethical use of AI, and accountability in education (Ramli, 2024). The existence of clear and effective regulations is essential to guide educational institutions in creating rules that ensure the use of AI complies with established government guidelines.

To make these policies more acceptable, they should involve multi-stakeholder consultations, including educators, technologists, and civil society. Inclusive consultation builds trust in the policy-making

process. If the government can establish a regulatory framework that ensures that AI systems are designed to be accessible and non-discriminatory, especially for marginalized communities.

4. Conclusions

This paper reveals that capacity building at three levels; individual, institutional and enabling environment are key factors in addressing the impact of artificial intelligence (AI) in education. At the individual level, AI literacy and a lifelong learning mindset are key foundations for students and educators to adapt well to rapid technological advancements. At the institutional level, it is crucial for educational institutions to strategically integrate AI into curricula and teaching practices, and ensure that educators receive adequate and relevant training. Meanwhile, at the enabling environment level, supportive policies and fair regulations are essential elements to ensure the ethical and inclusive application of AI in the education sector.

The implications of this paper emphasize that to create an inclusive and sustainable education system in the era of AI, all three levels of capacity development must work synergistically. AI's impact on education presents both opportunities and challenges, so capacity development approaches are needed at all three levels: individual, institutional, and enabling environment. Each level needs to be carefully considered as they are interdependent to create an educational environment that can adapt to AI in a comprehensive and sustainable manner. The individual level of capacity ensures that learners and educators have sufficient skills to use AI effectively, but this will not work without institutional support such as institutional policies, infrastructure, and individualized training. Even well-equipped institutions cannot thrive in isolation without an enabling environment that provides supportive policies, ethical regulations, and public-private partnerships to responsibly scale up AI innovation. Neglecting any of the tiers can lead to imbalances, such as increased inequality and ethical scrutiny, which can undermine the overall effectiveness of AI in education.

The limitation of this study lies in its focus only on the capacity building perspective in the general education context, without considering social and cultural factors that may influence AI adoption and implementation. In addition, the application of AI in education may vary depending on local conditions and available resources in each region. The contribution of this research lies in a deeper understanding of the importance of a multidimensional approach to AI capacity building in the education sector. Nonetheless, to get a more holistic picture, further research is recommended to involve a broader analysis.

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