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Digital education policies in indonesia and malaysia toward the achievement of sustainable development goal 4

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Abstract: *Digital transformation in the education sector has become a key strategy for achieving Sustainable Development Goal 4 (SDG 4), which aims to ensure inclusive, equitable, and quality education and to promote lifelong learning opportunities for all. In Southeast Asia, Indonesia and Malaysia have developed various digital education policies in response to technological advancements and the evolving needs of modern education systems. However, differences in regulatory frameworks, infrastructure readiness, and patterns of policy implementation affect the effectiveness of digital education transformation in both countries. This study aims to analyze digital education policies in Indonesia and Malaysia in supporting the achievement of SDG 4. This research employs a normative legal research method with a comparative policy approach. The data were obtained through the analysis of laws and regulations, education policy documents, and government strategic programs related to digital transformation in the education sector. The findings indicate that both countries have adopted digital education policies focusing on expanding access to education, strengthening information technology infrastructure, and integrating technology into the learning process. Indonesia emphasizes digital education transformation through national platforms and policies aimed at equalizing access to education, while Malaysia has developed a more structured digital education ecosystem through a long-term education digitalization policy framework.*

Keywords: *Policy; Education; Digitalization.*

INTRODUCTION

The rapid development of digital technology has brought fundamental changes to education systems worldwide. The learning process is no longer confined to physical classrooms but has shifted toward technology-based models that emphasize flexibility, accessibility, and cross-border collaboration. In this context, digital education policy

serves as a strategic instrument for states to ensure that digital transformation contributes to improving the quality of education, promoting equitable access, and advancing sustainable human development, as mandated in Sustainable Development Goal (SDG) 4, namely "Quality Education." The role of government in enhancing the quality of educational services is a highly significant issue within the Indonesian education system (Akbar & Picard, 2019; Wani et al., 2022)

Although the Government of Indonesia has undertaken substantial efforts to improve its education system, a comprehensive assessment of the effectiveness of these policy interventions remains necessary (Gonzalez & Pelayo, 2022).

Indonesia and Malaysia are two Southeast Asian countries that demonstrate a strong commitment to the SDGs agenda, including the development of digital education. Both countries have initiated various policies, such as curriculum digitalization, the development of online learning platforms, and the enhancement of digital literacy among educators and students. However, the effectiveness of these policies continues to face significant challenges, including gaps in digital infrastructure, limited human resource capacity, disparities in access across regions, and the institutional readiness of educational systems to sustainably adopt new technologies (Maharani & Saputra, 2025; Yaqin et al., 2026).

While the ultimate objectives of digital education policies in both countries are relatively similar, their approaches and implementation exhibit distinct characteristics. Indonesia tends to focus on expanding access and promoting equity in educational technology, whereas Malaysia places greater emphasis on the integration of digital systems within frameworks such as Smart Education and the Malaysia Education Blueprint. These differences in social, economic, and institutional capacities are critical factors in understanding the effectiveness and sustainability of digital education policies in each country.

Digital education policy has become increasingly urgent in supporting the achievement of Sustainable Development Goal (SDG) 4, which seeks to ensure inclusive, equitable, and quality education for all. One of the primary reasons for this urgency is the potential of digital education to address disparities in access to education, which remain a fundamental challenge in Indonesia. Indonesia's vast geographical landscape, comprising thousands of islands, has contributed to persistent disparities in educational access between urban and rural areas, as well as between the western and eastern regions of the country. Through the utilization of digital technologies, learners can access the same educational resources regardless of geographical distance and location. The emergence of online learning platforms, digital libraries, and learning management systems has enabled educational services to reach remote areas that have historically faced shortages of qualified educators and inadequate educational infrastructure (Maharani & Saputra, 2025; Sood et al., 2025).

Beyond expanding access, digital education also plays a strategic role in enhancing the quality of learning. The integration of technology enables the implementation of more interactive, adaptive, and data-driven learning approaches, thereby improving the effectiveness of teaching and learning processes. Teachers can utilize a wide range of digital media, educational simulations, instructional videos, and artificial intelligence (AI) technologies to facilitate the delivery of learning materials in more engaging and accessible ways. At the same time, learners gain broader opportunities to access

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educational resources at both national and global levels, allowing them to expand their knowledge, skills, and competencies. Accordingly, the digitalization of education should not be viewed merely as a supplementary tool for teaching and learning, but also as a critical instrument for enhancing the overall quality of education (Maujud et al., 2024; Paramahita et al., 2023).

Accordingly, the research questions of this study are as follows: first, how is the construction of digital education policy in Indonesia in supporting the achievement of SDG 4? Second, how do the models of digital education policy in Indonesia and Malaysia support the achievement of SDG 4?

Therefore, this study is expected to provide both academic and practical contributions to the formulation of inclusive, adaptive, and sustainable digital education policy strategies in Southeast Asia, thereby strengthening the direction of digital education development toward the achievement of SDG 4.

METHODS

This study employs a normative legal research design with a comparative approach to analyze digital education policies in supporting the achievement of Sustainable Development Goal 4 (SDG 4) in Indonesia and Malaysia. The normative approach is used to examine laws and regulations, policy documents, and regulatory frameworks governing digital transformation in the education sector in both countries. Meanwhile, the comparative approach is applied to assess and contrast the characteristics of policies, development trajectories, and the implementation of digital education in Indonesia and Malaysia.

The research adopts several approaches, namely the statute approach, the conceptual approach, and the comparative approach. The statute approach involves the examination of relevant laws and policy instruments related to the digitalization of education. The conceptual approach is employed to understand the concepts of digital education, digital transformation in education, and their linkage to sustainable development goals. The comparative approach, on the other hand, is used to identify similarities, differences, and the relative strengths of digital education policies implemented in both countries.

The types and sources of legal materials in this study consist of primary, secondary, and tertiary legal materials. Primary legal materials include legislation, government policies, and official documents (Khoiriyah et al., 2023) related to digital education transformation in Indonesia and Malaysia. Secondary legal materials comprise books, scholarly journal articles, research reports, and academic publications addressing digital education policies and their implementation. Tertiary legal materials include legal dictionaries, encyclopedias, and other relevant reference sources that support and strengthen the analysis.

The collection of legal materials is conducted through library research by reviewing legal documents, academic literature, and other relevant data sources. Subsequently, the analysis of legal materials is carried out qualitatively using descriptive-analytical and comparative methods. This analysis aims to systematically examine digital education

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policies in both countries, identify implementation challenges, and formulate a strengthened policy model to more effectively support the achievement of SDG 4.

RESULTS AND DISCUSSION

The Construction of Digital Education Policy in Indonesia and Malaysia

Digital transformation in Indonesia's education sector constitutes a key component of the national strategy to enhance educational quality, expand equitable access, and strengthen human resource readiness in responding to the digital economy and the Fourth Industrial Revolution. The Government of Indonesia has positioned the digitalization of education as a national priority, implemented through various regulations, strategic policies, and the development of educational technology platforms (Yaqin et al., 2026).

Asta Cita, as a national development strategy, places the strengthening of human resources, science, technology, and education as fundamental pillars in achieving an advanced, competitive, and inclusive Indonesia. One of its eight core missions emphasizes the development of human capital through improving the quality of education and mastery of technology, which directly aligns with the direction of digital education policy in Indonesia.

In the context of higher education, *Asta Cita* is further elaborated into several key priorities, including the strengthening of education, science, and technology to produce globally competitive human resources. This is consistent with the vision of Indonesian higher education, which emphasizes "empowered higher education institutions with accountable governance to grow and generate impact, enhanced research and development capacity leading to value-added downstream innovation, and the effective functioning of science and technology in accelerating sustainable socio-ecological and economic transformation."

Digital education policy serves as a strategic instrument for operationalizing the *Asta Cita* agenda. Through the digitalization of learning, the government seeks to expand access to education, improve the quality of teaching and learning, and integrate science and technology into the national education ecosystem. The "Impactful Education" program launched by the Ministry of Education, Culture, Research, and Technology in 2025 reinforces this direction, focusing on digital transformation through the provision of smart boards, the strengthening of the *Merdeka Mengajar* platform, and the implementation of Learning Management Systems (LMS) across all levels of higher education (Anggraeni & Wachidah, 2025; Paramahita et al., 2023).

Empirically, the digitalization of education has demonstrated significant contributions to the achievement of the *Asta Cita* mission. Data from SEVIMA (2024) indicate that 93.4% of higher education institutions in Indonesia have adopted information technology systems, with 92.4% implementing hybrid learning models that combine online and offline methods to enhance academic flexibility and efficiency. Furthermore, 76% of institutions reported improved efficiency in academic services, while 67% of lecturers indicated increased productivity following the integration of LMS into teaching and learning activities. These findings suggest that digital education policy is not merely

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an administrative innovation but a catalyst for strengthening human capital competitiveness and institutional effectiveness in higher education.

From a systemic perspective, the digitalization of education also supports the realization of *Asta Cita*'s vision concerning the enhancement of research capacity and the downstreaming of research outputs. Through digital infrastructure and online research management systems, collaboration among universities, industry, and government institutions has become more open and efficient. Initiatives such as the Science and Technology Innovation Network and digital-based national research platforms facilitate data exchange and accelerate value-added innovation, enabling science and technology to effectively contribute to sustainable socio-economic transformation, as envisioned in *Asta Cita*.

Nevertheless, the effectiveness of digital education policy continues to face challenges, particularly in terms of disparities in infrastructure and digital literacy across regions. Several higher education institutions in underdeveloped, frontier, and outermost (3T) areas have not yet been able to fully adopt digital technologies due to limited connectivity and human resource constraints. Therefore, to ensure the equitable implementation of *Asta Cita*, it is necessary to strengthen the digital ecosystem through the expansion of technological infrastructure, the enhancement of digital competencies among lecturers and students, and the development of adaptive education data governance responsive to technological advancements. (Sood et al., 2025; Zulaikha et al., 2025)

The respective policy frameworks in Indonesia and Malaysia are outlined in the following table: (Alias & Ramli, 2025; Wani et al., 2022)

Aspect	Indonesia	Malaysia
National policy framework for digital technology and AI in education	The 2026 Joint Ministerial Decree, enacted on 12 March 2026, establishes a nationwide framework for the use and teaching of digital technology and artificial intelligence across formal, non-formal, and informal education. The policy is nationally applicable while allowing implementation to accommodate the characteristics and institutional autonomy of each educational pathway. Formal educational institutions are required to assess the readiness of human resources, infrastructure, and governance; implement the prescribed guidelines; protect children from digital threats including cyberbullying, sexual exploitation, pornography, online violence, technology addiction, and privacy violations; maintain a balance between digital and non-digital learning activities; foster collaboration with parents and civil society; and conduct	Malaysia has developed several national initiatives, including the National Policy on Industry 4.0 (Industry4WRD), the Malaysia Digital Economy Blueprint (MyDIGITAL), and AI ethics guidelines, all of which have influenced the education sector by encouraging the integration of Industry 4.0 and AI into higher education curricula. However, Malaysia does not yet have a cross-ministerial policy instrument that specifically and comprehensively regulates the use of digital technology and AI across all educational pathways with an explicit focus on child protection in educational settings comparable to Indonesia's Joint Ministerial Decree.

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	regular monitoring and evaluation.	
Level-specific guidelines and child protection	The annex to the Joint Ministerial Decree provides detailed provisions for each educational level. For early childhood education, it specifies minimum age requirements, limits on screen time per session and per day, requirements for interactive educational content, and mandatory content filtering and personal data protection measures. For primary and secondary education, it establishes a progression-based learning framework primary education emphasizes computational thinking and social interaction ethics; lower secondary education focuses on digital literacy and ethical technology use; and upper secondary education introduces algorithms, programming, and STEM integration. Across all levels, institutions must implement comprehensive digital security protocols, including data protection, cyberbullying prevention, and harmful content filtering. In higher education, the policy is guided by principles of humanity, well-being, transparency, and fairness, while regulating AI use in learning, research, and administration, addressing risks such as academic integrity violations, cognitive dependency, and algorithmic bias, strengthening institutional AI governance, and promoting innovation ecosystems through collaboration among universities, industry, research institutions, and government. For non-formal education, the guidelines emphasize relevance, inclusiveness, flexibility, partnerships, and the mandatory development of digital safety protocols covering digital ethics, AI literacy, privacy, and personal data protection.	Malaysia has implemented Child Online Protection initiatives, collaborated with the International Telecommunication Union on child online protection, issued online child safety guidelines through the Malaysian Communications and Multimedia Commission (MCMC), and introduced digital literacy modules in schools. Nevertheless, the integration of these initiatives into binding regulations that directly govern educational institutions' use of AI in classroom settings including screen-time limits, content standards, balanced learning activities, and institutional AI governance in higher education remains largely programmatic and sector-specific rather than consolidated within a comprehensive cross-ministerial regulatory framework comparable to that adopted by Indonesia.

A significant development in this context is the government's issuance of Ministerial Regulation of the Ministry of Communication and Digital Affairs No. 9 of 2026, which restricts social media account access for children under the age of 16 as part of efforts to protect children in the digital environment. The policy was introduced in response to the growing range of digital risks faced by children, including exposure to harmful content, cyberbullying, personal data exploitation, digital addiction, and online fraud.

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The government recognizes that the digital environment offers not only educational benefits but also risks that may adversely affect children's psychological, social, and moral development.

This situation presents a significant policy dilemma, as it requires a balance between protecting children in the digital environment and safeguarding their right to access technology-enabled education. In practice, digital learning frequently relies on online platforms that share characteristics with social media, including interactive features, information sharing, group discussions, and virtual collaboration. Consequently, overly restrictive digital access policies may create barriers to educational processes, particularly within distance-learning and other technology-mediated educational models. From a legal and public policy perspective, this condition demonstrates that digital transformation in education cannot be understood merely as an expansion of technological access; it must also be accompanied by proportionate and effective child-protection mechanisms. The state therefore needs to formulate a regulatory framework capable of distinguishing between the use of digital platforms for legitimate educational purposes and the use of platforms that pose risks to children's development. Accordingly, social media access restrictions should not be interpreted as restrictions on digital education per se, but rather as an effort to establish a safer digital environment in which technology can continue to be utilized effectively for educational purposes.

In the context of SDG 4, the central challenge is not choosing between child protection and the digitalization of education, but rather developing a digital education governance model that can integrate both objectives in a balanced manner. This requires the state to ensure that child protection policies in the digital environment do not undermine students' right to technology-enabled education, while simultaneously ensuring that digital learning takes place within an environment that is safe, healthy, and responsible. Digital education policies and child protection policies in the digital environment should therefore be positioned as complementary policies, rather than as policies that are inherently in conflict.

Digital Education Policies in Indonesia and Malaysia in Supporting Sustainable Development Goal 4

The implementation of digital education policies aligned with *Asta Cita* carries strategic implications for the achievement of Sustainable Development Goal (SDG) 4, namely "Quality Education" for all. In this context, the digitalization of education is not merely a technological innovation but a systemic transformation that reshapes learning paradigms, institutional governance, and the direction of national education policy.

1. Implications for Learning Transformation
   Digital education policy encourages a paradigm shift from teaching-centered to learning-centered approaches, in which technology enhances collaborative, personalized, and adaptive learning experiences. Platforms such as *Merdeka Mengajar*, *Kampus Merdeka*, and various local Learning Management Systems (e.g., SPADA Indonesia) serve as key catalysts in creating flexible and outcome-oriented learning environments. This reflects the *Asta Cita* principle of positioning education

as a means of developing globally competitive human resources. Digitalization enables students and lecturers to access global knowledge resources, strengthen inter-institutional research, and connect higher education with the demands of technology-driven industries.(Bin Tajudin et al., 2022; Maujud et al., 2024)

2. Implications for Higher Education Governance
   Within the framework of the higher education vision of "growth and impact," digital education policies reinforce data-driven governance. Through the integration of national academic systems (such as PDDikti, SISTER, ARKAS, and the Higher Education Report Card), the government is able to monitor and evaluate institutional performance in a more transparent and efficient manner. This aligns with the *Asta Cita* mission of establishing accountable, results-oriented governance while enhancing public accountability in higher education administration.
3. Implications for Human Capital Development
   The digitalization of education facilitates the enhancement of digital literacy, research competencies, and adaptability to emerging technologies among students and academic staff. The "Impactful Education" program emphasizes project-based learning approaches that are relevant to labor market demands and future challenges. Consequently, this policy supports the *Asta Cita* agenda of strengthening human capital development, producing graduates who are not only academically competent but also adaptive to global digital transformation. (Anggraeni & Wachidah, 2025; Zulaikha et al., 2025)
4. Implications for Equity and Inclusion in Education
   In line with the spirit of SDG 4, digital education policies expand access for previously marginalized groups, including those in disadvantaged, frontier, and outermost (3T) regions, women, and persons with disabilities. The use of adaptive technologies, disability-friendly digital content, and digitalization-focused scholarships represents concrete efforts toward educational inclusivity promoted under *Asta Cita*. Although digital disparities persist, government initiatives to expand educational internet access such as programs led by Bakti Kominfo and the Merdeka Belajar Digital Fund constitute strategic measures to address access barriers.(Maharani & Saputra, 2025; Yaqin et al., 2026)
5. Future Policy Directions (2025–2030)
   The future direction of digital education policy in Indonesia toward 2030 is focused on three main priorities:
   a. the integration of a national digital system to establish an interconnected ecosystem linking education, research, and innovation;
   b. the enhancement of digital human resource capacity through expanded digital competency training for educators and students, including initiatives such as Digital Talent Scholarships and AI Learning Programs; and
   c. the downstreaming of research and digital innovation by fostering collaboration among universities, industry, and government (the triple helix model) to generate sustainable, value-added technological innovations.

In the global context, these policy directions strengthen Indonesia's position within the ASEAN Digital Education Network (ADEN), which aims to enhance student mobility and cross-border research collaboration in Southeast Asia, including bilateral cooperation with Malaysia under the ASEAN Digital Masterplan 2025.

CONCLUSIONS

The construction of digital education policy in Indonesia in supporting the achievement of Sustainable Development Goal (SDG) 4 has, in principle, demonstrated a progressive direction; however, it has not yet been fully systemically integrated. Various government initiatives such as school digitalization, online learning platforms, and the strengthening of digital literacy are normatively aligned with the objectives of SDG 4, particularly in ensuring inclusive and quality education. Nevertheless, at the level of implementation, significant gaps persist, especially with regard to digital infrastructure, disparities in access across regions, and the readiness of human resources (both educators and learners). Therefore, the current construction of digital education policy in Indonesia remains partial in nature and requires regulatory harmonization as well as strengthened governance grounded in equitable access.

The models of digital education policy in Indonesia and Malaysia in supporting SDG 4 reveal differences in terms of governance, consistency of implementation, and policy integration. Indonesia tends to adopt an adaptive model that has yet to be standardized at the national level, resulting in varied implementation across regions. In contrast, Malaysia has implemented a more structured and integrated model through long-term planning based on a national digital education blueprint, supported by stronger infrastructure readiness and more consistent policy frameworks. Accordingly, the ideal policy model for Indonesia is a hybrid approach that combines adaptive flexibility with systemic strengthening and national standardization, while emphasizing equitable access, capacity building of human resources, and cross-sectoral policy integration to accelerate the achievement of SDG 4.

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