PEDAGOGIKA
Volume 17 (Nomor 01) 2026
HaL. 124-140

Teacher Strategies in Managing Digital-Based Learning

Abd Rahman Lasindrang[1], Warni Tune Sumar[2], Sulkifly[3]
Universitas Negeri Gorontalo
Email: abdrahman@gmail.com

ABSTRAK

Penelitian ini bertujuan untuk mendeskripsikan strategi guru dalam mengelola pembelajaran berbasis digital di SDN 90 Sipatana Kota Gorontalo. Penelitian ini menggunakan pendekatan kualitatif dengan jenis penelitian deskriptif. Teknik pengumpulan data dilakukan melalui observasi, wawancara, dan dokumentasi. Analisis data dilakukan melalui reduksi data, penyajian data, dan penarikan kesimpulan, sedangkan keabsahan data diuji melalui triangulasi sumber dan teknik.,Hasil penelitian menunjukkan bahwa strategi guru dalam mengelola pembelajaran di SDN dilaksanakan melalui tiga tahapan utama, yaitu perencanaan, pelaksanaan, dan evaluasi pembelajaran yang terintegrasi dengan pemanfaatan teknologi digital.Pada tahap perencanaan, guru menyusun pembelajaran dengan mengacu pada Capaian Pembelajaran (CP) dalam Kurikulum Merdeka. Dalam proses ini, guru memanfaatkan platform digital seperti Canva untuk merancang media ajar yang menarik, serta YouTube sebagai sumber referensi materi pembelajaran.Pada tahap pelaksanaan, guru menerapkan pembelajaran secara fleksibel dengan menyesuaikan kondisi dan kebutuhan siswa. Strategi yang digunakan melibatkan pemanfaatan berbagai media digital, terutama video pembelajaran dari YouTube untuk membantu pemahaman konsep secara visual. Selain itu, guru juga menggunakan perangkat teknologi seperti laptop,LCD (proyektor) dan PID (Papan Interaktif Digital) guna meningkatkan interaksi dan keterlibatan siswa dalam proses pembelajaran.,Sementara itu,pada Evaluasi pembelajaran berbasis digital di SDN 90 Sipatana dilakukan melalui berbagai bentuk asesmen yang bervariasi dan disesuaikan dengan kebutuhan siswa. Asesmen yang digunakan meliputi kuis interaktif berbasis digital.,Temuan penelitian menunjukkan bahwa strategi guru mampu menciptakan pembelajaran yang interaktif, adaptif, dan berpusat pada peserta didik meskipun terdapat keterbatasan sarana prasarana.

Kata Kunci: Strategi guru, pembelajaran digital, sekolah dasar

ABSTRACT

The development of digital technology has brought significant changes to the educational process, requiring teachers to adapt learning strategies that integrate technology effectively. Digital-based learning is not only related to the use of technological devices but also involves teachers' ability to plan, implement, and evaluate learning activities based on students' needs. This study aims to describe teachers' strategies in managing digital-based learning at SDN 90 Sipatana. This study employed a qualitative approach with a descriptive research design. The research was conducted at SDN 90 Sipatana, Gorontalo City. The participants consisted of the principal and classroom teachers involved in digital-based learning implementation. Data were collected through observation, interviews, and documentation. Data analysis was carried out using the interactive model of data condensation, data display, and conclusion drawing. Data validity was ensured through source and technique triangulation. The results showed that digital-based learning management at SDN 90 Sipatana was implemented through three main stages: planning, implementation, and evaluation. In the planning stage, teachers designed learning activities based on Learning Outcomes (CP) and Learning Objectives Flow (ATP), selected appropriate digital learning resources, and integrated technology into lesson plans. In the implementation stage, teachers utilized laptops, LCD projectors, Digital Interactive Boards (PID), internet resources, and digital media combined with conventional learning strategies through a blended learning approach. The use of digital media increased students' attention, participation, and enthusiasm during learning activities. However, the implementation process faced challenges, including limited

devices and unstable internet connections. Teachers addressed these challenges through adaptive strategies, such as alternating device use, preparing offline materials, and combining digital and conventional methods. In the evaluation stage, teachers applied diagnostic, formative, and summative assessments supported by digital tools such as Google Forms and project-based assignments. Evaluation results were used to determine remedial and enrichment activities, while teacher collaboration through the learning community (Kombel) supported the improvement of digital learning practices.
The study concludes that digital-based learning at SDN 90 Sipatana has been implemented effectively through structured planning, adaptive implementation, and continuous evaluation. The success of digital learning depends not only on technological availability but also on teachers' ability to integrate technology with pedagogical strategies and student needs.

Keyword: teacher strategies; digital-based learning; elementary school

INTRODUCTION

The rapid development of digital technology has significantly influenced various aspects of human life, including education. The transformation of learning in the digital era has encouraged schools to move beyond conventional teaching methods toward learning environments that are more interactive, flexible, and learner-centered. In elementary education, digital technology provides opportunities to improve the quality of learning through the integration of digital media, online resources, and technology-supported learning activities. Therefore, teachers are required not only to have pedagogical competence but also digital competence to effectively integrate technology into the learning process (Redecker & Punie, 2020; Sari & Setiawan, 2021).

Digital-based learning refers to a learning process that utilizes digital devices, applications, and technological resources as supporting tools to facilitate learning activities and achieve educational objectives. The use of digital technology does not merely focus on the availability of devices but also requires teachers' ability to select appropriate media, design meaningful learning activities, and manage classroom interactions effectively. Technology integration in learning should be aligned with learning objectives, content, pedagogy, and student characteristics so that technology functions as a pedagogical tool rather than only as a technical instrument (Mishra, 2023; Schmidt et al., 2021). The integration of digital technology in learning is closely related to the development of multimedia-based learning. Digital media such as videos, interactive presentations, and online learning platforms can support students' understanding by presenting learning materials in visual and contextual forms. According to Mayer (2021), multimedia learning can improve students' comprehension when verbal and visual information are designed appropriately to support cognitive processes.

Previous studies have shown that the success of digital-based learning is strongly influenced by teachers' strategies in planning, implementing, and evaluating learning activities. Teachers play an important role in determining how technology is utilized to support student engagement, motivation, and understanding. Effective digital learning requires teachers to adapt their instructional strategies according to students' needs, available facilities, and learning contexts. In addition, teachers' creativity and flexibility are essential, particularly in

schools that still experience limitations in digital infrastructure (Setyosari, 2020; Sari & Setiawan, 2021).

Although digital-based learning has become increasingly important, its implementation at the elementary school level still faces various challenges. Some schools experience limitations related to the availability of digital devices, internet access, and teachers' readiness to optimize technology in learning. These challenges indicate that the effectiveness of digital learning is not solely determined by technological facilities but also by teachers' ability to manage learning strategies and overcome existing constraints (Kemdikbudristek, 2022).

SDN 90 Sipatana, Gorontalo City, is one of the elementary schools that has implemented digital-based learning by utilizing technological facilities such as laptops, LCD projectors, Digital Interactive Boards (PID), internet networks, and other digital learning resources. However, the implementation of digital learning at the school still encounters challenges, including limited devices and dependence on internet connectivity. Interestingly, teachers at SDN 90 Sipatana have developed various strategies to overcome these challenges, such as adjusting learning methods, utilizing alternative digital resources, combining digital and conventional approaches, and managing technology use according to classroom conditions. This phenomenon shows that the success of digital-based learning is closely related to teachers' strategies in managing the learning process. However, studies that specifically examine how elementary school teachers manage digital-based learning through planning, implementation, and evaluation processes are still limited, particularly in schools with infrastructure constraints. Therefore, this study aims to describe teachers' strategies in managing digital-based learning at SDN 90 Sipatana, Gorontalo City.

METHOD

This study employed a qualitative approach with a descriptive research design. The qualitative approach was chosen because this study aimed to explore and describe teachers' strategies in managing digital-based learning in a natural school setting. Through this approach, researchers were able to obtain in-depth information regarding the planning, implementation, and evaluation of digital-based learning at the elementary school level. The research was conducted at SDN 90 Sipatana, Gorontalo City. The research participants consisted of the principal and classroom teachers who were directly involved in the implementation of digital-based learning. The principal was selected as an informant to obtain information related to school policies, support, and management of digital learning implementation. Meanwhile, classroom teachers were selected to obtain information regarding the planning, implementation, classroom management, and evaluation of digital-based learning.

Data were collected through observation, interviews, and documentation. Observation was conducted to identify the process of digital-based learning implementation, including the use of digital devices, teacher strategies, student involvement, and classroom interactions. Semi-structured interviews were conducted with the principal and teachers to obtain detailed information regarding their experiences, strategies, challenges, and solutions in managing digital-based learning. Documentation was used to collect supporting data, such as learning modules, assessment documents, and other relevant learning materials. Data analysis was carried out using the interactive model of Miles, Huberman, and Saldaña, which includes three stages: data condensation, data display, and conclusion drawing/verification. Data obtained

from observations, interviews, and documentation were first selected and organized according to the research focus. The data were then presented in the form of descriptions and categories to identify patterns related to digital-based learning management strategies. Finally, conclusions were drawn based on the findings and continuously verified throughout the research process.

To ensure data validity, this study applied source triangulation and technique triangulation. Source triangulation was conducted by comparing information obtained from different informants, namely the principal and teachers. Meanwhile, technique triangulation was conducted by comparing data obtained from interviews, observations, and documentation. Through this process, the credibility and accuracy of the research findings could be maintained.

RESULTS AND DISCUSSION

Results

1. Digital-Based Learning Planning

The findings reveal that digital-based learning planning at SDN 90 Sipatana is implemented systematically and continuously through several important stages, including identifying learning objectives, selecting learning resources, designing learning activities, developing lesson plans, and preparing learning assessments. The planning process indicates that teachers have positioned digital technology as a supporting component in achieving learning objectives rather than as the main focus of learning. This shows that the integration of technology is carried out based on pedagogical considerations, curriculum demands, and students' learning needs.

The planning process demonstrates that teachers understand the importance of aligning technology use with instructional objectives. Before integrating digital media into the learning process, teachers first analyze the competencies that students need to achieve, the characteristics of learners, and the suitability of learning materials. This approach ensures that digital technology is not used merely because of technological availability, but because it provides added value in supporting students' understanding and improving the effectiveness of learning activities.

In the context of the Independent Curriculum, teachers begin the planning process by referring to the Learning Outcomes (Capaian Pembelajaran/CP) and Learning Objectives Flow (Alur Tujuan Pembelajaran/ATP) as the foundation for developing learning activities. The identification of learning objectives becomes an important stage because it determines the selection of learning strategies, media, and assessment techniques. Teachers adapt the planned learning activities to students' abilities and learning conditions so that the learning process becomes more flexible and responsive to students' needs.

Furthermore, the findings indicate that teachers at SDN 90 Sipatana do not separate digital technology from the overall learning design. Instead, technology is integrated into the learning components, including learning resources, classroom activities, and assessment processes. This integration reflects an effort to create meaningful learning experiences where students can actively participate, explore information, and develop their understanding through various learning resources.

The systematic planning carried out by teachers also shows that digital-based learning requires careful preparation. Teachers consider the availability of facilities, students' readiness, and the learning environment before implementing digital media. Therefore, the success of digital learning is not only determined by the presence of digital devices but also by teachers' ability to plan and manage technology effectively.

Overall, digital-based learning planning at SDN 90 Sipatana reflects a structured, adaptive, and student-centered approach. Teachers utilize digital technology as a learning support tool that strengthens the interaction between teachers, students, learning materials, and learning environments. Through proper planning, digital technology contributes to creating learning activities that are more engaging, contextual, and aligned with the objectives of elementary education.

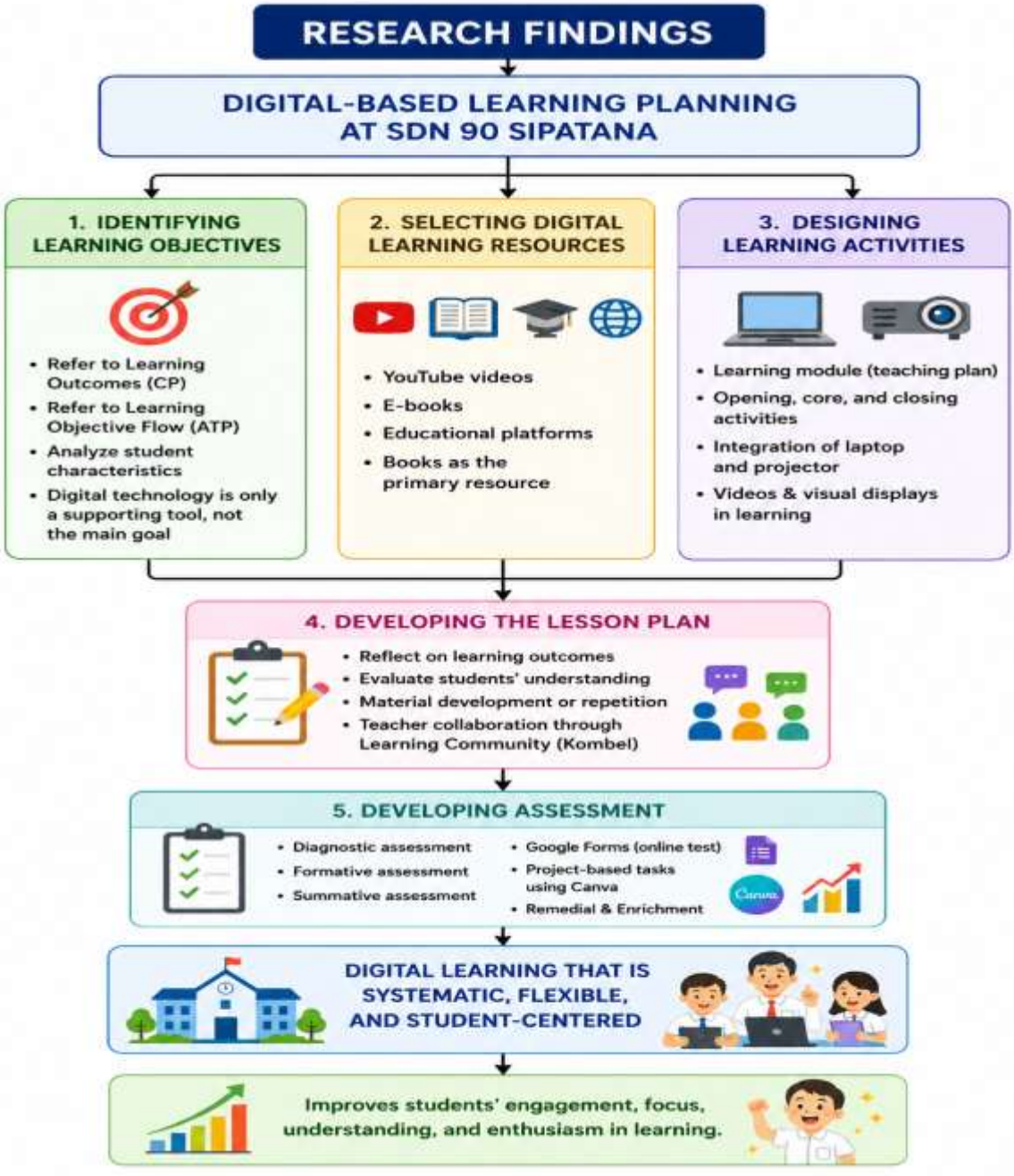

Figure 1. Digital-Based Learning Planning At SDN 90 Sipatana

The planning process begins with the identification of learning objectives based on the Learning Outcomes (Capaian Pembelajaran/CP) and Learning Objectives Flow (Alur Tujuan Pembelajaran/ATP) in the Independent Curriculum. Before deciding which digital media to use, teachers first analyze the competencies that students need to achieve, the characteristics of the students, and the complexity of the learning materials. This process ensures that technology selection is not carried out simply because digital tools are available, but because they are considered appropriate to support the achievement of learning outcomes.

The principal explained that teachers consistently refer to curriculum documents when designing learning objectives and adapt them to classroom conditions.

"Teachers consistently refer to the Learning Outcomes and Learning Objectives Flow when developing learning objectives, then adapt them to the students' conditions in the class." (KS/W)

This statement indicates that teachers at SDN 90 Sipatana implement a structured planning process by placing curriculum objectives as the foundation of digital learning. The use of technology is integrated after teachers understand what students need to learn and how the learning process should be designed.

A similar explanation was provided by a fourth-grade teacher who stated that digital media selection is conducted after considering the suitability between learning objectives and learning materials.

"We first look at the learning objectives, then determine digital media that aligns with the material to be taught." (G4/W)

Based on these findings, it can be seen that teachers apply a goal-oriented approach in designing digital learning. Digital media is selected based on its ability to facilitate students' understanding and create meaningful learning experiences.

In the stage of selecting learning resources, teachers utilize various digital resources to enrich learning materials. The resources include learning videos from YouTube, electronic books (e-books), and other educational platforms. However, digital resources do not replace conventional learning resources. Teachers continue to use textbooks as the main reference and combine them with digital materials to provide broader and more contextual learning experiences.

The selection of digital learning resources is based on several considerations, including relevance to the learning objectives, suitability with student characteristics, and the ability of the media to present learning materials in an interesting way. The use of videos and visual content helps students understand abstract concepts more easily because the materials are presented through concrete examples and illustrations.

One teacher explained:

"I usually use videos from YouTube and several other digital sources that are relevant to the material to make it easier for students to understand the learning." (G1/W)

The use of various learning resources demonstrates that teachers have attempted to create diverse learning experiences. Digital resources provide opportunities for students to access information in different forms, while teachers remain responsible for selecting and adapting the materials according to learning objectives.

Furthermore, teachers design digital-based learning activities by integrating technology into teaching modules. The learning activities are organized into three main stages: introductory activities, core activities, and closing activities. In the introductory stage, teachers use digital media to attract students' attention and build learning motivation. During the core activities, digital media such as videos, images, and presentations are used to explain learning concepts, while the closing stage focuses on reflection and strengthening students' understanding.

The implementation of digital learning activities is supported by technological devices such as laptops and LCD projectors. Through these tools, teachers present learning materials visually and interactively, allowing students to observe, analyze, and discuss learning content more actively. The use of digital media has contributed to increasing student concentration, participation, and enthusiasm during classroom activities.

In developing lesson plans, teachers conduct continuous reflection based on students' learning outcomes. Reflection is used to identify whether learning objectives have been achieved and determine appropriate follow-up actions. If students have understood the material, teachers provide enrichment activities; however, if students still experience difficulties, teachers repeat explanations or adjust learning strategies.

Lesson plan development is also strengthened through teacher collaboration activities in the learning community (Kombel). Through discussion and sharing sessions, teachers exchange experiences, evaluate learning practices, and develop strategies for more effective technology integration.

The final stage of planning is the development of learning assessments. Teachers prepare assessments that cover cognitive, affective, and psychomotor aspects. Assessment activities include diagnostic assessment at the beginning of learning, formative assessment during the learning process, and summative assessment at the end of learning. In addition to conventional assessments, teachers utilize digital assessment tools such as Google Forms and project-based assignments using Canva.

A teacher stated:

"For assessment, we use Google Forms and sometimes assign students to create simple designs using Canva." (G2/W)

The use of digital assessment tools helps teachers conduct evaluation more efficiently and obtain information about students' learning progress. The assessment results are then used as a basis for determining follow-up actions, such as remedial and enrichment programs.

Overall, digital-based learning planning at SDN 90 Sipatana reflects a structured, adaptive, and student-centered learning approach. Teachers integrate technology into each stage of planning while still prioritizing curriculum objectives, student characteristics, and learning effectiveness. The findings indicate that digital technology functions as a learning support system that strengthens interaction, engagement, and the quality of the learning process.

2. Implementation of Digital-Based Learning

The findings reveal that the implementation of digital-based learning at SDN 90 Sipatana has been carried out through a structured process that integrates digital technology, learning strategies, and classroom management. Teachers utilize digital devices such as laptops, LCD projectors, Digital Interactive Boards (PID), and internet access as supporting facilities to deliver learning materials and create more interactive learning experiences. The implementation of digital learning demonstrates that technology is not only used as a presentation tool but also as a medium to facilitate communication, collaboration, and student engagement during the learning process.

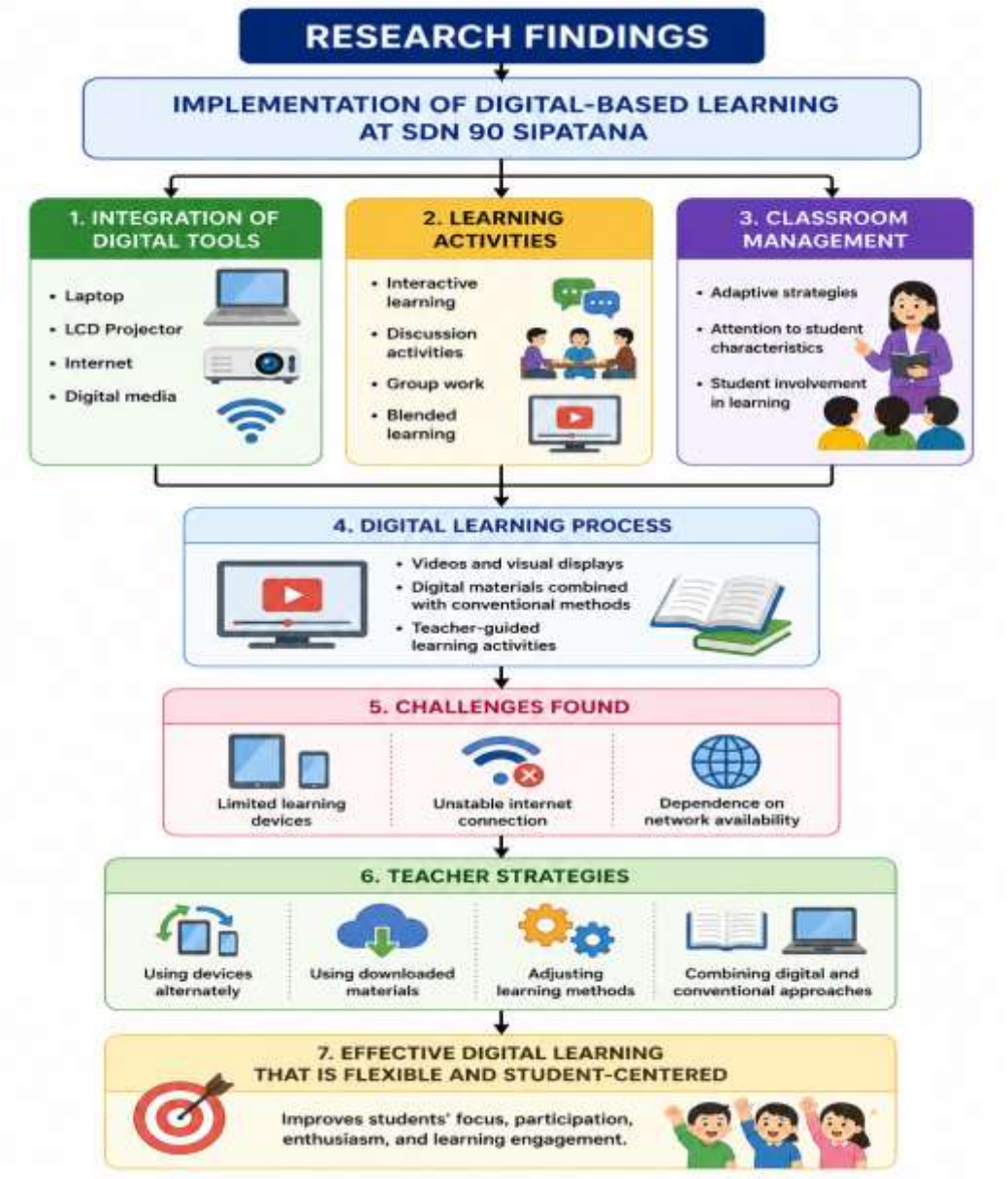

Figure 2. Implementation of Digital-Based Learning at SDN 90 Sipatana

The implementation of digital-based learning begins with the preparation of learning media and instructional materials based on the learning objectives that have been previously designed. Teachers select digital materials that are relevant to the topic being taught, such as

learning videos, images, presentations, and other digital resources. These materials are integrated into classroom activities to support students' understanding and provide a more concrete learning experience, particularly for materials that are difficult to explain through conventional methods.

During classroom activities, teachers combine digital learning approaches with conventional teaching strategies through a blended learning model. Digital media is used to introduce concepts, explain materials, and provide examples, while conventional methods such as discussions, question-and-answer sessions, group work, and direct explanations are still implemented. This combination allows teachers to maintain meaningful interaction between teachers and students while utilizing the advantages of digital technology.

The principal explained that teachers have utilized technological devices as part of classroom learning activities.

"During the learning process, teachers use laptops and LCDs to display learning materials and videos." (KS/W)

The use of laptops and LCD projectors enables teachers to present learning materials in various formats, including videos, animations, and visual presentations. These forms of media help students understand learning concepts more easily because abstract information can be presented in a more concrete and interesting way. The use of digital media also provides opportunities for students to observe, analyze, and respond to learning materials actively.

The findings also show that digital-based learning influences students' learning participation. Students demonstrate greater attention, curiosity, and enthusiasm when teachers use digital media during lessons. Compared to learning activities that rely only on textbooks and verbal explanations, digital-supported learning creates a more dynamic classroom atmosphere where students are more involved in discussions and learning activities.

A fourth-grade teacher explained:

"When using videos or visual displays, students are more focused and more enthusiastic about participating in the lesson." (G4/W)

This finding indicates that digital technology contributes to increasing student engagement. The presence of visual and interactive media helps attract students' attention and encourages them to participate actively. Students are not only receivers of information but also become involved in observing, questioning, discussing, and responding to learning materials.

In addition to the use of digital media, teachers also demonstrate adaptive classroom management strategies. Teachers adjust learning activities based on student characteristics, learning abilities, and classroom conditions. Since students have different levels of digital familiarity and learning readiness, teachers provide guidance and support to ensure that all students can participate in digital-based activities.

Classroom management becomes an important aspect of digital learning implementation because the use of technology can create both opportunities and challenges. Teachers need to manage students' attention, interaction, and time effectively so that technology supports learning rather than becoming a distraction. Therefore, teachers regulate the use of devices, organize student activities, and combine digital activities with direct interaction.

However, the implementation of digital-based learning at SDN 90 Sipatana still faces several challenges, particularly related to technological infrastructure. Limited numbers of devices sometimes prevent all students from accessing digital tools simultaneously. In addition, unstable internet connections can affect the continuity of digital learning activities, especially when teachers rely on online learning resources.

One teacher explained:

"Sometimes the internet connection is unstable, so we have to adjust the learning or use previously downloaded media." (G1/W)

The findings show that teachers respond to these challenges by implementing flexible strategies. When internet access is limited, teachers prepare alternative materials that can be accessed offline, such as downloaded videos or previously prepared presentations. Meanwhile, when the number of devices is insufficient, teachers organize students to use devices alternately and combine digital activities with non-digital learning tasks.

Another teacher stated:

"If devices are limited, students use them alternately, and learning activities continue to incorporate traditional methods." (G2/W)

These strategies demonstrate teachers' ability to maintain the continuity of learning despite technological limitations. Teachers do not depend entirely on digital facilities but use technology selectively according to classroom conditions. This reflects an adaptive approach in which technology is integrated with appropriate pedagogical decisions.

Furthermore, the implementation of digital-based learning also supports more efficient classroom activities. Digital media helps teachers deliver materials more effectively, organize learning resources, and provide various learning experiences. The use of technology allows teachers to present information more quickly and provides opportunities for students to access diverse sources of knowledge.

Overall, the implementation of digital-based learning at SDN 90 Sipatana shows that teachers have successfully integrated technology into the learning process through appropriate planning, interactive learning activities, and adaptive classroom management. Although several obstacles remain, teachers are able to overcome these challenges through creative and flexible strategies. Therefore, digital-based learning at SDN 90 Sipatana can be characterized as an interactive, adaptive, and student-centered learning process that supports the development of students' engagement and learning experiences.

3. Digital-Based Learning Evaluation

The findings reveal that digital-based learning evaluation at SDN 90 Sipatana is conducted systematically and continuously as an integral part of the learning process. Evaluation is not only used to measure students' final learning outcomes but also functions as a tool to monitor learning progress, identify students' difficulties, and determine appropriate follow-up actions. Teachers implement various assessment strategies by combining conventional assessment methods with digital-based assessment tools to obtain comprehensive information about students' achievement.

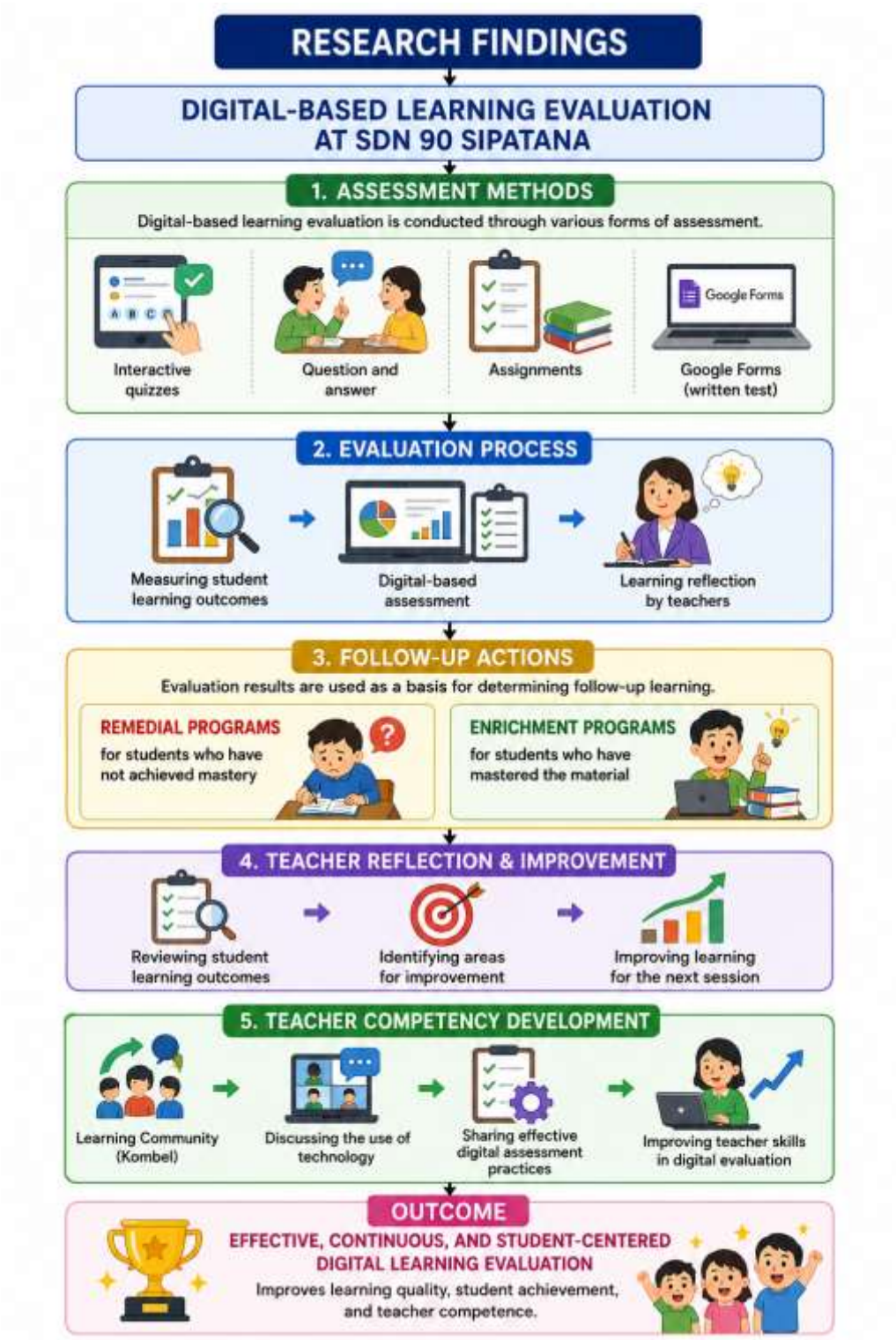

Figure 3. Digital-Based Learning Evaluation At SDN 90 Sipatana

The evaluation process begins with diagnostic assessment conducted at the beginning of learning activities. This assessment aims to identify students' initial understanding, learning readiness, and difficulties related to the learning materials. Teachers conduct diagnostic assessments through oral questions, short discussions, and classroom observations. The results of this initial assessment are used as a basis for teachers to determine appropriate learning strategies and adjust learning activities according to students' needs.

During the learning process, teachers conduct formative assessments continuously to monitor students' understanding and participation. Formative assessments are carried out through question-and-answer activities, discussions, assignments, observations, and interactive learning activities. Through this process, teachers can identify whether students have understood the material or require additional explanation.

The use of digital technology also supports the implementation of formative and summative assessments. Teachers utilize digital applications such as Google Forms to conduct written assessments and evaluate students' understanding more efficiently. Digital assessment allows teachers to process results more quickly and obtain information that can be used for improving learning activities.

A fourth-grade teacher explained:

"Assessments are conducted through questions and answers, assignments, and also using Google Forms for written tests." (G4/W)

This finding indicates that teachers have integrated technology into the evaluation process by selecting assessment tools that are appropriate to learning objectives. The use of Google Forms helps teachers conduct assessments in a more practical way, while still maintaining the purpose of evaluation as a means of measuring students' learning achievement.

In addition to written assessments, teachers also implement project-based assessments to evaluate students' creativity, understanding, and skills. Digital tools such as Canva are used as supporting media for assignments that require students to create visual products. Through project-based assessment, teachers are able to assess not only students' cognitive abilities but also their creativity, communication skills, and ability to apply knowledge in practical contexts.

The evaluation process at SDN 90 Sipatana also emphasizes reflection and continuous improvement. After conducting assessments, teachers analyze the results to identify learning weaknesses and determine the next instructional steps. Students who have not achieved the expected learning outcomes receive remedial activities, while students who have mastered the material are provided with enrichment activities.

The principal stated:

"After the assessment is conducted, students who have not yet completed the course are given remedial sessions, while those who have completed the course are given enrichment sessions." (KS/W)

This follow-up process shows that assessment is not viewed merely as a final measurement but as a basis for improving learning quality. Through remedial and enrichment programs, teachers provide different learning treatments according to students' abilities and learning progress.

Furthermore, teachers conduct learning reflections to evaluate the effectiveness of the teaching process. Reflection activities are carried out by reviewing students' responses, assessment results, and learning difficulties encountered during classroom activities. These reflections help teachers improve instructional strategies and prepare better learning activities for future lessons.

A teacher explained:

"We review student learning outcomes to identify areas that need improvement in the next meeting." (G1/W)

The findings also show that the improvement of digital-based evaluation practices is supported through teacher collaboration activities in the learning community (Kombel). Through Kombel, teachers share experiences, discuss the use of digital assessment tools, and exchange strategies for conducting effective evaluations. This collaboration contributes to strengthening teachers' digital competence and improving the quality of assessment practices. A teacher stated:

"Through Kombel, we discuss the use of technology and how to conduct more effective digital assessments." (G2/W)

Overall, digital-based learning evaluation at SDN 90 Sipatana demonstrates a comprehensive and continuous assessment system. Teachers integrate diagnostic, formative, and summative assessments with digital tools to support accurate evaluation of student learning outcomes. The evaluation results are utilized for reflection, remedial, enrichment, and improvement of future learning activities. This shows that digital-based evaluation functions not only as a measurement instrument but also as a mechanism for improving the quality of learning and supporting student-centered education.

Discussion

1. Digital-Based Learning Planning at SDN 90 Sipatana

The findings indicate that digital-based learning planning at SDN 90 Sipatana is conducted systematically through the stages of identifying learning objectives, selecting learning resources, designing learning activities, developing lesson plans, and preparing assessments. The findings show that teachers do not consider technology as the primary goal of learning but as a supporting tool to achieve learning objectives. This indicates that the integration of digital technology has been carried out based on pedagogical considerations, curriculum objectives, and students' learning needs.

This finding is consistent with the Technological Pedagogical Content Knowledge (TPACK) framework, which emphasizes that effective technology integration requires the alignment of technological knowledge, pedagogical knowledge, and content knowledge. Technology use in learning becomes meaningful when teachers are able to determine when, why, and how technology should be used according to learning objectives (Schmidt et al., 2021; Mishra, 2023). In the context of SDN 90 Sipatana, teachers first analyze the Learning Outcomes (CP), Learning Objectives Flow (ATP), student characteristics, and learning materials before selecting digital media. This demonstrates that technology integration is not based solely on the availability of devices but on instructional planning.

The selection of digital learning resources, such as YouTube videos, e-books, and educational platforms, shows that teachers have implemented a multimodal learning approach. Digital resources provide opportunities for students to access learning materials through various representations, including visual, audio, and interactive formats. This finding supports Mayer's multimedia learning theory, which explains that students' understanding can improve when information is presented through appropriate combinations of verbal and visual elements (Mayer, 2021).

Furthermore, the development of digital-based lesson plans through teacher reflection and collaboration in learning communities (Kombel) shows that learning planning is dynamic

and adaptive. Teachers continuously adjust learning strategies based on student responses and learning outcomes. This reflects the concept of continuous professional development, where teacher collaboration becomes an important factor in improving instructional quality (Hairon & Tan, 2021).

Therefore, digital-based learning planning at SDN 90 Sipatana demonstrates that effective technology integration begins with strong instructional planning. The findings emphasize that digital learning success depends not only on technological facilities but also on teachers' ability to design meaningful learning experiences.

2. Digital-Based Learning Implementation at SDN 90 Sipatana

The findings show that digital-based learning implementation at SDN 90 Sipatana is carried out through the integration of digital devices, interactive learning activities, and adaptive classroom management. Teachers utilize laptops, LCD projectors, Digital Interactive Boards (PID), and internet resources to support learning activities. However, technology is combined with conventional teaching methods through discussion, question-and-answer activities, and group work, creating a blended learning approach.

This finding aligns with the concept of blended learning, which emphasizes the combination of digital and face-to-face learning approaches to create flexible and meaningful learning experiences (Hrastinski, 2021). The implementation at SDN 90 Sipatana shows that digital technology does not replace the teacher's role but strengthens teacher-student interaction and supports various learning activities.

The use of videos and visual learning materials was found to increase students' attention, enthusiasm, and participation. This finding supports the theory of student engagement, which explains that students are more actively involved when learning activities are interactive, meaningful, and connected to their experiences. Digital media provides opportunities for students to observe learning materials more clearly and participate in classroom discussions (Fredricks et al., 2022).

However, the findings also reveal several challenges, particularly limited digital devices and unstable internet connections. These challenges indicate that digital learning implementation in elementary schools is still influenced by infrastructure readiness. Similar conditions are often found in schools where technology access remains unequal. Therefore, teachers' ability to adapt becomes an important factor in maintaining effective learning.

The strategies implemented by teachers, such as using devices alternately, preparing offline materials, and combining digital and conventional approaches, demonstrate teacher flexibility in managing digital learning. This finding shows that successful digital learning is not only determined by infrastructure but also by teachers' creativity and problem-solving abilities.

Overall, the implementation of digital-based learning at SDN 90 Sipatana reflects a student-centered learning approach in which technology is used to increase interaction, motivation, and learning effectiveness. The findings emphasize the importance of teacher competence in managing technology-based classrooms.

3. Digital-Based Learning Evaluation at SDN 90 Sipatana

The findings indicate that digital-based learning evaluation at SDN 90 Sipatana is implemented through diagnostic, formative, and summative assessments. Teachers utilize various assessment methods, including question-and-answer activities, assignments, observations, Google Forms, and digital-based projects. The evaluation process is not only focused on measuring final learning outcomes but also on monitoring student development throughout the learning process.

This finding is in line with the concept of formative assessment, which emphasizes that assessment should provide information for improving learning rather than merely measuring achievement. Continuous assessment allows teachers to identify students' difficulties and adjust learning strategies based on students' needs (Panadero et al., 2021).

The use of digital tools such as Google Forms demonstrates that technology supports assessment efficiency by helping teachers collect and process learning data more effectively. Digital assessment also provides opportunities for faster feedback, enabling teachers to determine appropriate follow-up actions. This supports the view that digital assessment can improve the effectiveness and accuracy of evaluation processes (Redecker & Punie, 2020).

The implementation of remedial and enrichment programs based on assessment results indicates that evaluation at SDN 90 Sipatana follows the principle of differentiated learning. Students who have not achieved learning mastery receive additional support, while students who have mastered the material receive enrichment activities. This approach ensures that assessment results are used to improve learning quality.

Furthermore, teacher reflection and collaboration through Kombel contribute to improving digital evaluation practices. Through professional discussions, teachers exchange experiences and develop better strategies for using technology in assessment. This demonstrates that teacher competency development is an essential component in sustaining digital-based learning implementation.

Overall, digital-based learning evaluation at SDN 90 Sipatana shows that assessment has developed beyond a measurement function into a tool for improving learning quality. The integration of digital technology supports more flexible, continuous, and student-centered evaluation practices.

CONCLUSION

This study concludes that digital-based learning at SDN 90 Sipatana has been implemented systematically and effectively through three main stages: planning, implementation, and evaluation. In the planning stage, teachers demonstrate the ability to integrate digital technology based on learning objectives, curriculum requirements, and student characteristics. Teachers begin the planning process by referring to the Learning Outcomes (CP) and Learning Objectives Flow (ATP), selecting appropriate digital learning resources, designing technology-supported learning activities, developing lesson plans, and preparing relevant assessments. This shows that digital technology is positioned as a learning support tool rather than the primary objective of instruction.

In the implementation stage, digital-based learning is carried out through the use of technological devices such as laptops, LCD projectors, Digital Interactive Boards (PID), and internet-based resources. Teachers combine digital media with conventional learning strategies

through a blended learning approach. The use of digital media, particularly videos and visual materials, contributes to increasing students' attention, participation, motivation, and engagement in learning activities. However, the implementation process still faces challenges, including limited digital devices and unstable internet connections. Teachers overcome these challenges through adaptive strategies, such as alternating device use, preparing offline materials, and combining digital and conventional learning methods.

In the evaluation stage, teachers implement continuous and varied assessment strategies, including diagnostic, formative, and summative assessments. Digital tools such as Google Forms and project-based activities using Canva support the evaluation process and provide teachers with information about students' learning progress. The evaluation results are utilized to determine follow-up actions in the form of remedial and enrichment programs. In addition, teacher collaboration through the learning community (Kombel) contributes to improving teachers' competence in managing digital-based assessment.

Overall, digital-based learning implementation at SDN 90 Sipatana reflects an adaptive, flexible, and student-centered learning approach. The success of digital learning is not only determined by the availability of technology but also by teachers' ability to plan, manage, and evaluate learning effectively. Therefore, improving teacher digital competence and strengthening technological infrastructure are important factors for supporting sustainable digital-based learning in elementary schools.

REFERENCES

Bond, M., Bedenlier, S., Marín, V. I., & Händel, M. (2020). Emergency remote teaching in higher education: Mapping the first global online semester. *International Journal of Educational Technology in Higher Education*, *17*, Article 50. https://doi.org/10.1186/s41239-020-00282-x

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2022). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research, 92*(3), 1–38.

Hairon, S., & Tan, C. (2021). Professional learning communities in Singapore and Shanghai: Implications for teacher collaboration. *Compare: A Journal of Comparative and International Education, 51*(5), 767–784.

Hrastinski, S. (2021). What do we mean by blended learning? *TechTrends, 65*, 564–569. https://doi.org/10.1007/s11528-021-00542-5

Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi. (2022). *Panduan implementasi Kurikulum Merdeka*. Jakarta: Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi.

Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi. (2023). *Platform Merdeka Mengajar: Panduan pemanfaatan*. Jakarta: Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi.

Mayer, R. E. (2021). *Multimedia learning* (3rd ed.). Cambridge University Press.

Mishra, P. (2023). Rethinking technology and creativity in the 21st century: The updated TPACK framework. *Educational Technology Research and Development, 71*(2), 1–15.

Panadero, E., Andrade, H., & Brookhart, S. M. (2021). Fusing self-regulated learning and formative assessment: A roadmap of where we are, how we got here, and where we are going. *Australian Educational Researcher*, *48*, 13–31.

Redecker, C., & Punie, Y. (2020). *European framework for the digital competence of educators: DigCompEdu*. Publications Office of the European Union.

Sari, R., & Setiawan, A. (2021). Kompetensi digital guru dalam menghadapi pembelajaran abad 21. *Jurnal Pendidikan Indonesia, 10*(2), 1–10.

Schmidt, D. A., Baran, E., Thompson, A. D., Mishra, P., Koehler, M. J., & Shin, T. S. (2021). Technological pedagogical content knowledge (TPACK): The development and validation of an updated framework. *Journal of Research on Technology in Education, 53*(3), 1–17.

Setyosari, P. (2020). Desain pembelajaran digital dan implementasinya di sekolah dasar. *Jurnal Teknologi Pendidikan*, *22*(2), 1–10.