Hipkin Journal of Educational Research
http://ejournal-hipkin.or.id/index.php/hipkin-jer/

Teacher and technology roles in the Kurikulum Merdeka at SD Muhammadiyah 4 Bandung

Haura Qurrata Ayunina
Universitas Pendidikan Indonesia, Kota Bandung, Indonesia
hauraqurrata@upi.edu

ABSTRACT

This research examines the implementation of Kurikulum Merdeka, which is being gradually introduced across basic education units in Indonesia. This curriculum is designed to provide flexibility for learner-centered learning and to adapt education to the dynamics of the times and the individual needs of students. In this context, SD Muhammadiyah 4 Bandung is one of the schools that has adopted the Kurikulum Merdeka and implemented it in Informatics subjects. This study aims to assess the implementation of Kurikulum Merdeka at SD Muhammadiyah 4 Bandung, with a focus on the implementation of Informatics learning and student learning outcomes. The method employed is a descriptive qualitative approach, using in-depth interviews with the principal, the vice principal for curriculum, and the Informatics teachers. The results showed that although this curriculum provides teachers with flexibility to customize instruction, there remain challenges, including teacher readiness to use technology and differences in students' ability to operate devices such as Chromebooks. Therefore, ongoing teacher training and additional support for students are needed to optimize the implementation of the curriculum. This research provides recommendations to strengthen teacher training, increase evaluation time, and improve support systems to better respond to evolving educational needs.

ARTICLE INFO

Article History:
Received: 12 Aug 2025
Revised: 12 Nov 2025
Accepted: 19 Nov 2025
Publish online: 12 Dec 2025

Keywords:
curriculum evaluation; Informatics learning; Kurikulum Merdeka; primary education; technology

Open access
Hipkin Journal of Educational Research is a peer-reviewed open-access journal.

ABSTRAK

Penelitian ini mengkaji implementasi Kurikulum Merdeka yang saat ini sedang diterapkan secara bertahap di berbagai satuan pendidikan dasar di Indonesia. Kurikulum ini dirancang untuk memberikan fleksibilitas pembelajaran yang berpusat pada murid serta menyesuaikan pendidikan dengan dinamika zaman dan kebutuhan individu murid. Dalam konteks tersebut, SD Muhammadiyah 4 Bandung menjadi salah satu sekolah yang telah mengadopsi Kurikulum Merdeka dan menerapkannya dalam mata pelajaran Informatika. Penelitian ini bertujuan untuk menilai penerapan Kurikulum Merdeka di SD Muhammadiyah 4 Bandung, dengan fokus pada pelaksanaan terhadap pembelajaran Informatika dan hasil belajar murid. Metode yang digunakan adalah pendekatan kualitatif deskriptif, melalui wawancara mendalam dengan kepala sekolah, wakil kepala sekolah bidang kurikulum, dan guru Informatika. Hasil penelitian menunjukkan bahwa meskipun kurikulum ini memberikan fleksibilitas bagi guru dalam menyesuaikan pembelajaran, masih terdapat tantangan seperti kesiapan guru dalam penggunaan teknologi serta perbedaan kemampuan murid dalam mengoperasikan perangkat seperti Chromebook. Oleh karena itu, pelatihan berkelanjutan bagi guru dan dukungan tambahan bagi murid sangat diperlukan untuk mengoptimalkan implementasi kurikulum. Penelitian ini memberikan rekomendasi untuk memperkuat pelatihan guru, meningkatkan waktu untuk evaluasi, dan memperbaiki sistem dukungan agar lebih responsif terhadap kebutuhan pendidikan yang terus berkembang.

Kata Kunci: *evaluasi kurikulum; Kurikulum Merdeka; pembelajaran Informatika; pendidikan dasar; teknologi*

How to cite (APA 7)
Ayunina, H. Q. (2025). Teacher and technology roles in the Kurikulum Merdeka at SD Muhammadiyah 4 Bandung. *Hipkin Journal of Educational Research, 2*(3), 347-356.

Peer review
This article has been peer-reviewed through the journal's standard double-blind peer review, where both the reviewers and authors are anonymised during review.

https://doi.org/10.64014/hipkin-jer.v2i3.238

INTRODUCTION

Merdeka Curriculum is a strategic step taken by the Indonesian government in response to significant changes in the world of education. This curriculum was introduced as part of an effort to improve the quality of education by providing greater room for flexibility and autonomy in the learning process. With this approach, it is hoped that students can learn according to their needs and interests, making the learning process more effective and enjoyable. This curriculum focuses on students' active role in learning, making them the center of the educational process. The goal of this approach is to develop communication skills essential for their future success (Asfiati, 2023).

Merdeka Curriculum also emphasized the importance of integrating character and national values into learning, so that students are not only academically intelligent but also possess a strong social awareness. Thus, education is expected to produce a generation that excels not only in knowledge but also possesses integrity and responsibility as citizens (Fauzan *et al.,* 2023). This approach provides students with opportunities to be more actively involved in discussions and collaboration, thereby strengthening participatory learning.

However, in its implementation, the Independent Curriculum requires support from various parties, including teachers, parents, and the community. One crucial aspect in ensuring the curriculum's success is teacher training and professional development (Maryani *et al*., 2024). Systematic and structured training is needed to improve teachers' understanding and skills in implementing the Independent Curriculum effectively (Sabeliana *et al*., 2024). In this way, teachers can facilitate student-centered learning and support the optimal development of students' character and competencies.

For example, at Muhammadiyah 4 Elementary School in Bandung, the implementation of the Independent Curriculum aligns with government policies, including the use of Basic Education Data (Dapodik), which requires every school to follow this curriculum systematically. The Independent Curriculum is implemented in stages, according to the government's phases. The Vice Principal for Curriculum explained that the curriculum changes began with phase A, followed by phase B the following year, which were then adapted to local needs and student characteristics. The school also adjusted the curriculum to focus on students being more active than teachers, with teachers acting as learning facilitators.

The Curriculum Development Team (TPK) at Muhammadiyah 4 Elementary School, Bandung, consists of teachers selected by the previous curriculum team and the principal. This team meets monthly to assign tasks and organize the teachers' needs for implementing the curriculum. However, implementing the Independent Curriculum at this school is not without challenges. One of the main challenges is limited resources and teacher preparedness, especially for those approaching retirement (Syofyan *et al*., 2024). To this end, schools provide study groups and training to enhance teachers' understanding of technology use, such as Chromebooks in learning. Furthermore, another challenge is ensuring that digital-based learning is not merely viewed as a game or entertainment, but as a serious part of education. Therefore, classroom discipline and consensus are crucial in maximizing the benefits of technology in learning (Harefa *et al*., 2024).

The successful implementation of the Merdeka Curriculum at SD Muhammadiyah 4 in Bandung relies heavily on close collaboration between teachers, the school, and parents. Furthermore, readiness to address the various challenges that arise with this significant change is also a crucial factor. One of the main issues faced at this school is the disparity in technology proficiency between teachers and students. Some teachers still struggle to use digital devices optimally, while some students are also unfamiliar with using Chromebooks independently in the learning process. The readiness of human resources and technological infrastructure is a common challenge across various regions in implementing the Merdeka Curriculum (Harefa *et al*., 2024). The success of this curriculum depends heavily on intensive training and a continuous mentoring system for teachers (Sabeliana *et al*., 2024). Therefore, implementing a student-

https://doi.org/10.64014/hipkin-jer.v2i3.238

focused curriculum is expected not only to produce intelligent students but also to develop strong social and moral skills, with comprehensive support from the education ecosystem.

Considering these challenges, it is crucial to conduct a comprehensive evaluation of the implementation of the Medeka Curriculum at the elementary education level, particularly in technology-oriented disciplines such as Informatics. Therefore, this study aims to assess the implementation of the Merdeka Curriculum at SD Muhammadiyah 4 Bandung, focusing on Informatics instruction and its impact on academic achievement. Furthermore, this study seeks to identify the challenges faced and propose strategic recommendations to improve the efficacy of curriculum implementation through technological advancements and educator professional development.

LITERATURE REVIEW

Merdeka Curriculum: Concept and Implementation

Merdeka Curriculum: An educational framework that gives educators and students the freedom to design and implement a curriculum tailored to their needs and interests, without having to adhere to a standardized curriculum. This approach emphasizes personalized learning, critical thinking, and the development of skills relevant to real-world applications. The Independent Curriculum aims to create a more dynamic and adaptable learning environment. It also encourages creativity and innovation among teachers and students, and prioritizes student-centered learning (Asfiati, 2023; Rambe & Aisyah, 2023). The main features of the Merdeka Curriculum include (Alimuddin, 2023; Kurniawan *et al.*, 2024; Nur *et al.*, 2023):

1. Student-Centered Learning: Focus on students' needs and interests, allowing them to take an active role in their education;
2. Flexibility: Teachers can adjust the curriculum based on student feedback, current events, and emerging trends.
3. Interdisciplinary Approach: Encouraging connections between various subjects to create a more holistic understanding of knowledge;
4. Emphasis on Skills: Prioritizes the development of critical thinking, problem-solving, and collaboration skills over relying on memorization;
5. Assessment Diversity: Using a variety of assessment methods, such as projects, presentations, and portfolios, to evaluate student learning.

Implementing the Independent Curriculum involves several stages to ensure its success. Some of the steps frequently taken includes (Lubis, 2024; Pawartani & Suciptaningsih, 2024; Wahyuni *et al.*, 2024):

1. Needs Assessment: Conducting surveys or discussions with students, parents, and educators to identify interests, strengths, and areas for development;
2. Curriculum Design: Coordinate with stakeholders to design key themes, projects, and learning objectives that can enhance interconnectedness between subjects.
3. Resource Allocation: Providing resources that support curriculum implementation, such as teaching materials, technology, and partnerships with the community.
4. Teacher Professional Development: Providing training to teachers on Independent Curriculum design, student-centered teaching methods, and community assessment strategies;
5. Pilot Program: Implementing the curriculum on a small scale to gather feedback before wider implementation;
6. Continuous Evaluation: Establish a continuous evaluation system to assess the effectiveness of the curriculum, including student performance and engagement levels.

https://doi.org/10.64014/hipkin-jer.v2i3.238

By adopting the Merdeka Curriculum, educational institutions can create a more relevant and engaging learning environment for students and prepare them to face the challenges of the modern world. The success of this curriculum depends heavily on the active involvement of all parties, including teachers, students, and the community. Proper implementation of the Independent Curriculum can increase student motivation to learn, foster creativity and 21st-century skills, and strengthen character and national values in accordance with the six dimensions of Pancasila (Zumrotun et al., 2024).

The Role of Technology in Learning in Elementary Schools

The use of technology in education is increasingly important in supporting the Independent Curriculum. Technology can increase student interactivity and enable more personalized learning experiences. The use of digital tools allows teachers to create learning environments that are more responsive to individual student needs (Chen & Singh, 2025). The integration of technology, especially artificial intelligence-based technology, supports project-based learning and personalized feedback, thereby significantly improving digital literacy and student engagement (Huang *et al*., 2025). The use of devices such as laptops and Chromebooks in elementary school learning, as implemented at Muhammadiyah 4 Elementary School in Bandung, can support more engaging, relevant learning aligned with technological developments. Technology not only increases student engagement but also provides a learning experience tailored to each student's individual pace (Widiansyah *et al*., 2024). Thus, the application of technology in learning not only supports the Independent Curriculum but also develops the much-needed 21st-century skills of students. Therefore, it is crucial to ensure that all students have equal access to technology and the training necessary to utilize these tools effectively.

Several studies have shown that using technology in learning can increase student engagement, accelerate conceptual understanding, and provide a variety of resources that can be accessed anytime. The use of technology in learning can increase student engagement and strengthen their understanding of content (Aisyah *et al*., 2024). However, the challenge is the gap in students' access to technology and skills, which can affect learning effectiveness. Technology also allows students to learn at their own pace, creating a learning experience tailored to individual needs. This requires ongoing training and support from schools to ensure that technology is used optimally to achieve curriculum objectives.

Challenges in Implementing the New Curriculum in Elementary Schools

The implementation of the Merdeka Curriculum in elementary schools faces several challenges, including technological readiness, changes in teacher mindsets, and a mismatch between the curriculum and on-the-ground realities. The main challenges faced by elementary schools there include limited training, inadequate infrastructure, and a lack of public understanding of the essence of the Merdeka Curriculum. (Sa'diah *et al.,* 2025). Many teachers still experience difficulties in independently developing learning materials, conducting diagnostic assessments, and dealing with disparities in student readiness and high workloads (Hadi & Retnawati, 2025).

Many teachers are unfamiliar with a more flexible, student-centered curriculum, requiring more intensive training and support to adapt to this approach. Furthermore, limited technological devices and inadequate infrastructure are also significant obstacles to implementing this curriculum in many elementary schools. Therefore, providing teachers with the necessary equipment and technical training is a crucial step in overcoming these barriers.

In addition to the explanation above, the successful implementation of the Independent Curriculum requires a cultural shift within educational institutions that prioritizes collaboration and innovation over traditional teaching methods. This shift involves not only training teachers to use new pedagogical

https://doi.org/10.64014/hipkin-jer.v2i3.238

approaches but also fostering an environment that encourages experimentation and feedback. Successful curriculum reform requires attention not only to teachers' technical skills but also to the emotional dimension and a supportive work environment, including the freedom to try new approaches and receive constructive feedback (Yang & Sato, 2025). Teacher well-being and the successful implementation of reforms are closely linked to the flexibility and support they receive in navigating change.

Schools should create forums for teachers to share best practices and challenges, thus building a community of practice that supports continuous improvement. Furthermore, involving students in designing their learning experiences can increase motivation and ownership of their education, thus reinforcing the principles of the Merdeka Curriculum. Integrating student feedback into curriculum development can significantly improve the relevance and applicability of learning materials, ensuring they meet students' diverse interests and needs (Siswadi, 2023).

Developing Teacher Professionalism in the Independent Curriculum

Teacher professional development is key to the successful implementation of the Merdeka Curriculum. Teachers need to be trained to manage a more flexible curriculum and increase student engagement in learning. Furthermore, teachers need to be educated on the use of technology in teaching and a wider range of assessment methods. As part of professional development, teachers should also be given space for reflection and sharing experiences through structured learning groups. This will help them improve their teaching skills and enrich their learning approaches. Training programs that combine formal approaches, such as workshops, with informal learning, such as mentoring and teacher collaboration, significantly improve learning effectiveness and teachers' confidence in implementing new teaching strategies (Makhmetova *et al*., 2025). Intensive practice-based training can improve the overall quality of teachers' instructional practices (Williams *et al*., 2025).

Beyond teacher professional development, community engagement is essential to the successful implementation of the Merdeka Curriculum. Schools that actively involve parents and local stakeholders in the educational process often see increased support for students' learning journeys. This collaborative approach not only fosters a sense of ownership among parents but also provides valuable insights that can inform curriculum adjustments to meet community needs better. When parents are involved, students tend to demonstrate higher levels of motivation and academic achievement, thus reinforcing the principles of an inclusive educational environment (Prasetyo, 2024). By partnering with local organizations and businesses, schools can also gain access to additional resources and expertise, enriching the educational experience and ensuring the curriculum remains relevant and responsive to evolving societal demands.

METHODS

This study uses a descriptive qualitative approach to describe the implementation of the Independent Curriculum at Sekolah Dasar Muhammadiyah 4, Bandung. The focus of the study was on the implementation of Informatics subjects at the school. This approach was chosen to provide a deeper understanding of the curriculum implementation process and the various challenges the school faced during its implementation.

Data were collected through in-depth interviews with three key informants: the Principal, the Vice Principal for Curriculum, and the Informatics Teacher at Muhammadiyah 4 Elementary School, Bandung. The interview instrument consisted of a semi-structured interview guide based on the Merdeka Curriculum implementation indicators, which encompass aspects of school policy, curriculum planning, and technology-based learning practices.

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The principal was interviewed to gain insights into institutional-level curriculum implementation policies and strategies. The vice principal provided perspective on the curriculum team's role and the challenges of developing materials that address student needs. Meanwhile, the Informatics teacher provided a firsthand account of the curriculum's implementation in learning, particularly the use of technology devices such as Chromebooks.

Interviews were conducted openly and flexibly, allowing researchers to explore each informant's perspectives, experiences, and suggestions. Data analysis employed a thematic approach, grouping data based on key themes emerging from the interview transcripts. The analysis phase included transcription, initial coding, data categorization, and drawing conclusions that represent key findings in the context of implementing the Independent Curriculum in elementary schools.

RESULTS AND DISCUSSION

Interview Results and Key Findings

Interviews with three key informants at Muhammadiyah 4 Elementary School in Bandung indicate that the implementation of the Independent Curriculum has progressed with varying dynamics. The principal stated that this curriculum provides teachers with flexibility in designing learning based on student needs. However, he also noted challenges related to teacher readiness to integrate technology into learning. The vice principal for curriculum explained that the curriculum planning and evaluation process still faces coordination challenges between teachers and the curriculum team. He also highlighted the need for educators to have a harmonized understanding of the Merdeka Curriculum's fundamental principles.

An Informatics teacher reported that the use of devices such as Chromebooks has supported Informatics learning. However, she observed that students' abilities in operating the devices varied, necessitating additional support. Teachers also noted that the use of relevant learning applications still needs improvement. All informants agreed that improving teacher competency, particularly in the use of educational technology, is an urgent need to strengthen the implementation of this curriculum in their schools.

Implementation of the Independent Curriculum and Learning Flexibility

Based on interviews, the Independent Curriculum at Muhammadiyah 4 Elementary School in Bandung has successfully increased learning flexibility. This is evident in how Informatics teachers create Learning Outcomes and teaching modules tailored to students' needs. However, challenges remain in implementing this learning technology. Examples include the technological readiness of school facilities, teachers' skills in integrating these devices into engaging teaching and learning activities, and students' initial interests and abilities before being introduced to the devices they will be teaching. The use of devices like Chromebooks offers significant opportunities to increase student interactivity, but it also requires teachers to master technology. Therefore, effective technology integration still requires ongoing training and adequate technical support for teachers.

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Utilization of Technology in the Implementation of the Independent Curriculum

Informatics teachers have revealed that the use of technology, such as Chromebooks, is very helpful in increasing student engagement with the subject matter. However, a challenge is the varying levels of student ability with these devices, which requires teachers to provide additional support for students who are struggling. Therefore, teachers need to identify students' abilities and provide additional guidance to

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those who are struggling, so that no one is left behind. An inclusive approach will help create a more effective and equitable learning environment for all students. Furthermore, collaboration between teachers and parents can play a vital role in helping students better understand and use technology in their learning. By involving parents in the technology-based learning process, schools can strengthen teaching outside the classroom and ensure students receive the support they need.

Curriculum Coordination and Evaluation

In addition to technological challenges, interviews also revealed time constraints for conducting comprehensive curriculum evaluation and reflection. Although evaluations are conducted monthly, some teachers felt that the available time was insufficient for in-depth reflection on the learning process. Evaluation and reflection are essential parts of the learning process. Continuous evaluation can help teachers identify strengths and weaknesses in learning and make necessary improvements.

However, time constraints are a significant obstacle to implementing evaluation and reflection. One of the main obstacles is the lack of training and mentoring for teachers in developing learning materials and methods that align with the principles of the Independent Curriculum. Furthermore, time constraints also hinder the evaluation and reflection process.

To address these challenges, it is crucial for schools and the government to provide sufficient time for teachers to conduct evaluation and reflection. The Ministry of Education and Culture recommends that educators provide time for reading, analyzing, and reflecting on assessment results. Furthermore, educators should use assessment results as discussion material to identify what has worked well and areas for improvement. By providing sufficient time for evaluation and reflection, it is hoped that teachers can improve the quality of learning and effectively achieve the goals of the Merdeka Curriculum.

Discussion

Based on findings regarding the implementation of the Independent Curriculum at Muhammadiyah 4 Elementary School in Bandung, it is known that teachers have strived to create more flexible learning practices. Teachers are no longer necessarily limited to textbook material and conventional learning methods (such as lectures). Learning practices are more student-centered in the classroom and are integrated with technology as a learning tool or media. An example is the use of Chromebooks and their operation to open simple platforms or sites like Google. As suggested by several previous studies, a flexible, adaptive curriculum can increase student engagement and creativity by inviting students to directly participate in learning projects or discussions. Therefore, the implementation of the Independent Curriculum is expected to create a more dynamic and engaging learning environment, where students feel more involved in their learning process. Furthermore, it is important to continuously evaluate the effectiveness of this curriculum to make necessary improvements to achieve the desired educational goals (Ibrahim *et al*., 2024).

Overall, the findings of this study indicate that the Merdeka Curriculum at Muhammadiyah 4 Elementary School, Bandung, has had a positive impact on learning activities. However, challenges remain related to technological readiness and teachers' skills in integrating it. Technological readiness and differences in students' ability to use devices are challenges that require intensive teacher training and additional support for students who struggle (Ramadhan & Arifin, 2024). Developing teachers' professional skills, especially in operating digital hardware and software, when done consistently, can contribute to their readiness to apply technology in learning, particularly in science and technology (Tondeur *et al.,* 2020). Therefore, increasing teacher capacity through training and technical assistance is crucial to ensure that technology is truly used effectively to support learning. Furthermore, institutional support from schools in providing

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adequate resources and infrastructure, including access to devices and internet connectivity, is also a key factor in the successful implementation of the Independent Curriculum. Continuous technology training for teachers is key to improving the effectiveness of technology-based learning. For example, studies on training based on the TPACK (Technological Pedagogical Content Knowledge) framework significantly assist teachers in integrating digital technology into learning and strengthening their pedagogical understanding in effectively managing technology-based classrooms (Hanifah *et al*., 2025).

The importance of coordination between teachers and the curriculum team has also proven crucial to successful curriculum implementation. This coordination allows for open dialogue in developing and adapting lesson plans to suit the context of each class. An example of coordination activities that teachers can undertake is conducting learning reflections from each phase of the learning group, allowing for more effective learning program development based on on-the-ground needs (Azmi *et al.,* 2023). Adaptation of the curriculum by teachers in real contexts requires support from a program culture that encourages open communication between curriculum developers and teachers, so that curriculum implementation is not rigid but more contextually responsive (Cousins & Brereton, 2025). The vice principal for curriculum suggested intensifying collaboration between teachers and the curriculum team. This aims to ensure more effective curriculum planning and evaluation.

Therefore, to optimize the implementation of the Independent Curriculum, schools need to provide ongoing teacher training. Furthermore, improving technical support and providing adequate resources is also crucial. Effective collaboration between all relevant parties will significantly contribute to the curriculum's success and facilitate students' holistic development.

CONCLUSION

The implementation of the Independent Curriculum at Muhammadiyah 4 Elementary School in Bandung has provided greater flexibility, enabling teachers to adapt Informatics instruction to students' needs better. However, this success is still limited by teachers' readiness to integrate technology and by students' varying abilities to use learning devices such as Chromebooks. Continuous technology training for teachers and additional support for students experiencing difficulties are crucial factors in increasing the effectiveness of Independent Curriculum-based learning. This study also highlights the need for long-term evaluation of the curriculum's impact on student academic outcomes and the role of technology in supporting student skill and character development. Therefore, strengthening teacher capacity and improving the evaluation system are key recommendations to optimize future implementation of the Independent Curriculum. Suggestions for further research include conducting direct experiments on technology-based teacher training to ensure their competencies align with student needs and existing technological developments.

AUTHOR'S NOTE

The author declares that there is no conflict of interest regarding the publication of this article. The author also confirms that the data and content of this article are free from plagiarism. We would like to express our gratitude to SD Muhammadiyah 4 Bandung for providing permission and support to conduct this research, as well as to all parties who contributed throughout the research process.

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https://doi.org/10.64014/hipkin-jer.v2i3.238