



SDGs-based adaptive curriculum model to improve education quality in the digital age

Eva Puspitasari

Universitas Pendidikan Indonesia, Bandung, Indonesia

epsh28@upi.edu

ABSTRACT

The rapid advancement of technology and global sustainability issues demand innovations in educational curricula aligned with the Sustainable Development Goals (SDGs), specifically SDG 4 on quality education. This article examines the development of an adaptive curriculum model based on SDGs designed to enhance education quality in the digital era. Emphasizing 21st-century skills, such as critical thinking, creativity, collaboration, and digital literacy, this model prepares students to respond more to global challenges. The research employs a descriptive qualitative approach through a literature review, analyzing sources related to SDG implementation in education. Findings indicate that integrating technology into the curriculum enables more inclusive and interactive learning, reaching students in remote areas. The Project-Based Learning (PjBL) and Problem-Based Learning (PBL) approaches adopted in this curriculum have proven effective in enhancing students' skills in solving real-world problems. In conclusion, this SDG-based adaptive curriculum model has the potential to create a generation that is not only academically competent but also socially aware and sustainability-oriented, providing essential skills for navigating dynamic global changes.

ARTICLE INFO

Article History:

Received: 6 Sep 2024

Revised: 27 Nov 2024

Accepted: 29 Nov 2024

Available online: 2 Dec 2024

Publish: 28 Feb 2025

Keyword:

adaptive curriculum; digital era; Sustainable Development Goals (SDGs)

Open access

Inovasi Kurikulum is a peer-reviewed open-access journal.

ABSTRAK

Perkembangan teknologi yang pesat dan isu keberlanjutan global menuntut adanya inovasi dalam kurikulum pendidikan, yang relevan dengan Sustainable Development Goals (SDGs), khususnya SDG 4 tentang pendidikan berkualitas. Artikel ini mengkaji pengembangan model kurikulum adaptif berbasis SDGs yang dirancang untuk meningkatkan kualitas pendidikan di era digital. Dengan menekankan pada keterampilan abad 21, seperti berpikir kritis, kreativitas, kolaborasi, dan literasi digital, model ini bertujuan untuk mempersiapkan peserta didik agar lebih responsif terhadap tantangan global. Metode penelitian menggunakan pendekatan deskriptif kualitatif melalui studi pustaka, yang menganalisis sumber literatur terkait penerapan SDGs dalam pendidikan. Hasilnya menunjukkan bahwa integrasi teknologi dalam kurikulum memungkinkan pembelajaran yang lebih inklusif dan interaktif, serta menjangkau peserta didik di daerah terpencil. Pendekatan Project-Based Learning (PjBL) dan Problem-Based Learning (PBL) yang diadopsi dalam kurikulum ini terbukti efektif dalam mengasah keterampilan peserta didik dalam memecahkan masalah nyata. Kesimpulannya, kurikulum adaptif berbasis SDGs ini berpotensi menciptakan generasi yang tidak hanya cakap secara akademis, tetapi juga berkesadaran sosial dan berorientasi pada keberlanjutan, yang menjadi modal penting dalam menghadapi perubahan global yang dinamis.

Kata Kunci: era digital; kurikulum adaptif; Sustainable Development Goals (SDGs)

How to cite (APA 7)

Puspitasari, E. (2025). SDGs-based adaptive curriculum model to improve education quality in the digital age. *Inovasi Kurikulum*, 22(1), 1-12.

Peer review

This article has been peer-reviewed using the journal's standard double-blind peer review, in which both the reviewers and authors are anonymized during the review.

Copyright

2024, Eva Puspitasari. This an open-access article distributed under the terms of the Creative Commons Attribution-ShareAlike 4.0 International (CC BY-SA 4.0) <https://creativecommons.org/licenses/by-sa/4.0/>, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author, and the source is credited. *Corresponding author: epsh28@upi.edu

INTRODUCTION

Education has a significant role in building an environmentally friendly and resilient human society. In the global context, the Sustainable Development Goals (SDGs) established by the United Nations in 2015 have become universal recommendations for countries to accomplish environmentally friendly growth. Of the 17 goals of the SDGs, quality education (SDG 4) is the primary foundation that contributes to achieving other goals, such as reducing inequality, creating decent work opportunities, and maintaining environmental sustainability (Enyanto *et al.*, 2024). The need for quality and sustainable education has become increasingly significant in the last decade, especially amid rapid technological development. The United Nations, through the Sustainable Development Goals (SDGs), established SDG 4, which focuses on quality education that is inclusive and equitable and leads to lifelong learning. This requires a curriculum that provides access and aligns learning content and methods with the demands of the digital era (Surahman, 2024).

The development of an SDG-based adaptive curriculum model is relevant to improving the quality of national education, especially in the current digital era. Such a curriculum provides a foundation for learners to develop 21st-century skills and aims to raise awareness of social responsibility and sustainability. As the digital landscape evolves, the need to adapt to technology in education becomes more prominent. The SDGs underscore the importance of access to quality education (SDG 4), which can be realized through a flexible curriculum based on digital inclusion. The application of technology in the curriculum allows for more interactive teaching and problem-based learning that hones critical thinking skills (Handayani *et al.*, 2023). One concrete example of an adaptive SDGs-based curriculum in Indonesia is independent learning, which aims to allow teachers to adapt teaching methods according to the local context and learners' needs. This curriculum not only focuses on knowledge transfer but also encourages the development of critical, collaborative, and creative skills. In the context of globalization and the industrial revolution 4.0, Indonesia realizes that education must produce graduates who are competent in academics and adaptive to technological change (Fitra, 2023).

At the school level, Merdeka Belajar provides flexibility in curriculum design tailored to the characteristics of learners, for example, by implementing competency-based assessments that allow evaluation based on real and relevant skills, not just traditional academic assessments. Although this technology-based curriculum model presents many opportunities, infrastructure and access challenges in various regions in Indonesia are still significant obstacles. In some remote areas, limited internet access hinders the effective implementation of digital-based curriculum. This shows the importance of collaborative efforts between the government, the private sector, and communities to ensure all learners get equal learning opportunities. Initiatives such as internet assistance programs in rural areas and digital training for teachers and learners are integral parts of the strategy to achieve the SDGs in Indonesia (Sumampow *et al.*, 2024).

Strengthening the implementation of SDGs-based adaptive curriculum models requires collaboration between institutions that provide resources and mentoring for educators to effectively adopt digital technologies. The government and educational institutions also need to continuously evaluate the effectiveness of this curriculum through longitudinal studies that monitor the impact of the curriculum on learners' readiness for the world of work and their social roles in society. Infrastructure adjustments and improvements, especially in areas not yet covered by technology, should be prioritized to ensure equitable access to quality education across Indonesia (Dito & Pujiastuti, 2021). Smart Learning is an innovative approach that integrates technology in education to achieve the SDGs, particularly in providing inclusive and quality education (Makinde *et al.*, 2024). This finding aligns with other studies showing that using learning media can improve digital skills, create more creative and innovative

education, and encourage readiness in the Smart Society 5.0 era (Sama *et al.*, 2022). Another study supports the Smart Learning approach by proving that applying the SMART learning model can significantly improve students' activity and concept understanding (Latjompoh, 2021).

Utilizing digital tools and platforms such as Smart Learning improves learner engagement, adaptation, and learning outcomes, and enables personalization of learning to individual needs. Applying technologies such as virtual simulation and augmented reality in Smart Learning provides learners with opportunities for immersive learning and cross-cultural collaboration through global connectivity. Technology-based education has great potential to provide equitable quality education and support the SDGs through an adaptive curriculum aligned with global developments. In this context, there is a need to develop an SDGs-based adaptive curriculum model designed to meet the needs of the digital era while supporting relevant and inclusive education.

This article aims to design a curriculum model that is responsive to technological developments and integrated with local potential as part of community empowerment. This model is expected to make a real contribution to achieving SDG targets, especially SDG 4, by offering an inclusive, adaptive, and sustainable education strategy for all learners in Indonesia. The article also highlights the importance of educator training and infrastructure equity, especially in less developed areas, by encouraging collaboration between the government, educational institutions, and technology providers.

LITERATURE REVIEW

SDGs Adaptive Curriculum

Research on Sustainable Development Goals (SDGs)-based adaptive curriculum in basic education shows that the Kurikulum 2013 in Indonesia has sought to align with the SDGs by integrating cognitive, psychomotor, and affective aspects to develop 21st-century skills, such as critical thinking and collaboration. The cognitive aspects help learners understand social and environmental complexity, while the psychomotor and affective aspects emphasize application skills and social and environmental values. However, implementing this curriculum still faces challenges, mainly related to uneven infrastructure and a lack of technology training for educators. To optimize the implementation of the SDGs in basic education, this study recommends increasing teacher competencies, improving facilities, and collaborating between institutions to ensure inclusive and sustainable education (Hidayah & Yuliawati, 2021).

An SDGs-based curriculum is essential for building inclusive and sustainable education, where equitable access and quality are top priorities. Curriculum reform and inclusive education policies are needed to address social and economic inequalities, especially for minority groups, learners with disabilities, and children from underprivileged families. Educational technology becomes important in expanding accessibility and enabling personalized learning, especially to reach learners in remote areas. In addition, implementing this curriculum requires cross-sector collaboration between the government, educational institutions, community organizations, and the private sector to provide adequate infrastructure, training, and resources. Through this approach, SDGs-based curricula not only improve the quality of education but also shape a more inclusive, equitable, and resilient society in the face of global challenges (Hafshah & Nugraheni, 2024). Furthermore, the SDGs-based adaptive curriculum approach is expected to facilitate a learning process that is not only centered on academic outcomes but also builds life skills relevant to global challenges. Curriculum integration provides benefits and impacts in improving the quality of education, especially in the context of the SDGs (Hadiapurwa *et al.*, 2024). The integration of SDGs in the curriculum aims to equip learners with a holistic understanding of social and environmental responsibility, which is expected to form a generation sensitive to global issues, such as climate change, gender equality, and economic sustainability.

The Role of Technology in Education

The use of technology in education, accelerated by the COVID-19 pandemic, has brought significant benefits, including time flexibility, accessibility, and increased parental involvement in learners' learning processes. The development of digital technologies has supported the transformation of education towards more adaptive and interactive learning models, in line with the SDGs' goal of providing quality and inclusive education. Technologies such as e-learning and project-based learning (PjBL) enable learners to develop critical thinking and collaboration skills, overcome geographical access constraints, and increase engagement in learning. For SDGs-based curriculum implementation, infrastructure support and educator training are needed to utilize technology optimally. Collaboration between educational institutions, government, and the private sector is needed to realize inclusive, sustainable education (Said, 2023). The study at SMA Negeri 1 Banda Aceh shows that applications such as WhatsApp and Google Classroom help in the delivery of materials and interaction between learners and teachers. However, there are still constraints such as limited devices and low understanding of technology among parents. The study highlights the importance of infrastructure support and training for educators to ensure optimal technology integration in education, especially in areas with limited access (Azis *et al.*, 2024).

Curriculum Development Strategy

Curriculum development in the context of modern education requires strategies that are adaptive to the development of science, technology, and the needs of society. There are various strategies for curriculum innovation, including curriculum management based on relevance, continuity, flexibility, effectiveness, and efficiency (Thaib & Siswanto, 2015). Effective curriculum management focuses on the link between learning experiences and educational objectives and the relevance of subject matter to the demands of the world of work and technological developments. One of the strategies outlined is to conduct regular curriculum reviews involving various stakeholders, including teachers, school committees, and principals, to ensure that the curriculum remains relevant to social and technological dynamics. In curriculum management efforts, the suggested approach is policy, where opinions from teachers and related parties are integrated into curriculum decisions, increasing their involvement in curriculum development (Azis *et al.*, 2024). This strategy ensures that the curriculum can adapt to the latest social, economic, political, and technological developments. Monitoring the external and internal environment is key to keeping educational institutions responsive and relevant in the face of change. At the same time, an adaptive curriculum not only pursues academic achievement but also equips learners with practical skills and values to face increasingly complex global challenges (Putra *et al.*, 2023).

METHODS

The literature study research method uses secondary data from various scientific literature to answer research questions without making direct field observations. This research uses a qualitative descriptive method to deeply understand theories or concepts related to the topic under study. Data is taken from trusted sources such as relevant and up-to-date journal articles, books, and research reports, which are collected through academic databases such as Google Scholar, Scopus, and several journals relevant to the researcher's topic (Fadli, 2021).

The data collection process included a literature search using relevant keywords, selection based on relevance and quality of sources, and documentation of literature that met the criteria (Susanto *et al.*, 2023). This research applies keywords such as adaptive curriculum, SDGs, and digital era to identify

relevant literature in curriculum development to improve the quality of education. The analysis focuses on applying Project-Based Learning (PjBL) and Problem-Based Learning (PBL) approaches and integrating digital technology to support inclusive and globally appropriate learning. In addition, the review emphasizes the importance of social awareness and inter-institutional collaboration as key components in strengthening sustainable education in line with the SDGs. The criteria for literature documentation in data collection include thematic relevance, source authority, publication currency, substantive relevance to the SDGs, methodological validity, clarity of research outcomes, and contribution to educational technology innovation. Literature that meets these criteria will provide a solid theoretical and empirical foundation in supporting the development of SDGs-based adaptive curriculum.

This research uses a simple literature review approach with around 20-30 relevant journal articles. This number was chosen to provide a comprehensive overview of adaptive curriculum implementation in the context of the SDGs and the digital age without neglecting the depth of analysis. As such, these sources will include up-to-date perspectives that can help identify trends, challenges, and best practices in implementing PjBL and PBL in the digital era, while presenting strong empirical evidence as a foundation for formulating recommendations for more responsive and sustainable curriculum development. Furthermore, the data was analyzed through content analysis techniques to identify key themes and patterns that align with the research focus. The validity of the research results was ensured through source triangulation to ensure consistency of information from various literature, so that the results obtained reflect a comprehensive and reliable understanding. This literature study is then organized as a literature review that includes background, thematic analysis, and conclusions, which are expected to make a theoretical contribution to the development of knowledge in the field under study.

RESULTS AND DISCUSSION

SDGs-based Curriculum Model

The SDGs (Sustainable Development Goals)-based curriculum model is an approach that seeks to integrate sustainable development goals in the education sector, especially in achieving inclusive and equitable quality education for all learners. In the Indonesian context, implementing this curriculum is expected to overcome current educational challenges, such as the quality gap between urban and rural areas, limited access to technology, and lack of adequate infrastructure. Through the SDGs-based curriculum, learners are not only taught academic knowledge but also instilled with relevant sustainability values, such as environmental awareness, social equality, and economic sustainability, so that they can understand and contribute to the achievement of global goals (Ramadani & Nugraheni, 2024). These challenges underscore the urgency of future-oriented education, which can equip learners to adapt to a changing world and effectively address global issues. Education must serve as a platform to form insightful individuals who are integrity and respond to the complexity of global dynamics (Muliadi & Nasri, 2023).

The curriculum is also designed to prepare learners with 21st-century skills, such as critical thinking, collaboration, creativity, and digital literacy, which are needed in the modern era. To achieve these goals, the development of an SDGs-based curriculum involves components such as the integration of sustainability values in various subjects, the application of project-based learning to instill contextualized understanding, and an inclusive approach so that every learner, including those in remote areas, has equal access to quality education. In its implementation, the SDGs-based curriculum requires in-depth training for educators to teach sustainability-oriented materials and digital literacy and support from various parties, including the government and private sector, to provide adequate infrastructure and technology (Firmansyah, 2024).

The SDGs-based adaptive curriculum model is designed to respond to the needs of learning in the digital era that demands flexibility and connectedness with technological developments. The curriculum includes integrating global issues in learning, such as climate change, equality, and socio-economic development, which can be implemented through project-based learning and problem-based learning methods. The project-based learning approach encourages students to engage in projects that challenge them to design and implement creative solutions to problems relevant to the SDGs. Such projects may include creating teaching materials that support sustainability concepts, researching the social impact of educational technology, or developing inclusive teaching initiatives. This method aims to strengthen practical skills and connect learning with real-world applications. Meanwhile, problem-based learning is a method that leads learners to understand how to learn and work together in groups to solve real problems (Indarta *et al.*, 2022).

Using digital technology, learners can learn through e-learning platforms, simulations, and interactive applications that enrich their learning experience. On the other hand, digital literacy is also a key competency that learners must master to compete in an increasingly connected world. This adaptive curriculum not only accommodates academic needs but also includes developing 21st-century skills such as creativity, collaboration, and critical thinking (Imran, 2024). The SDGs-based adaptive curriculum also accommodates the rapid development of technology through a flexible approach. For example, using Artificial Intelligence (AI) and big data technologies can help evaluate individual learners' learning progress so that learning approaches can be tailored to the needs of each learner (Aqiilah *et al.*, 2024).

In this digital era, implementing the SDGs-based curriculum model also aims to instill sustainability attitudes and values relevant to everyday life, such as environmental management, social empathy, and multicultural understanding, which are important provisions in facing global challenges (Wulandari, 2024). The SDGs-based adaptive curriculum model is expected to improve the quality of education in Indonesia and make it more relevant to global demands. This curriculum will produce graduates who are not only academically brilliant but also have environmental awareness, digital skills, and the ability to adapt to rapid changes in the digital era. Proper curriculum implementation can create a generation ready to contribute to sustainable development, reduce educational inequality, and bring Indonesia closer to achieving the SDGs targets by 2030.

Application of Technology in Education

The discussion on the application of technology in education highlights the important role of technology in supporting the achievement of sustainable quality education. In the digital era, technology is a learning tool and a significant catalyst in developing an adaptive curriculum model that fits the needs of the times and the goals of the SDGs (Lailan, 2024). The SDGs-based curriculum aims to create inclusive and sustainable education, where technology plays an important role in expanding access, increasing learning effectiveness, and fostering 21st-century competencies, such as digital literacy, creativity, and critical thinking skills (Lestari *et al.*, 2024).

The application of technology in education provides opportunities for interactive and dynamic digital-based learning. Various technologies, such as e-learning, Augmented Reality (AR), Virtual Reality (VR), and Artificial Intelligence (AI), offer more immersive and contextualized learning experiences. For example, AR and VR can take learners on virtual experiences that allow them to understand scientific, historical, or cultural phenomena more directly and practically. AI technologies also enable the implementation of personalized learning, where the system can analyze learners' learning needs and provide materials or challenges tailored to their progress (Solihat *et al.*, 2024). With the help of such technologies, SDGs-based adaptive curriculum can provide more responsive learning, facilitate different learning styles, and increase learner engagement (Peea *et al.*, 2024).

Technology also opens up wider access to education for learners in remote areas or who experience limited facilities. Through e-learning platforms and internet-based applications, learning materials can be accessed from anywhere and at any time, allowing learners to learn independently (Sukono, 2020). In addition, digital technology helps overcome the geographical constraints that have been an obstacle to spreading quality education throughout Indonesia. In ensuring the implementation of SDGs-based curriculum, developing digital infrastructure is important, especially in providing reliable internet access throughout Indonesia. In this context, cooperation between the government, educational institutions, and the private sector is needed to ensure affordability and equitable access to technology in all regions (Al Majeed *et al.*, 2024).

Implementing technology in SDGs-based adaptive curriculum also involves training and capacity building for teachers to use technology effectively. Teachers must be equipped with digital skills to utilize technology-based learning platforms, such as Learning Management System (LMS), and implement innovative learning approaches (Marlina *et al.*, 2022). This training is important so that teachers not only use technology but also integrate it effectively in the learning process, following the values of the SDGs. In addition, teachers act as facilitators who help learners to use technology wisely, given the challenges of the digital era, such as misuse of information or cyberbullying (Doringin *et al.*, 2020).

The application of technology in education also faces various challenges, including uneven infrastructure, limited funding, and resistance to change. However, with government policy support and cross-sector collaboration, the application of technology in an adaptive curriculum based on the SDGs can positively impact the quality of education. Technology helps create a more inclusive learning environment, foster creativity, and develop relevant skills for the future, all of which are essential in achieving sustainable quality education (Ady & Putra, 2024). With the proper integration of technology, SDGs-based adaptive curriculum can produce graduates who are not only academically competent but also have the environmental awareness and digital skills needed in a changing world. Technology enables flexible, adaptive, and sustainability-oriented teaching and learning processes, thus bringing Indonesia closer to achieving the SDGs goals, especially regarding quality education.

Implementation of the Curriculum Development Strategy

The SDGs-based adaptive curriculum development strategy for improving the quality of education in the digital era underscores the importance of a comprehensive and responsive approach to changing times. This strategy involves developing learning materials and ensuring the curriculum can equip learners with skills and values relevant to global and local needs. The ultimate goal is to create a flexible, inclusive, and sustainability-oriented curriculum, integrating digital technology to improve the effectiveness and accessibility of learning (Cantika, 2022).

One of the main strategies in developing an SDGs-based curriculum is the integration of sustainability values in all aspects of learning. Sustainability values, such as environmental stewardship, social equality, and a sustainable economy, must be integrated into various subjects, from science and social studies to language and arts. For example, in science lessons, learners can learn about the impacts of climate change and the importance of conserving natural resources, while in social studies lessons, they can explore issues such as social inequality and poverty. This approach allows learners to understand the relevance of learning materials to real-life contexts and their role in achieving broader global goals (Wulandari, 2024).

The utilization of digital technology is also an important strategic component in the development of SDGs-based adaptive curriculum. Technology increases access to education for learners in different regions and facilitates more interactive and adaptive learning methods. This strategy includes using e-learning platforms, interactive apps, and AI-based learning tools that enable personalization of learning

materials according to learners' needs. Digital technologies can help deliver richer and deeper learning experiences through simulations, videos, or online discussion platforms that allow learners to explore multiple perspectives independently and creatively. This aligns with the need for 21st-century skills, such as digital literacy, critical thinking, and collaboration (Aqilah *et al.*, 2024).

Teacher competency development is also a key strategy in implementing an SDGs-based curriculum. Teachers not only need conventional teaching skills, but also need to be able to apply technology and integrate sustainability values into their teaching. Therefore, teacher training and professional development programs should focus on mastering digital technology and a deep understanding of the SDGs and how to teach them (Khayati *et al.*, 2020). With these competencies, teachers can act as facilitators who help learners develop relevant skills and understanding to face global challenges. In addition, the training also covers soft skills, such as digital classroom management and developing inclusive learning approaches (Kurniawan & Abidin, 2024).

To support the effectiveness of SDGs-based adaptive curriculum, cross-sectoral cooperation is needed between the government, educational institutions, the private sector, and the community. The government plays a role in developing policies that support the integration of SDG-based curriculum at all levels of education and ensure that adequate budget allocations are available for developing technological infrastructure and teacher training programs. On the other hand, the private sector can support by providing technology devices, internet access, and educational programs that help students and teachers understand technology and sustainability. This collaboration enables comprehensive support for sustainability-based and technology-assisted education.

Competency-based evaluation and assessment are an important part of this curriculum development strategy. An evaluation system that can measure learners' achievements in terms of academics and the sustainability skills and values they have learned is needed to ensure that the SDGs-based adaptive curriculum is fit for purpose. Project-based assessments, collaborative evaluations, and competency-focused digital assessments allow learners to demonstrate their understanding more in-depth and practically. These assessment systems can also provide more accurate feedback to teachers and learners, allowing them to adjust teaching and learning methods to improve learning outcomes. With these strategies, the development of an SDGs-based adaptive curriculum is expected to improve the quality of education in Indonesia, especially in preparing a generation that has academic competence and relevant awareness and skills for a sustainable world. This curriculum will prepare graduates to face challenges in the digital era and contribute to achieving the SDGs' goals, especially in quality and sustainable education.

Discussion

The SDGs-based curriculum model is a holistic approach designed to provide high-quality education by developing core 21st-century skills, such as critical thinking, creativity, collaboration, and digital literacy. The integration of SDGs in education not only includes the achievement of academic competencies, but also aims to foster learners' awareness of global issues, including environmental sustainability, social equality and collective responsibility. Thus, learners not only acquire academic knowledge, but are also encouraged to understand their role in shaping a sustainable and adaptive society to global challenges (Tareze *et al.*, 2022).

The application of technology plays a central role in the SDGs-based curriculum. Technologies such as e-learning, Augmented Reality (AR), and Virtual Reality (VR) extend the reach of education and create more contextualized and immersive learning experiences. Through e-learning, learners in remote areas can access quality materials, while AR and VR allow them to understand complex phenomena such as climate change or ecosystem interactions more tangibly. These technologies support adaptive and

personalized learning approaches, allowing materials to be tailored to individual learning needs and pace, which is crucial in the digital age (Gunarsih, 2023).

SDGs-based curriculum development strategies require a collaborative and sustainable approach, with active involvement from the government, educational institutions, the private sector, and the community. The government and educational institutions are responsible for providing supporting infrastructure, such as internet networks and digital devices, especially in areas that lack access. The private sector also plays a role in providing technology tools and training programs that are accessible to educators. This collaboration is crucial to ensure that quality education can be accessed equitably without being constrained by geographical or economic limitations. Teacher capacity building is another important component in the implementation of this curriculum. Teachers need to be equipped with technology skills and a deep understanding of the SDGs' values to integrate technology effectively in teaching. The training is also designed to develop teachers' ability to convey sustainability values in a way relevant and engaging way for learners. In the digital era, teachers are not only teachers but also facilitators who assist learners in using technology wisely and internalizing the importance of sustainability (Vioresa et al., 2023).

With this approach, the SDGs-based curriculum is expected to shape a generation that excels academically and has social awareness and relevant digital skills for the future. This curriculum prepares learners to adapt dynamically to global changes and contribute to sustainable development in various sectors. The SDGs-based adaptive curriculum, therefore, is not just an educational instrument but also a means to realize social sustainability and resilience in the face of 21st-century complexity.

CONCLUSION

The development of an SDGs-based adaptive curriculum model offers an innovative solution to improve the quality of education in the digital era. With an approach that utilizes digital technology and project-based learning methods, this curriculum facilitates learning that is relevant, inclusive, and oriented towards 21st-century skills. Applying project-based and problem-based learning in the curriculum allows learners to hone their critical thinking, collaboration, and creativity skills in a real context related to the SDG goals. In addition, with the support of technology, the curriculum provides wider access and responsiveness for learners in different regions, ensuring equitable distribution of quality education. As a result, the SDGs-based adaptive curriculum is expected to produce a generation capable of facing global challenges and contributing to sustainable development. Further development of this research could include evaluating the effectiveness of SDGs-based adaptive curriculum implementation across different education levels and regions and analyzing its impact on 21st-century skills such as critical thinking, collaboration, and creativity. In-depth research could also be conducted to explore the optimal integration of technology in learning methods and access to education in remote areas to improve equity in education quality. In addition, further studies could examine the potential for adapting this curriculum in local cultural contexts to ensure relevance and higher learner engagement.

AUTHOR'S NOTE

The authors declare that there is no conflict of interest related to the publication of this article and emphasize that the data and content of the article are free from plagiarism.

REFERENCES

- Ady, P., & Putra, N. (2024). Keterbatasan akses dan infrastruktur dalam keberlangsungan vokasional. *Netizen: Journal of Society and Bussiness*, 1(5), 249-254.
- Al Majeed, F. S., Sundana, R. N. R., Ramadhan, R. G., & Abrar, M. A. (2024). Strategi meningkatkan kualitas pendidikan menuju Indonesia Emas 2045: Analisis pandangan akademisi. *Antropocene: Jurnal Penelitian Ilmu Humaniora*, 4(3), 82-89.
- Aqilah, N., Iman, W. W., & Rachman, I. F. (2024). Inovasi model pembelajaran literasi digital yang efektif untuk mendukung implementasi SDGS 2030. *Jurnal Multidisiplin Ilmu Akademik*, 1(3), 269-276.
- Azis, A., Nurashiah, N., Kusnafizal, T., Sakdiyah, S., & Alfian, A. (2024). Information and communication technology in the learning process. *JTP-Jurnal Teknologi Pendidikan*, 26(1), 158-170.
- Cantika, V. M. (2022). Prosedur pengembangan kurikulum (kajian literatur manajemen inovasi kurikulum). *Inovasi Kurikulum*, 19(2), 171-184.
- Dito, S. B., & Pujiastuti, H. (2021). Dampak Revolusi Industri 4.0 pada sektor pendidikan: Kajian literatur mengenai digital learning pada pendidikan dasar dan menengah. *Jurnal Sains dan Edukasi Sains*, 4(2), 59-65.
- Doringin, F., Tarigan, N. M., & Prihanto, J. N. (2020). Eksistensi pendidikan di era revolusi industri 4.0. *Jurnal Teknologi Industri dan Rekayasa (JTIR)*, 1(1), 43-48.
- Enyanto, M., Akbar, B., & Rachman, I. (2024). Peran literasi digital dalam pencapaian SDGs: Perspektif pendidikan & pengembangan masyarakat. *Jurnal Ilmu Pendidikan (JIP)*, 2(6), 944-954.
- Fadli, M. R. (2021). Memahami desain metode penelitian kualitatif. *Humanika*, 21(1), 33-54.
- Firmansyah, M. D. (2024). Transformasi pendidikan melalui kolaborasi pemerintah, swasta, dan masyarakat untuk literasi digital demi pembangunan berkelanjutan 2030. *Ilmiah Multidisiplin*, 1(4), 317-327.
- Fitra, D. (2023). Kurikulum merdeka dalam pendidikan modern. *Jurnal Inovasi Edukasi*, 6(2), 149-156.
- Gunarsih, T. (2023). Inovasi dan tantangan dalam pembelajaran pendidikan agama Islam di era digital. *Guau: Jurnal Pendidikan Profesi Guru Agama Islam*, 3(1), 148-161.
- Hadiapurwa, A., Ali, M., Ropo, E., & Hernawan, A. H. (2024). Trends in climate change education studies in the last ten years: A systematic literature review. *Jurnal Mimbar Ilmu*, 29(1), 32-45.
- Hafshah, D. R., & Nugraheni, N. (2024). Dinamika kesetaraan pendidikan sebagai fondasi SDGs. *Jurnal Penelitian Pendidikan Indonesia (JPPI)*, 1(3), 142-150.
- Handayani, F., Hasyim, D. M., Suryono, W., Sutrisno, & Novita, R. (2023). Peran teknologi pendidikan dalam mendukung efektivitas pelaksanaan Kurikulum Merdeka Belajar di Perguruan Tinggi. *Jurnal Review Pendidikan dan Pengajaran*, 6(4), 1-12.
- Hidayah, V. N., & Yuliatwati, F. (2021). Kurikulum tematik 2013 dalam framework sustainable development goals di sekolah dasar. *EduHumaniora: Jurnal Pendidikan Dasar Kampus Cibiru*, 13(2), 162-171.
- Imran. (2024). Dinamika kurikulum nasional: Tinjauan sejarah dan prospek masa depan. *Jurnal Mudarrisuna: Media Kajian Pendidikan Agama Islam*, 14(2), 266-281.
- Indarta, Y., Jalinus, N., Waskito, Samala, A. D., Riyanda, A. R., & Adi, N. H. (2022). Relevansi kurikulum merdeka belajar dengan model pembelajaran abad 21 dalam perkembangan era society 5.0. *Edukatif: Jurnal Ilmu Pendidikan*, 4(2), 3011-3024.
- Khayati, N. A., Muna, F., Oktaviani, E. D., & Hidayatullah, A. F. (2020). Teacher's role program in inclusive education to achieve Sustainable Development Goals (SDGs). *Kolokium Jurnal Pendidikan Luar Sekolah*, 8(1), 1-6.
- Kurniawan, D. T., & Abidin, Y. (2024). Program penguatan dan pendampingan pemanfaatan website interaktif alur merdeka pembelajaran sekolah dasar untuk guru - guru Sekolah Dasar Mitra UPI Kampus Cibiru. *Satwika: Jurnal Pengabdian kepada Masyarakat*, 4(1), 43-51.

- Lailan, A. (2024). Peran teknologi pendidikan dalam pembelajaran. *Sentri: Jurnal Riset Ilmiah*, 3(7), 3257-3262.
- Latjompoh, M. (2021). Application of smart learning models to improve activity and complete student concepts. *JournalNX: A Multidisciplinary Peer Reviewed Journal*, 7(3), 105-115.
- Lestari, B. B., Nugraheni, N., & Husain, F. (2024). Penerapan edukasi SDGS di lingkungan sekolah guna mendukung terwujudnya kesejahteraan pendidikan. *Socius: Jurnal Penelitian Ilmu-Ilmu Sosial*, 1(10), 67-72.
- Makinde, S. O., Ajani, Y. A., & Abdulrahman, M. R. (2024). Smart learning as transformative impact of technology: A paradigm for accomplishing Sustainable Development Goals (SDGs) in education. *Indonesian Journal of Educational Research and Technology*, 4(3), 213-224.
- Marlina, S., Athirah Azis, P., Dwi Pratiwi, N. S., & Anas, M. M. (2022). Pelatihan penggunaan media berbasis teknologi untuk guru di Kabupaten Pangkajene dan Kepulauan. *Journal of Community Dedication*, 2(4), 220-230.
- Muliadi, E., & Nasri, U. (2023). Future-oriented education: The contribution of educational philosophy in facing global challenges. *Jurnal Ilmiah Profesi Pendidikan*, 8(4), 2420-2427.
- Peea, F., Anneke, D. R., & Naibaho, L. (2024). Revolusi pemikiran: Memahami peran pendidikan dalam menghadapi era teknologi 5.0. *Jurnal Kridatama Sains dan Teknologi*, 6(1), 25-33.
- Putra, S., Yulaekah, Y., Syaifuddin, M., & Andriani, T. (2023). Manajemen strategi pengembangan kurikulum dan interaksi edukatif. *Jurnal Ekonomi Manajemen Sistem Informasi*, 4(3), 605-613.
- Ramadani, D. H., & Nugraheni, N. (2024). Upaya peningkatan pendidikan Indonesia dalam mencapai target Sustainable Development Goals (SDGs). *Jurnal Penelitian Pendidikan Indonesia (JPPI)*, 1(3), 126-132.
- Said, S. (2023). Peran teknologi sebagai media pembelajaran di era abad 21. *Jurnal PenKoMi: Kajian Pendidikan dan Ekonomi*, 6(2), 194-202.
- Sama, S., Bahri, S., & Misbahudholam AR, M. (2022). Realizing creative innovative education through increasing digitalization skills in learning with Canva media in the era of smart society 5.0. *Mattawang: Jurnal Pengabdian Masyarakat*, 3(1), 70-81.
- Solihat, A. N., Dahlan, D., Kusnendi, K., Susetyo, B., & Al-Obaidi, A. Sh. M. (2024). Artificial Intelligence (AI)-based learning media: Definition, bibliometric, classification, and issues for enhancing creative thinking in education. *ASEAN Journal of Science and Engineering*, 4(3), 349-382.
- Sukono, M. (2020). Dinamika perkembangan e-learning dan tantangannya dalam media pembelajaran. *Kontinu: Jurnal Penelitian Didaktik Matematika*, 4(2), 110-124.
- Sumampow, Z. F., Rambitan, B. F., Sadsuitubun, M., Wakur, N., & Sumual, S. Y. (2024). Pembaruan kurikulum di era digital: Tinjauan literatur tentang strategi manajemen dan evaluasi yang efektif. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, 9(2), 1-12.
- Surahman, E. (2024). Curriculum and instructional designs on SDGs STEM learning. *Inovasi Kurikulum*, 21(2), 1177-1192.
- Susanto, D., Risnita, & Jailani, M. S. (2023). Teknik pemeriksaan keabsahan data dalam penelitian ilmiah. *Jurnal Qosim: Jurnal Pendidikan, Sosial, dan Humaniora*, 1(1), 53-61.
- Tareze, M., & Astuti, I. (2022). Model pembelajaran kolaborasi SDGs dalam pendidikan formal sebagai pengenalan isu global untuk meningkatkan kesadaran sosial peserta didik. *Visipena*, 13(1), 42-53.
- Thaib, R. M., & Siswanto, I. (2015). Inovasi kurikulum dalam pengembangan pendidikan (suatu analisis implementatif). *Jurnal Edukasi: Jurnal Bimbingan Konseling*, 1(2), 216-228.
- Vioreza, N., Hilyati, W., & Lasminingsih, M. (2023). Education for sustainable development: Bagaimana urgensi dan peluang penerapannya pada kurikulum merdeka?. *Eureka: Journal of Educational Research and Practice*, 1(1), 34-47.

Wulandari, C. E. (2024). Integrasi prinsip pembangunan berkelanjutan dalam kurikulum pendidikan Islam: Sebuah tinjauan literatur. *TarbiyahMU*, 4(2), 22-28.