LITERASI : JURNAL ILMU PENDIDIKAN
ISSN: 2085-0344
e-ISSN: 2503-1864
Journal homepage: www.ejournal.almaata.ac.id/literasi
DOI : http://dx.doi.org/10.21927/literasi.2025.16(3).373-383

Implementation of an Independent Curriculum Integrated with Information and Communication Technology: A Case Study of SD Inpres Dok VIII Atas Jayapura City Papua Province

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ABSTRAK

Implementasi Kurikulum Merdeka yang terintegrasi dengan teknologi memiliki peran strategis dalam menciptakan pengalaman belajar yang interaktif, adaptif, dan relevan dengan tuntutan era digital serta tujuan pendidikan nasional. Namun, penelitian empiris mengenai penerapan Kurikulum Merdeka berbasis Teknologi Informasi dan Komunikasi (TIK) di wilayah timur Indonesia masih terbatas, khususnya di sekolah dasar negeri seperti SD Inpres Dok VIII Atas, Kota Jayapura, Provinsi Papua. Penelitian ini bertujuan untuk mengkaji dan memberikan gambaran mengenai implementasi Kurikulum Merdeka yang mengintegrasikan TIK dalam pembelajaran di tingkat sekolah dasar. Metode yang digunakan adalah kualitatif dengan pendekatan deskriptif melalui studi literatur, observasi, dan wawancara terhadap guru dan siswa. Hasil penelitian menunjukkan bahwa integrasi TIK berperan penting dalam pelaksanaan proyek Penguatan Profil Pelajar Pancasila (P5), terutama dalam meningkatkan keterlibatan siswa, memperkuat karakter, serta mempersiapkan mereka menghadapi tantangan global dan disrupsi digital. Penggunaan teknologi juga mendukung efisiensi pengelolaan kelas dan penerapan pembelajaran diferensiatif. Namun, efektivitas implementasi sangat dipengaruhi oleh dukungan kepemimpinan sekolah, ketersediaan pelatihan guru berkelanjutan, serta akses terhadap perangkat dan jaringan internet. Penelitian ini merekomendasikan penguatan kapasitas digital guru, pemerataan infrastruktur TIK, dan pembentukan komunitas belajar digital di tingkat sekolah dasar sebagai langkah strategis untuk mengoptimalkan implementasi Kurikulum Merdeka berbasis teknologi di Papua.

KATA KUNCI : *kurikulum merdeka; sekolah dasar; teknologi informasi dan komunikasi*

ABSTRACT

The implementation of the Merdeka Curriculum integrated with technology plays a strategic role in creating interactive, adaptive, and relevant learning experiences in line with the demands of the digital age and national education goals. However, empirical research on the application of the Merdeka Curriculum based on Information and Communication Technology (ICT) in eastern Indonesia is still limited, especially in public elementary schools such as SD Inpres Dok VIII Atas, Jayapura City, Papua Province. This study aims to examine and provide an overview of the implementation of the Merdeka Curriculum that integrates ICT in learning at the elementary school level. The method used is qualitative with a descriptive approach through literature study, observation, and interviews with teachers and students. The results of the study show that ICT integration plays an important role in the implementation of the Pancasila Student Profile Strengthening (P5) project, especially in

increasing student engagement, strengthening character, and preparing them to face global challenges and digital disruption. The use of technology also supports efficient classroom management and the application of differentiated learning. However, the effectiveness of implementation is greatly influenced by school leadership support, the availability of ongoing teacher training, and access to devices and the internet. This study recommends strengthening teachers' digital capacity, equalizing ICT infrastructure, and forming learning communities.

KEYWORDS: *information and communication technology; merdeka curriculum; primary school*

Article Info :
Article submitted on May 15, 2025
Article revised on 31 July, 2025
Article accepted on October 23, 2025
Article published on November 30,2025

INTRODUCTION

Learning is a sector that continues to evolve alongside technological advances. Digital transformation and the rapid flow of information through digital communication systems have influenced the world of education. The learning process at the elementary school level plays a crucial role in shaping the basic abilities and initial skills of students (Pujasmara et al., 2023). The 2022 PISA results show a decline in global learning achievement due to the Covid-19 pandemic, but Indonesia's position has actually increased by 5-6 ranks compared to 2018. This increase is due to the resilience of teachers and adaptive government policies through emergency curricula and online training programs (Porta & Todd, 2022).

The success of curriculum simplification during the pandemic became the basis for the creation of the Merdeka Curriculum, which reduces the core material load by 30–40% and provides space for interactive, in-depth, and project-focused learning. This curriculum also encourages diagnostic assessments and learning that adapts to the individual abilities of students. With this approach, education is no longer oriented towards content delivery, but towards strengthening competencies and holistic character building (Rachman et al., 2022; Sumarsih et al., 2022).

The Merdeka Curriculum is expected to produce independent, critical, and innovative students. Its implementation also emphasizes the values of the Pancasila Student Profile (P5) through contextual and enjoyable project activities (Safitri, Wulandari, & Herlambang, 2022). In this context, the use of Information and Communication Technology (ICT) is one of the important strategies for creating learning that is adaptive to the developments of the digital era.

Based on initial observations at SD Inpres Dok VIII Atas Kota Jayapura, the Merdeka Curriculum has been implemented since 2022, and ICT-based learning media have been used since the pandemic. However, teachers still face obstacles in optimizing the use of technology. This condition raises the need for further research on the implementation of the Merdeka

Curriculum integrated with ICT in elementary schools in eastern Indonesia.

The curriculum plays a central role as a pedagogical instrument in designing learning processes that are oriented towards mastery of competencies and character building. The Merdeka Curriculum (Wahyudin et al., 2024) was developed in response to the challenges of post-pandemic education and digital transformation, emphasizing flexibility, differentiated learning, and collaboration among education stakeholders. In addition, the Merdeka Curriculum serves as a reference for educators in presenting various learning alternatives that contribute to character building, while encouraging students to think critically, creatively, and innovatively (Rusmayani, R. et al., 2024).

This curriculum also introduces the Pancasila Student Profile Strengthening Project (P5), which aims to foster the values of mutual cooperation, creativity, and critical thinking through project-based activities (Mery et al., 2022). In curriculum implementation theory, successful implementation is largely determined by the capacity to implement, which is the readiness and ability of schools to adopt change effectively (Komara et al., 2024). Therefore, the curriculum must also be developed and adapted to optimize the quality of education today (Sajja et al., 2023).

In the digital age, teachers play a central role in integrating technology into learning. Teachers' attitudes, beliefs, and abilities in using ICT determine the effectiveness of the learning process (Waffner, 2020; Dostal et al., 2017). Information technology such as smartphones, laptops, and computers opens up opportunities for learning innovation, including the integration of ICT in STEM (Hourigan et al., 2024; Septiyanto et al., 2024).

Previous research (Hidayati & Aslam, 2021) shows that the use of ICT-based learning media such as Quizizz can increase student engagement and learning outcomes. However, various studies also emphasize that the success of technology integration is highly dependent on teacher readiness and adequate infrastructure support (Esra & Mawardi, 2025; Setiawati & Mariana, 2025).

Learning is a process that not only involves the relationship between teachers and students, but also involves active interaction between students and learning resources or learning media. The effectiveness of the teaching and learning process is highly dependent on the teaching approach or strategy applied, especially in terms of the delivery of material by educators, (Ernawati et al. 2024). Therefore, the implementation of ICT-based learning in the Merdeka Curriculum is important to improve the quality of learning, especially in rural elementary schools such as Jayapura, which face limitations in digital facilities.

The conceptual framework of this study is based on the interrelationship between three main concepts: Independent Curriculum, Information and Communication Technology (ICT) Integration, and Learning Implementation in Elementary Schools. The Independent Curriculum provides a flexible education policy framework that focuses on strengthening students' character and competencies. ICT Integration serves as a means and strategy to create interactive, efficient learning that meets the demands of the 21st century. Implementation

in Elementary Schools is the concrete manifestation of the curriculum, which is influenced by factors such as teacher competence, school leadership support, digital infrastructure, and student participation.

These three components interact with each other in the context of education in Papua. Teachers' readiness to utilize ICT, supported by school policies and adequate infrastructure, will determine the effectiveness of the Merdeka Curriculum's implementation. Conversely, limited facilities and digital literacy can be obstacles to achieving the expected learning objectives. Conceptually, this study places the implementation of the ICT-based Merdeka Curriculum as the main variable that influences the improvement of learning quality, student engagement, and character building through the Pancasila Student Profile project.

METHODS

This study uses a qualitative approach with a case study research design. According to Creswell & Poth (2018), qualitative research aims to provide an in-depth description of a phenomenon from the perspective of individuals directly involved in it, through intensive data collection using interviews, observations, and documentation. Meanwhile, according to Sugiyono (2018), qualitative research methods are based on post-positivistic thinking, which views social reality as complex, dynamic, and meaningful. In qualitative research, researchers act as key instruments who directly collect, interpret, and analyze data in the field. The purpose of this study is to gain an in-depth understanding of the implementation of the Merdeka Curriculum integrated with Information and Communication Technology (ICT) at SD Inpres Dok VIII Atas, Jayapura City, Papua Province, and to identify the factors that influence the effectiveness of this implementation. The research was conducted at SD Inpres Dok VIII Atas, Jayapura City, Papua Province. This location was chosen because the school has implemented the Merdeka Curriculum since 2022 and has begun to integrate ICT-based learning media as a post-Covid-19 learning innovation. The research subjects were: 1) Class teachers directly involved in the implementation of the ICT-integrated Merdeka Curriculum, 2) Students as learners who directly experienced the ICT-based learning process, 3) The principal and vice principal in charge of curriculum as parties supporting the implementation policy.

The sampling technique used purposive sampling, which is the selection of informants based on certain considerations such as direct involvement, experience, and ability to provide information relevant to the research focus. Data collection in this study was conducted using three main techniques: observation, in-depth interviews, and documentation.

Data analysis was conducted interactively and continuously, following the model proposed by Miles, Huberman, and Saldana (2014), which consists of three main stages, namely: 1) Data Reduction: Data reduction is carried out by selecting, focusing, simplifying, and organizing raw data obtained from observations, interviews, and documentation. At this stage, researchers write summaries of interview results, mark relevant statements, and group information

according to the research focus, 2) Categorization and Thematic Determination (Data Display and Thematic Categorization): After the data is reduced, the next step is to present the data in the form of categories and main themes. The data is systematically arranged in tables, matrices, or narratives so that the relationships between categories can be clearly seen. Some themes that may emerge, 3) Interpretation and Conclusion Drawing: At this stage, researchers interpret the grouped data to find the deeper meaning of the phenomenon being studied. Interpretation is carried out by linking field findings with curriculum implementation theory, technology adoption theory in education, and previous research results. Final conclusions are drawn based on the consistency of findings, emerging patterns, and the relevance between theory and practice in the field.

RESULTS AND DISCUSSION

Technology is generally interpreted as anything that can provide us with convenience in many ways. Technology also has a huge impact on education, both of which are becoming increasingly inseparable due to their interconnected roles. Technology can be used as a tool by educators to facilitate the education process. In addition, learners can also explore more knowledge and do a different learning process. Learning in the classroom can be made more enjoyable by implementing learning innovations fuelled by the presence of information and communication technology. The purpose of using ICT in education is to introduce technology to students so that students get used to using technology in everyday life (Yunita & Sholeh, 2021). In the current era of digitalisation, almost all access to information and materials can be found in cyberspace either accessing a page or application. The Ministry of Education is well aware of the current needs, as utilising technology can reach a wider distribution of policies, as well as optimise the implementation of the independent curriculum through differentiated learning processes. During differentiated learning, there should be a supportive classroom environment where teachers are in the classroom, welcoming, and feel welcome, everyone respects each other, learners feel as safe as possible in their classroom, teaching to achieve learner success, there is equality felt in tangible form by learners. It furthers indicate a tendency of student learning success which can be strengthened through better teacher and student interaction, and teachers' ability to enhance their collaboration with other teachers to develop more innovative learning methods and techniques, (Budirahayu & Saud, 2023). The use of technology can be an option for teachers to implement differentiated learning in the classroom. The application of information and communication technology in schools is carried out as a response and adjustment of school policies to technological developments in the digital era and various school community policies (Ariefah, 2023). However, more generally and more broadly, schools implement an information technology-based curriculum based on teachers' understanding, availability of facilities, and teachers' use of technology in learning practices.

ICT and media competencies and teachers' beliefs as influential factors in the

implementation of an independent curriculum. In addition to studies on the reform process in schools, in the context of the digitisation process in schools, the term 'teacher readiness' is used to describe the likelihood, willingness and motivation of teachers to integrate digital resources into their teaching. Studies show that teachers who are convinced of the added value of digital resources are essential for them to be used in a pedagogically meaningful way (Educa, 2021). Especially considering their low level of technological competence to integrate ICT as a means of transforming classroom methodology '"(Alberola-Mulet et al., 2021). In line with the replicated study, teachers' technology-related teaching skills were crucial for different forms of students' active learning, whereas the digital technology equipment available in a school was less important, (Anne Lohr, 2024). One teacher, abbreviated as SI, stated, 'We face obstacles in adjusting to learning independence, especially in terms of using technology. But we are trying to keep learning and overcome that.' However, not all teachers experienced the same obstacles (Ragil Nazar & Bagea, n.d.).

The reality at SD Inpres Dok VIII Atas, Jayapura City is that in implementing the Merdeka curriculum, ICT has been integrated with the aim of strengthening the learner profile of Pancasila. First, the technology implementation model designed has proven to be effective in supporting the strengthening of learner characters in line with Pancasila values, especially in terms of improving critical thinking skills, creativity, and strengthening ethics and national insight. Technologies such as augmented reality, digital project-based learning, and robotics play an important function and role in fostering/creating an interactive and contextualised learning environment. Secondly, this research shows that the appropriate use of technology can answer the challenges of globalisation and digital disruption faced by basic education in particular, especially to strengthen the profile of Pancasila learners in schools contained in the independent curriculum.

Teaching and learning activities are easier with the presence of technology, it only takes a technology-based tool or media in the learning process to increase students' interest and learning effectiveness. Learning requires the use of various communication tools, including the internet, digital communication, and other forms of media to support learning well.

The result of this research is that the utilisation of information and communication technology (ICT) can improve teaching quality, learner quality, learner interest, and simultaneously increase the value of educators in the field of technological advancement. Learner satisfaction about P5 activities (Projek Penguatan Profil Pelajar Pancasila) shows that 89% of learners are very satisfied with the existence of an independent curriculum that provides opportunities for learners to develop their talents and interests more broadly and openly according to the principle of individual differences. In addition, the use of information and communication technology can improve the quality of learning, the quality of learners, the interest of learners, and the high appreciation of teachers in the current era of technological advances (Dwi Alfina &

Hasanah, 2024). Learners' satisfaction with P5 activities (Pancasila Profile Strengthening Project) is evidenced by the results of interviews that have been conducted. Learners said that they were very satisfied with the presence of Merdeka curriculum integrated with ICT assistance in learning because it was able to provide opportunities for all learners to develop talents and interests widely and openly according to the views of individual differences.

This research synthesised findings from studies published between 2010 and 2015, focusing on how mobile devices such as tablets and smartphones are used in classrooms. The review found that mobile learning applications can significantly improve access to educational resources and facilitate personalised learning experiences. However, challenges such as device management, digital equity and teacher training needs were identified as barriers to widespread adoption. Therefore, when teachers feel they are ready to cope with Information Communication Technology (ICT) challenges, their anxiety and emotional fatigue may decrease, which in turn may increase their well-being, (Bo-Ching Chen. Dkk, 2024). Findings from our study also revealed the need for adequate teacher training to utilise the full functionality of educational tools, to address issues of technology anxiety and low self-efficacy among users of these tools (Zheng & Li, 2020).

Principles of ICT Integration in Learning

Several concepts of ICT deployment in the learning process have been identified based on the literature review, and these principles are translated into activities that enable learners to actively participate in an engaging and meaningful learning process. Constructive means enabling learners to integrate new concepts into previously acquired knowledge to understand the meaning of their inquiry and any concerns they may have (Khairatunnisa & 2022, n.d.).

Contextualised learning allows learning scenarios to be focussed on important learning processes. Reflective learning suggests that as part of the actual learning process, learners can recognise what has been learned and recall it. Learning today can be delivered through a variety of learning platforms, including auditory, visual and kinesthetic, which must be supported by available technology.

The implementation of information and communication technology in schools is done as a response and adjustment of school policies to technological developments in the digital era and various government policies. However, more generally and more broadly, schools implement an information technology-based curriculum based on teachers' understanding, availability of facilities, and teachers' use of technology in learning practices. The Pancasila Learner Profile Strengthening Project (P5) at SD Negeri Dok VIII Atas Jayapura City, Papua Province has been running well, the process of the Pancasila Learner Profile Strengthening Project (P5) achieved through learning projects is included in the Pancasila learner profile. The implementation of P5 learning activities has been included in the schedule, P5 learning activities are carried out outdoor and indoor learning activities, during the learning process teachers prepare

learning implementation strategies such as preparing learning tools to support the Pancasila learner profile, students can be involved in the P5 learning process with the preparation of students and the enthusiasm of students to continue project-based learning.

CONCLUSION

Based on the results of the study, it can be concluded that information and communication technology plays a very important role in supporting the implementation of the Merdeka Curriculum, particularly in strengthening the implementation of the Pancasila Student Profile in elementary schools. The use of various digital media and platforms such as Google Classroom, Zoom, and other online resources has been proven to improve students' language skills and make the learning process more interactive and meaningful.

The main contribution of this study lies in the development of a technology-based learning model designed to strengthen the character of Pancasila Students. This model provides a new approach that combines technology with character education, thereby enriching the literature and practice of value-based education in the digital age.

However, this study has several limitations. The scope of the study, which is still limited to elementary schools in certain regions, and the relatively short duration of the intervention may affect the generalization of the results. Therefore, further research is recommended in a more diverse educational context and level, as well as with a longer time frame to assess the sustainable impact of implementing this model. The findings of this study are expected to serve as a reference for teachers, schools, and policymakers in strategically integrating technology into the learning process. Thus, education in Indonesia can produce a generation that is not only academically superior, but also has strong character, national insight, and the ability to adapt amid rapid technological developments.

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