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Roadmap for Implementing SDGs-Based Mathematics Learning in the Independent Curriculum: A Comparative Study of Indonesia and Singapore

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Abstract

Background: This research is motivated by the need to integrate the values of the Sustainable Development Goals (SDGs), particularly SDG 4, into mathematics learning in the Independent Curriculum. Although the Independent Curriculum provides flexibility through the P5 project, its implementation shows significant gaps, such as the dominance of conventional media and low teacher digital literacy. In contrast, Singapore has successfully implemented Education for Sustainable Development (ESD) systematically through the LLP and ALP, supported by teacher professionalism and data-driven policies.
Aims: This study aims to analyze the implementation of SDGs in mathematics learning in the Merdeka Curriculum and the Singapore National Curriculum and to compile a roadmap for the implementation of SDGs-based mathematics learning for the period 2025–2030.
Methods: The method used was descriptive qualitative, using systematic review techniques and international comparative studies. Data were collected through analysis of official curriculum documents from Indonesia and Singapore.
Result: The findings show that Indonesia has integrated the SDGs through P5, but not explicitly into the mathematics curriculum. The use of data-driven learning technologies remains low. Singapore has a centralized curriculum with strong ESD integration, uses environmental data for mathematical modeling, and demonstrates higher PISA performance. The comparative analysis identified gaps in pedagogy, teacher preparedness, and digital infrastructure.
Conclusion: The research resulted in a roadmap for strengthening SDG-based mathematics learning for 2025–2030, consisting of five pillars: curriculum evaluation, strengthening mathematics teacher competencies in ESD, developing SDG teaching modules, integrating sustainability values into mathematical reasoning, and a data-driven evaluation system. This roadmap serves as a strategic reference for strengthening the implementation of the Independent Curriculum toward more contextual and sustainable mathematics learning.

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INTRODUCTION

Education plays a central role in realizing sustainable development as outlined in the United Nations 2030 Agenda (SDGs). Among the 17 global goals, Quality Education (SDG 4) holds a strategic position as it serves as the foundation for achieving other goals, including technological innovation (SDG 9), sustainable cities (SDG 11), and action on climate change (SDG 13)(Susanti & Chanifudin, 2025; Widiatmoko et al., 2024). In the context of primary and secondary education, mathematics learning plays an important role as a means of developing numeracy literacy, scientific reasoning, and problem-solving skills needed to understand sustainability issues quantitatively and integrate sustainability concepts into mathematics learning(Ramadhani et al., 2025). For example, through environmental data analysis, population growth modeling, or energy consumption calculations, mathematics can be used to strengthen the role of critical thinking and sustainable decision-making.

Indonesia responded to these global demands by implementing the Independent Curriculum, which emphasizes learning flexibility, differentiation, and integration of projects to strengthen the Pancasila Student Profile (P5). Conceptually, the Independent Curriculum opens up space for the development of SDG-based mathematics learning through project-based activities, an inquiry-based approach, and the use of contextual data(Desak Ayu, 2024; Pane, 2023). However, implementation in the field shows a significant gap. A recent national study showed that learning practices are still dominated by the use of conventional media such as PowerPoint (97.6%), textbooks (82.4%), and whiteboards (75.3%), while the use of creative digital media, which is highly relevant to contextual mathematics learning, is only around 15.3%. This condition reflects that the expected pedagogical transformation has not been optimally realized, so the integration of SDGs in mathematics learning has not reached a systematic level(Akbar et al., 2023; Juryatina et al., 2024).

In contrast, Singapore has demonstrated success in integrating Education for Sustainable Development (ESD) into the national curriculum through structured approaches such as the Learning for Life Program (LLP) and the Applied Learning Program (ALP). Strengthening teacher professionalism, data-driven policies, and curriculum consistency are key factors enabling the comprehensive and sustainable integration of global issue-based mathematics learning(Lutfiyani & Pramesti, 2025; Ng, 2020; Novianty & Nurjanah, 2025). This success is reflected in the performance of the 2022 PISA (Planning for International Student Assessment), where Singapore ranked highest in the world, while Indonesia ranked 69th out of 80 countries. This difference in performance underscores that Indonesia's challenges lie not only in curriculum content but also in implementation capacity, mathematics pedagogy, and technological readiness(OECD, 2023; Triantoro et al., 2025).

Although the differences in learning implementation between Indonesia and Singapore have been widely discussed in various comparative studies, these studies generally still focus on comparing curriculum structures, learning approaches, or learning outcomes(Daniati et al., 2024; Nukman, 2024; Sappaile, 2025). On the other hand, research on the integration of SDGs and Education for Sustainable Development (ESD) in mathematics education in Indonesia tends to focus on general policy aspects, teacher readiness, and the implementation of P5 projects, without specifically examining mathematics learning as a vehicle for data analysis, modeling, and quantitative reasoning on sustainability issues. Thus, although the implementation gap between the two countries has been identified, there is still limited research that utilizes this international comparison to formulate an implementation framework that specifically directs the integration of SDGs into mathematics learning.

Based on these conditions, this study positions the gap between Indonesia and Singapore not merely as a difference in achievements or policies, but as a basis for formulating strategic solutions that are implementable. Therefore, this study aims to conduct a comparative analysis of the integration of SDGs in mathematics learning in the Merdeka Curriculum and Singapore's national curriculum, as well as to develop a roadmap for the implementation of SDG-based mathematics learning for the period 2025–2030. Through a systematic review and international comparative study approach, this study is expected to bridge the gap between curriculum design and learning practices, while providing more measurable policy directions in strengthening contextual, adaptive, and sustainable mathematics learning.

METHOD

Research Design

This research uses a descriptive qualitative approach with two main methods: a systematic review and an international comparative study. The qualitative approach was chosen because the research focuses on analyzing curriculum documents and literature to understand how the values of the Sustainable Development Goals (SDGs) are integrated into the Indonesian Merdeka Curriculum and the Singaporean National Curriculum. The combination of these two methods allows researchers to develop a comprehensive, evidence-based implementation roadmap.

Participant

No human participants (such as teachers or students) were interviewed or surveyed directly as primary data in this study. This study focuses on analyzing literature and policy documents.

Population and the methods of sampling

The population data includes scientific articles, policy reports, mathematics curriculum documents, and academic literature available in databases such as Scopus, Google Scholar, and official government sources. The data collection technique used was a systematic review, with the following criteria:

1. Integration of SDGs in mathematics learning.
2. Implementation of the Indonesian and Singaporean education curriculum.
3. 21st century mathematics learning model.

Data that meets the criteria is then analyzed to see the pattern of application of SDG values in the context of the two countries.

Instrument

The primary instrument used is document analysis. This instrument is applied to the Merdeka Curriculum (Indonesia) and the Singapore National Curriculum, administered by the Ministry of Education (MOE) of Singapore. The analysis focuses on aspects of SDGs value integration, approaches to mathematics learning, development of 21st-century mathematical competencies and literacy, and the social, cultural, and policy contexts influencing the development of each curriculum.

Procedures and time frame

This research procedure was structured in stages to ensure a systematic and structured study flow. The following stages illustrate the steps taken by the researchers, from literature search to developing a roadmap for implementing SDGs-based learning.

Figure 1. Research Procedure Diagram

The research procedure involved a Systematic Review and an International Comparative Study, followed by a Synthesis of Findings and Roadmap Formulation. The timeframe analyzed for the comparative study of the two curricula was 2020 to 2025, and the resulting roadmap was proposed for the medium-term period of 2025–2030.

Analysis plan

The collected data was analyzed through stages tailored to the needs of the documentary and comparative studies. These stages include:

1. Document Analysis
   This stage was conducted by reviewing the Merdeka Curriculum and the Singapore National Curriculum in mathematics to identify the integration of SDGs elements, 21st-century competencies, and the learning approaches used. The analysis included curriculum structure, learning outcomes, and relevant implementation guidelines.
2. Comparative Analysis
   The results of the document analysis were then compared to identify similarities and differences in the integration of SDG values across the two curricula. The analysis also assessed the strength of the pedagogical approaches and policy support influencing the implementation of sustainability-based mathematics learning in Indonesia and Singapore.
3. Synthesis of Findings
   The final stage involved combining the results of the systematic review and comparative analysis to generate a comprehensive understanding of the integration of the SDGs into mathematics learning. This synthesis formed the basis for developing a roadmap for implementing SDG-based mathematics learning within the Independent Curriculum for the 2025–2030 period.

RESULTS AND DISCUSSION

Results

Curriculum Policy and Structure

Indonesia integrates SDG values through the Pancasila Student Profile Strengthening Project (P5), which is flexible and adaptable to each school. However, this flexibility leads to significant variations in implementation across regions. Singapore, on the other hand, adopts a more centralized approach through the Learning for Life Program (LLP) and Applied Learning Program (ALP), ensuring consistent integration of Education for Sustainable Development (ESD) across all schools(Fauziah & Fatayan, 2025; Ro, 2020).

Integration of SDGs in Mathematics Learning

In the Independent Curriculum, mathematics learning emphasizes problem-solving and exploration of real-world contexts, but the integration of the SDGs has not been explicitly incorporated into the curriculum. The use of environmental data or numerical analysis related to sustainability issues is still minimal. In Singapore, mathematics learning focuses on applying mathematical concepts to understand environmental issues through data analysis, modeling, and problem-solving based on global phenomena. The focus on reasoning and applied mathematics strengthens the relevance of mathematics to the SDGs(Pradana & Firdausi, 2025; Siregar et al., 2025).

Teacher Readiness and Infrastructure

In Indonesia, teachers still predominantly use conventional media such as PowerPoint (97.6%), textbooks (82.4%), and whiteboards (75.3%). Only around 15.3% use creative digital media. This low level of digital literacy hinders the integration of the SDGs, which ideally requires a data- and technology-driven approach. In contrast, Singapore has a robust technology infrastructure and a standardized, continuous teacher training system through the National Institute of Education (NIE). This enables effective implementation of data-driven mathematics learning(National Institute for Education (NIE), nd; Tasliah et al., 2024).

Global Performance and Implications for Education Systems

The 2022 PISA results showed that Indonesia was ranked 69th out of 80 countries, while Singapore was ranked first. This difference confirms that the integration of the SDGs into mathematics learning is heavily influenced by the readiness of the education system, teacher competence, and policy support.

Table 1. Comparison of SDGs-Based Curriculum Implementation (Indonesia and Singapore)

Aspect	Independent Curriculum (Indonesia)	Singapore National Curriculum
SDGs Integration Focus	Through the Pancasila Student Profile Strengthening Project (P5); flexible and optional	Systematically integrated through LLP and ALP

Mathematics Learning	Contextual, but SDG integration is not yet explicit; use of environmental data is still limited	Using environmental data and global issues for mathematical modeling and analysis
Technology Support	Conventional media is dominant; digital creative media use is only 15.3%	Strong digital infrastructure; data-driven learning approach
PISA 2022 Performance	Ranked 69 out of 80 countries	World's highest ranking
Main Challenges	Infrastructure gap, low digital literacy, variation in implementation between regions	Moderate challenges in academic pathway differentiation

Based on the results of the analysis of Indonesian and Singaporean curriculum documents and a comparative synthesis of the application of Education for Sustainable Development (ESD) in mathematics learning, five pillars of the 2025–2030 implementation roadmap were compiled as follows:

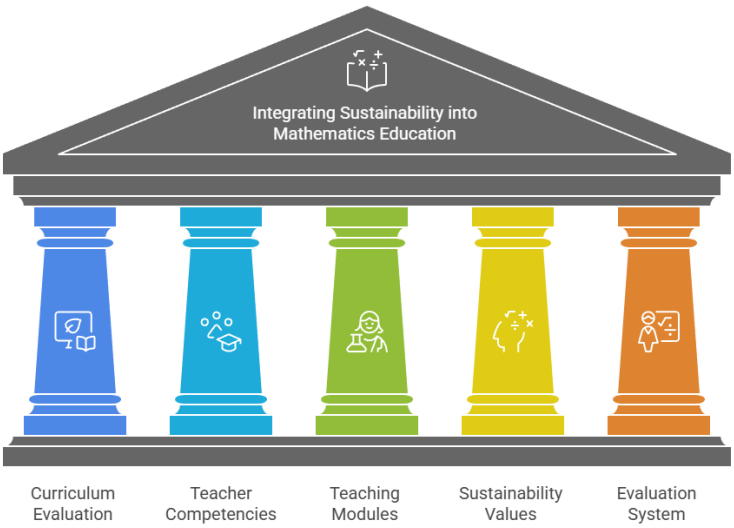

Figure 2. RoadmapImplementation of SDG-Based Mathematics Learning for the 2025–2030 Period

Curriculum Evaluation

This pillar focuses on a comprehensive review of the Merdeka Curriculum structure, particularly in mathematics, to assess the extent to which sustainability issues (SDGs) have been integrated into learning outcomes, teaching materials, and pedagogical approaches. The evaluation is conducted to identify areas for strengthening, particularly in numeracy, data analysis, and modeling competencies relevant to the socio-environmental context. The results of this evaluation serve as the basis for policy formulation and the development of teaching materials that are more adaptive to the needs of SDG-based mathematics learning.

Strengthening Mathematics Teacher Competence in ESD

This pillar emphasizes improving the capacity of mathematics teachers to understand, adapt, and integrate the concept of Education for Sustainable Development (ESD) into the learning process. Competency strengthening is carried out through intensive training that includes the use of environmental datasets such as energy, climate, pollution, waste, and water, the application of the SDGs context in mathematical problem-solving, teaching sustainability modeling and data literacy, designing P5 projects based on mathematical analysis, and improving skills in authentic assessment and evidence-based reasoning. With these competencies, teachers are able to transform mathematics learning from being procedural to a means of understanding global and local issues based on data.

Development of SDGs Teaching Modules

This pillar focuses on developing mathematics learning modules that integrate the SDGs through contextual activities, data analysis, and mathematical modeling. The modules are designed using real-world examples such as energy consumption, waste management, water quality, and

climate change; they utilize numerical data-based worksheets that enable students to interpret graphs, trends, and patterns; and they include P5-based mini-projects such as calculating a classroom carbon footprint, mapping environmental temperatures, or simulating energy use. Furthermore, these modules integrate digital technology to explore SDG statistical data, thus bridging the gap between mathematical concepts and the sustainability realities students face.

Integration of Sustainability Values in Mathematical Thinking Processes

This pillar emphasizes that mathematics learning is not only about calculating skills but also plays a role in developing critical and ethical thinking patterns regarding sustainability issues. The integration of sustainability values is realized through real-world problem-based learning, mathematical modeling to analyze the impact of environmental and social phenomena, strengthening data interpretation skills to support sustainability awareness, and developing a reflective attitude that utilizes numerical analysis in sustainability-oriented decision-making. With this approach, mathematics becomes a thinking tool that can help students understand, assess, and formulate solutions to various sustainability challenges.

Data-Based Evaluation System for SDGs Mathematics Learning

This pillar emphasizes the need for an assessment system that reflects students' ability to analyze, interpret, and utilize sustainability data as part of mathematics learning. The evaluation system is developed through assessments based on authentic datasets sourced from BMKG, BPS, the SDGs Data Portal, and other international sources; the implementation of a data analysis project that simultaneously assesses mathematical understanding and sustainability awareness; the use of an evaluation rubric that measures reasoning, data interpretation, and the ability to generate sustainable solutions; and formative assessment that monitors the development of students' numeracy and sustainability literacy. This data-driven evaluation results in mathematics learning that is relevant to global challenges and aligned with best practices in education in Singapore.

Discussion

Implications

The results of the study show that although the values of the Sustainable Development Goals (SDGs) have been conceptually accommodated through the Pancasila Student Profile Strengthening Project (P5), their integration into mathematics learning in the Merdeka Curriculum is still implicit and has not been realized in data-based learning and mathematical modeling practices. The dominance of conventional media and the low utilization of environmental data indicate that mathematics has not been positioned as a tool for analyzing sustainability issues. These findings are in line with the results of a study(Lina et al., 2025), which confirms that mathematics learning in various contexts still tends to be procedural, thus limiting its contribution to the development of sustainability thinking. Thus, the results of this study reinforce the argument that the integration of SDGs in mathematics learning requires a shift in the pedagogical approach towards explicit modeling, data interpretation, and contextual problem solving.

A comparison with the Singaporean context shows that the successful integration of Education for Sustainable Development (ESD) into mathematics learning is determined not only by curriculum flexibility, but also by the readiness of the education ecosystem as a whole, including policy consistency, teacher professional development, and digital infrastructure support. Learning practices that utilize environmental data and global phenomena for mathematical analysis show that mathematics can serve as an academic tool for understanding sustainability issues.(Hana et al., 2024)also emphasizes the need for explicit instructional planning and strengthening teacher competencies so that SDG integration is not merely symbolic. Therefore, the roadmap for implementing SDG-based mathematics learning formulated in this study is a direct response to the identified implementation gaps, while also providing strategic direction for strengthening the Merdeka Curriculum in the 2025–2030 period.

Research Contribution

This research provides theoretical and practical contributions to the development of sustainable education in Southeast Asia. Theoretically, this study enriches the literature on SDGs implementation in the curriculum by presenting an in-depth comparative analysis between two countries with different educational systems. This research emphasizes the importance of integrating SDGs into mathematics as a means of strengthening numeracy literacy and global awareness. Practically, the main contribution of this research is the development of an

implementation roadmap for the 2025–2030 period that can serve as a reference for policymakers. The roadmap identifies five strategic areas for strengthening the Independent Curriculum:curriculum evaluation, strengthening mathematics teacher competencies in ESD, development of SDGs teaching modules, integration of sustainability values in mathematical thinking processes, data-based evaluation systems for SDGs mathematics learning.

Limitations

This study has several limitations that need to be considered when interpreting the results. The roadmap developed in this study is conceptual in nature, as it was developed through systematic review and international comparative studies of curriculum documents, rather than through direct empirical implementation in educational units. Therefore, this roadmap has not been tested through classroom learning practices, pilot programs, or experimental interventions. In addition, this study did not involve primary data such as learning observations, teacher interviews, or analysis of student learning outcomes, and the comparative study only covered Singapore, so the findings need to be generalized with caution. The limitations of empirical data at the micro level (classroom and school) also limit the depth of pedagogical analysis, requiring further implementation-based research to test and refine the proposed roadmap.

Suggestions

Based on the findings and limitations of this study, several suggestions for further research and policy are as follows. First, the government needs to develop a pilot project for implementing SDG-based mathematics learning in schools with diverse characteristics to empirically test the effectiveness of the roadmap. Second, further research is recommended using a mixed-methods approach involving primary data such as classroom observations, teacher interviews, and analysis of student learning outcomes to strengthen the validity of the findings. Third, technology-based teacher training and data analysis should be made a national priority program to better align mathematics learning with the demands of the SDGs. Fourth, Indonesia can expand comparative studies to other ASEAN countries to identify more diverse and contextual sustainability integration strategies.

CONCLUSION

This study shows that the integration of Sustainable Development Goals (SDGs) into mathematics learning in the Merdeka Curriculum still faces various challenges, particularly related to teacher readiness, the use of technology, and the lack of explicit data-based learning and mathematical modeling. This situation means that the implementation of sustainability-based mathematics learning in Indonesia is not as strong as Education for Sustainable Development (ESD) practices in Singapore, which are supported by centralized policies, continuous teacher professional development, and adequate digital infrastructure. Based on this comparative analysis, this study produced a conceptual roadmap for strengthening SDG-based mathematics learning for the 2025–2030 period, which includes five strategic pillars, namely curriculum evaluation, strengthening the competence of mathematics teachers in ESD, developing SDG-based learning modules, integrating sustainability values into mathematical thinking processes, and a data-based learning evaluation system. This roadmap is expected to serve as a strategic reference for policy makers and education practices in strengthening the implementation of the Merdeka Curriculum towards more contextual, adaptive, and sustainable mathematics learning.

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AUTHOR CONTRIBUTION STATEMENT

EFN was responsible for conceptualizing the study, designing the research framework, conducting the systematic review, performing data analysis, and drafting the manuscript. WK contributed to the comparative analysis, interpretation of findings, refinement of the roadmap framework, and critical revision of the manuscript. Both authors reviewed and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

REFERENCES

akbar, J. saddam, Ariani, M., Zulhawati, Z., Haryani, H., Zani, BN, Husnita, L., Firmansyah, MB, Sa'dianoor, S., Karuru, P., & Hamsiah, A. (2023). Application of Digital Era Learning Media. PT. Sonpedia Publishing Indonesia.

Daniati, D., Susanti, R., Safitri, E.R., & Gulo, F. (2024). Analysis of Learning Aspects in Singapore and Their Comparison in Indonesia. Learning: Journal of Innovation in Educational Research and Learning, 4(4), 1036–1043. https://doi.org/10.51878/learning.v4i4.3483

Desak Ayu, DD (2024). Analysis of Students' Problem-Solving Abilities in the Minimum Competency Assessment (AKM)—Numeracy | Proceedings of the PGRI Senama. Proceedings of the PGRI Senama, 3, 24–33. https://doi.org/10.59672/senama.v3.4072

Fauziah, S., & Fatayan, A. (2025). Implementation of the Independent Curriculum Based on the Pancasila Student Profile Strengthening Project (P5) with the Theme of Sustainable Lifestyle in Grade IV of Elementary School. Global Education Scientific Journal, 6(3), 1288–1297. https://doi.org/10.55681/jige.v6i3.3955

Hana, AY, Sa'diyah, H., Nahar, ZK, & Fakhriyana, D. (2024). Quality Education to Achieve Sustainable Development Goals (SDGs) Through Mathematics Learning: A Systematic Literature Review. ARITHMETIC: Academic Journal of Math, 6(1), 79–100. https://doi.org/10.29240/ja.v6i1.9118

Juryatina, Ekahidayatullah, M., Ruwaidah, Uyun, N., & Arifudin. (2024). Integrating Sustainable Development Goals (SDGs) in 21st Century Elementary School Teacher Education (PGSD): Transformation of Prospective Teachers. JPI Narasi: Indonesian Education Journal, 1(1), 13–21.

Lina, SI, Johar, R., & Anwar. (2025). The role of mathematics education in shaping sustainable futures: A systematic literature review. Elements Journal, 11(3), 757–782. https://doi.org/10.29408/jel.v11i3.29706

Lutfiyani, RY, & Pramesti, SLD (2025). Comparison of Mathematics Education Curriculum in Indonesia and Singapore: Analysis of Learning and Evaluation Approaches at Secondary School Level. Journal on Mathematics Education Research (J-MER), 6(2), 127–142. https://doi.org/10.17509/j-mer.v6i2.83576

National Institute for Education (NIE). (nd). National Institute of Education (NIE). Retrieved December 11, 2025, from https://www.ntu.edu.sg/nie

Ng, PT (2020). The Paradoxes of Student Well-being in Singapore. ECNU Review of Education, 3(3), 437–451. https://doi.org/10.1177/2096531120935127

Novianty, CA, & Nurjanah, N. (2025). Comparison of Mathematics Learning Curriculum between Indonesia, Singapore, Japan, China, South Korea, and Finland (in the Independent Curriculum). PHI: Journal of Mathematics Education, 9(1), 10–22. https://doi.org/10.33087/phi.v9i1.426

Nukman, M. (2024). A Comparative Study of Educational Reform and Differences in Curriculum Systems in Singapore and Indonesia. ANTHOR: Education and Learning Journal, 3(3), 34–41. https://doi.org/10.31004/anthor.v3i3.324

OECD. (2023, December 4). Indonesia. OECD; OECD Publishing. https://www.oecd.org/en/publications/pisa-2022-results-volume-i-and-ii-country-notes_ed6fbcc5-en/indonesia_c2e1ae0e-en.html

Pane, R. (2023). Mathematics Education Learning Models in the Independent Curriculum. Bersatu: Bhinneka Tunggal Ika Education Journal, 1(6), 21–30. https://doi.org/10.51903/bersatu.v1i6.433

Pradana, PH, & Firdausi, AR (2025). Integration of Problem Based Learning (PBL) in Future Curriculum Development: A Bibliometric and Prism Study. Edueco Journal, 8(2), 416–429. https://doi.org/10.36277/edueco.v8i2.349

Ramadhani, MH, Agung, A., Izzania, RDSM, Sari, R., & Supriatna, I. (2025). Elementary School Students' Numeracy Skills: A Literature Review of Concepts, Challenges, and Implications for Contemporary Learning. Social, Humanities, and Educational Studies (SHES): Conference Series, 8(3), 1244–1258. https://doi.org/10.20961/shes.v8i3.107377

Ro, J. (2020). Curriculum, standards and professionalisation: The policy discourse on teacher professionalism in Singapore. Teaching and Teacher Education, 91, 103056. https://doi.org/10.1016/j.tate.2020.103056

Sappaile, B.I. (2025). A Comparative Analysis of the Merdeka Belajar Framework as a Means to Achieve Deep Learning in Elementary School Students: A Literature Review. COSMOS: Journal of Educational Sciences, Economics, and Technology, 2(4), 944–963.

Siregar, NF, Junaedi, I., & Mulyono, M. (2025). Analysis of Problem Solving in School Mathematics Curriculum in Singapore and Indonesia. Journal of Mathematics Education Work, 12(1), 47. https://doi.org/10.26714/jkpm.12.1.2025.47-54

Susanti, E., & Chanifudin, C. (2025). Efforts Towards Quality Education in Realizing the SDGs. Innovative: Journal of Social Science Research, 5(1), 4168–4179. https://doi.org/10.31004/innovative.v5i1.17980

Tasliah, AL, Nuraeni, A., & Rachman, IF (2024). Digital Literacy: The Key to Quality Education Through the Perspective of SDGs 2030. Multidisciplinary Journal of Academic Sciences, 1(3), 154–165. https://doi.org/10.61722/jmia.v1i3.1385

Triantoro, RP, Mawardi, MF, Arnafama, PMH, Suriansyah, A., & Purwanti, R. (2025). Educational Policy in the Era of the Industrial Revolution 4.0: Literature Analysis on Technology Integration in the Curriculum. Indonesian Educators' Scientific Journal, 4(1), 81–95. https://doi.org/10.56916/jipi.v4i1.1891

Widiatmoko, C., Indriasari, R., Sidiq, FF, & Mendrofa, DEK (2024). Strengthening Character Education as a Form of Quality Education in an Effort to Achieve the Sustainable Development Goals (SDGs). Wahana Bina Pemerintahan Journal, 6(2), 96–103. https://doi.org/10.55745/jwbp.v6i2.273