

Design of short-video-based microlearning for enhancing elementary students' digital literacy

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Abstract

This study analyzes the design of short-video-based microlearning developed by elementary school teachers to strengthen students' digital literacy in Bengkayang Regency, West Kalimantan. Qualitative case study design was employed in four elementary schools, with data collected through interviews, observations, and documentation and analyzed using Miles and Huberman's interactive models. The findings show that teachers were able to design microlearning creatively despite limitations in infrastructure and digital devices. The instructional designs focused on a single core concept within a duration of 1–5 minutes and integrated visual, audio, and text elements to support students' conceptual understanding. Teachers used accessible applications such as Canva, CapCut, and KineMaster and implemented videos through various strategies, including flipped classrooms, introductory activities, and contextual documentation of school activities. The implementation of microlearning proved effective in enhancing students' focus, engagement, and digital literacy skills, particularly in critically and responsibly interpreting digital information. However, teachers still faced challenges related to unstable electricity and internet access, limited devices, and constraints in video-editing skills. Overall, short-video-based microlearning is an effective and adaptive strategy to support the implementation of the Kurikulum Merdeka in border-area schools and offers an innovative solution for strengthening digital learning in elementary education.

Keywords: Microlearning; short video; digital literacy; elementary education; *Merdeka* curriculum

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INTRODUCTION

The rapid development of digital technology has brought significant changes to education, particularly in how teachers design and deliver learning experiences. The paradigm shift from conventional to digital learning requires approaches that align with the characteristics of 21st-century learners, who need learning that is fast, contextual, and technology-driven (Denojean-Mairet et al., 2024; Jainuri et al., 2025). One increasingly popular innovation is microlearning, a learning strategy that presents content in short, concise segments, often delivered through digital media such as short videos (Hug, 2022). This approach allows students to access learning materials flexibly, anytime and anywhere, thereby fostering more autonomous and interactive learning. Moreover, microlearning enhances student engagement by providing content that is

more appealing and easily digestible, aligning with the learning behaviors typical of the digital era. With its brief duration and focus on a single key concept, microlearning improves information retention and helps students understand and apply what they learn more effectively (Darwin, 2025; Jamaludin, 2023).

The strength of microlearning lies not only in its concise content delivery but also in its adaptability to learners' needs and learning styles in a digital environment where access to information is fast and dynamic (Manurung et al., 2025). Hug (2022) conceptualizes microlearning as a pedagogical strategy that presents content in small, structured units, enabling meaningful engagement within limited time. Similarly, Monib et al. (2024) defines microlearning as a technology-based model that breaks content into mini units in the form of videos, infographics, or motion graphics designed to enhance online learning effectiveness and strengthen students' digital literacy. Furthermore, Monib et al. (2025) emphasize that microlearning is not merely about content size but also about context and delivery methods, asserting that its success depends on its integration into a broader digital learning ecosystem, including social media, learning management systems, and interactive technologies. Such integration makes microlearning more effective in fostering conceptual understanding and long-term memory retention.

Short-video-based learning is one of the most widely adopted forms of microlearning. Short video combines visual, auditory, and textual elements to deliver multimodal information, helping learners construct deeper understanding through dual coding and reduced cognitive load (Febrianti & Pritasari, 2024; Waldia et al., 2023). Videos of 1–5 minutes are considered ideal, as they maintain students' focus on a single topic without causing fatigue while still allowing flexible repetition based on individual needs. These characteristics make short videos a highly relevant medium to support 21st-century learning, which emphasizes flexibility, creativity, and digital literacy.

However, field observations in several elementary schools in Bengkayang Regency indicate that the implementation of short-video-based microlearning remains suboptimal. Most teachers already possess digital devices such as laptops and smartphones, but their use is still largely limited to administrative purposes. Digital media in learning tends to be passive; for example, playing YouTube videos that are not adapted to students' contextual needs. In addition, teachers' skills in designing microlearning content remain limited, compounded by infrastructural challenges such as poor internet (Dewi et al., 2025; Silvester et al., 2022). Meanwhile, students show high enthusiasm for short-video-based learning media, which have been shown to improve focus, comprehension, and learning motivation.

These conditions indicate the urgent need to strengthen teachers' capacity in designing and implementing contextual short-video-based microlearning that aligns with the characteristics of elementary school students. Implementing such a strategy has the potential not only to enhance students' digital literacy but also to foster critical thinking, collaboration, and creativity, which are essential skills in the digital era (Anggraini et al., 2025; Salixova, 2025). Therefore, this study aims to analyze the design of short-video-based microlearning developed by elementary school teachers as an effort to strengthen students' digital literacy.

Based on this purpose, the present study aims to analyze the design of short-video-based microlearning developed by elementary school teachers as an effort to strengthen students' digital literacy in Bengkayang Regency. The study seeks to answer two main research questions:

1. What are the characteristics of short-video-based microlearning designs developed by elementary school teachers?
2. How do these designs contribute to strengthening students' digital literacy?

The findings are expected to provide a comprehensive understanding of microlearning implementation practices in elementary education and to serve as a reference for teachers in optimizing digital technology to design innovative and meaningful learning experiences.

METHODS

This study employs a qualitative approach with a case study design to analyze the instructional design and implementation of short-video-based microlearning developed by teachers to strengthen digital literacy among elementary school students. The research was conducted in four elementary schools in Bengkayang Regency, West Kalimantan, namely SDN 02 Bengkayang, SDN 03 Bengkayang, SDN 09 Rangkang, and SDN 01 Bengkayang. These schools were purposively selected because they had begun to adopt microlearning in their teaching practices. Participants in the study consisted of classroom teachers who designed and implemented short-video-based microlearning in their respective schools.

The study was carried out over four months, from March to June 2025, covering the stages of preparation, data collection, analysis, and validation of findings. The case study approach was chosen because it is considered the most relevant to provide an in-depth, contextual, and comprehensive understanding of the phenomenon being examined within real learning situations.

The focus of the research is directed toward analyzing the characteristics of short-video-based microlearning design, the strategies used by teachers to enhance students' digital literacy, and the challenges encountered during the design and implementation processes. To strengthen the theoretical foundation, a literature review was conducted covering the concepts of microlearning, digital literacy, instructional design, and the use of short video media in the context of elementary education. In addition, relevant previous studies were analyzed to identify research gaps that could serve as a basis for developing research instruments.

Data collection techniques in this study included in-depth interviews, direct observations, and documentation. Interviews were used to explore teachers' experiences, perceptions, and strategies in designing and implementing microlearning. Observations were conducted to directly examine the implementation of short-video-based learning, while documentation involved collecting teaching materials and instructional videos used by teachers.

The data obtained were analyzed using the interactive data analysis model proposed by [Miles and Hubermann \(1994\)](#) which consists of three main stages: data reduction, data display, and conclusion drawing. The data reduction stage involved simplifying, organizing, and focusing on information relevant to the research objectives. The data were then presented in descriptive narratives, tables, and diagrams to facilitate interpretation. The final stage involved drawing conclusions based on emerging patterns, relationships, and key findings from the analysis.

To ensure the validity of the findings, this study employed source and technique triangulation. Interview data were compared and cross-checked with observations and documentation. Prolonged engagement in the field and discussions among researchers were also conducted to strengthen the credibility and confirmability of the findings. Through this qualitative case study approach, the research is expected to provide a deep and holistic understanding of the design and implementation practices of short-video-based microlearning in strengthening digital literacy among elementary school students in Bengkayang Regency.

RESULTS AND DISCUSSION

Results

The development of education across regions in Indonesia has not progressed evenly. Bengkayang Regency, as one of the border areas in West Kalimantan, faces several challenges in implementing elementary education, both in terms of human resource quality and the availability of facilities and infrastructure. Several elementary schools remain difficult to access, and some still do not have stable electricity. Geographical conditions and infrastructural limitations pose significant obstacles to effective teaching and learning, particularly in implementing technology-based digital learning.

Observations and interviews in SDN 02 Bengkayang, SDN 03 Bengkayang, SDN 09 Rangkang, and SDN 01 Bengkayang revealed notable variations in teaching strategies among the schools. These variations were closely related to differences in available facilities and teachers' ability to utilize digital technology to support learning. Nonetheless, all teachers demonstrated strong enthusiasm and innovation in adapting their teaching strategies to students' conditions and needs, including the initial adoption of short-video-based microlearning as an approach suited to the learning characteristics of the digital generation.

The Design Process of Short-Video-Based Microlearning

The study found that teachers at the four elementary schools in Bengkayang Regency had developed short-video-based microlearning designs with varying characteristics, adapted to their respective available resources. In general, the design process followed systematic stages, including: (1) identifying learning objectives, (2) designing video content, (3) producing media, (4) implementing and facilitating interaction, and (5) evaluating learning outcomes.

The first stage began with determining a specific basic competency that could be explained within a short duration (1–5 minutes). Teachers then prepared a simple narrative script and visual materials focusing on the core concept of the lesson. The production process utilized popular applications such as Canva, CapCut, and KineMaster, resulting in short, vertically formatted (portrait) videos suitable for students' habitual use of digital devices.

A teacher at SDN 02 Bengkayang created a 3–5-minute video on the topic of changes in the states of matter using Canva, combining voice narration with simple animations. Meanwhile, the teacher at SDN 03 Bengkayang produced 2–3-minute videos using CapCut for flipped classroom activities. The teacher at SDN 09 Rangkang created 1–2-minute videos on alternative energy as digital anticipatory sets, while the teacher at SDN 01 Bengkayang documented a real-life activity on environmental cleanliness in a 4-minute video edited with KineMaster.

These design practices illustrate the application of Technological Pedagogical Content Knowledge (TPACK) principles, where teachers successfully integrated content, pedagogy, and technology in a contextual manner suited to students' characteristics in border areas. The findings also show that short-video-based microlearning does not necessarily require advanced devices or a strong internet connection. Teachers' creativity in designing content, determining video duration, and aligning materials with students' characteristics emerged as key factors in successfully designing effective short-video-based microlearning experiences.

Implementation of Microlearning in Elementary Schools

The implementation of short-video-based microlearning varied across the four schools, reflecting differences in infrastructure and teachers' digital competencies. Teachers used videos not only as a medium for delivering instructional content but also as tools to stimulate discussion, support reflection, and strengthen students' digital literacy. These variations were evident in the choice of applications, video duration, learning themes, and classroom implementation methods. Each teacher adapted the design of microlearning to align with students' characteristics and the available resources at their respective schools.

To clarify the comparison among schools, the following table presents the differences in design and implementation strategies of short-video-based microlearning in the four elementary schools in Bengkayang Regency.

Based on the Table 1, although the four schools had different conditions and resources, all teachers were able to utilize digital technology adaptively according to their respective contexts. For instance, SDN 02 Bengkayang used videos created with Canva and played them offline via a projector to help students understand abstract concepts in science lessons. SDN 03 Bengkayang employed Google Classroom and a flipped classroom model, allowing students to watch the videos before face-to-face sessions. Meanwhile, SDN 09 Rangkang used short videos

as an introduction to stimulate students' curiosity, and SDN 01 Bengkayang presented real-life school activities through videos edited with KineMaster to foster contextual understanding.

Table 1. Comparison of Short-Video–Based Microlearning Implementation Across Elementary Schools in Bengkayang Regency

| School | Media/application | Video duration | Theme | Implementation strategy | Impact on students |
|-------------------|---------------------------|----------------|---------------------------------|---|--|
| SDN 02 Bengkayang | Canva (offline) | 3–5 minutes | Changes in the States of Matter | Played in class using a projector; focused on visualizing science concepts | Students found it easier to understand abstract concepts and became more active in discussions |
| SDN 03 Bengkayang | CapCut & Google Classroom | 2–3 minutes | Thematic Material | Flipped classroom—students watched the video at home before face-to-face sessions | Increased discussion participation: students were better prepared for learning |
| SDN 09 Rangkang | CapCut (offline) | 1–2 minutes | Alternative Energy | Used as an introductory activity before lessons | Enhanced students' curiosity and concentration |
| SDN 01 Bengkayang | KineMaster (offline) | 4 minutes | Environmental Cleanliness | Showcased real-life school activities | Helped students understand clean living behavior in a more contextual way |

Source: Processed primary data, 2025

These four approaches illustrate that the essence of microlearning implementation does not lie in the sophistication of the technology used but rather in the teacher's ability to design concise, engaging, and meaningful learning experiences aligned with students' needs and characteristics in each school. This implementation demonstrates that microlearning does not require advanced devices or a strong internet connection. Instead, the teacher's creativity in designing content, determining duration, and adapting media to students' characteristics serves as the key factor in successful learning.

Challenges in the Implementation of Microlearning

Although the implementation of video-based microlearning in the four elementary schools showed positive outcomes in enhancing student engagement and understanding, its application in the field was not without challenges. Each teacher faced different circumstances and limitations, both in terms of infrastructure, technological competence, and student conditions. These challenges are key factors that must be considered to ensure that future implementation of microlearning can be more optimal and sustainable. The main challenges identified are as follows.

Limited technological infrastructure

Not all schools have stable access to electricity and internet networks. Teachers often had to wait for a better signal before uploading or playing learning videos. Consequently, most videos were played offline using projectors or teachers' personal mobile phones.

“When the signal is good, the children can watch using their parents' phones. But if not, we play it together at school so everyone can learn.”

(Grade IV Teacher, SDN 09 Rangkang)

Limited technical skills among teachers

Most teachers are not yet proficient in video creation and editing. They learn independently through YouTube or by sharing experiences with colleagues. On average, producing a simple video takes about 2–3 hours, depending on the complexity of the material and the teacher's technical ability.

Limited student access to digital devices

Not all students have personal gadgets, making access to videos at home limited. To address this, teachers play the videos collectively in class so all students can participate in learning activities together.

These constraints indicate that implementing microlearning in border areas requires systemic support, both in terms of infrastructure and teacher technological competence. Such support should include not only the provision of infrastructure such as stable internet networks, adequate digital devices, and technology-based learning facilities but also continuous professional development through training and teacher learning communities.

Results and Impact on Students' Digital Literacy

Despite the technical and resource-related challenges encountered during the implementation of video-based microlearning in the four elementary schools in Bengkayang Regency, the results showed significant positive impacts on improving students' digital literacy and learning motivation. Using short videos focusing on a single core learning concept, students became more active, enthusiastic, and better able to understand the material presented.

Classroom observations revealed noticeable changes in students' learning behavior when microlearning was integrated into lessons. Students appeared more focused on the videos, were able to grasp the main messages, and connected them to the ongoing lesson topics. During post-viewing discussions, students could restate the main concepts and provide examples of their application in daily life. One teacher explained:

"The children understand faster when the material is explained through short videos. They can see the examples directly, and then we discuss them together. Now, they are starting to tell the difference between videos that are useful for learning and those that are just for entertainment." (Grade V Teacher, SDN 09 Rangkang)

The findings indicate improvement in students' abilities across three main aspects of digital literacy. First, the ability to understand digital information, where students can identify the main message of the video and connect it to the lesson material. Second, a positive attitude toward digital media, characterized by an increased sense of responsibility in using devices appropriately during learning activities. Third, collaborative skills, like microlearning videos, are often utilized as materials for group reflection and discussion.

In addition, teachers reported that the use of microlearning created a more engaging and interactive classroom atmosphere. Learning activities that began with short videos stimulated students' curiosity and encouraged more active participation. One teacher stated:

"When we use videos, the atmosphere becomes lively right away. They're eager to know what's in the video and race to answer. Even the quiet students start to speak up." (Grade IV Teacher, SDN 03 Bengkayang)

Overall, the findings show that video-based microlearning not only enhances students' conceptual understanding but also fosters digital ethics and responsibility in technology use. This aligns with Ribble (2015) concept of digital citizenship, which emphasizes the importance of cultivating ethical, safe, and responsible digital behavior among learners. In conclusion, the implementation of video-based microlearning proves to be an effective and innovative instructional strategy to strengthen digital literacy and promote an adaptive learning culture in elementary schools located in border areas such as Bengkayang.

Discussion

The results of this study show that the implementation of short-video-based microlearning by elementary school teachers in Bengkayang Regency has significantly

contributed to improving students' digital literacy. This finding aligns with the study by [Farhan et al. \(2024\)](#), which emphasizes that microlearning is an effective learning strategy in the digital era because it strengthens critical thinking skills through brief, focused, and contextual learning segments. In the context of elementary education characterized by students' relatively short attention spans and the need for concrete visualization, short-video-based microlearning proves to be well suited to the learning characteristics of elementary school children.

The teachers' implementation also demonstrates the integration of content knowledge, pedagogical knowledge, and technological knowledge, as described in the Technological Pedagogical and Content Knowledge (TPACK) framework ([Koehler et al., 2013](#)). Teachers did not merely convert materials into digital form but modified their instructional strategies by adapting content, methods, and media to local contexts and students' abilities. For instance, teachers adjusted the duration of videos, used simple applications such as Canva, CapCut, or KineMaster, and adapted video distribution methods either offline or through limited online access to remain relevant to infrastructural conditions in border areas. This reflects a strong mastery of Technological Pedagogical Knowledge (TPK), where technology is used not as an end goal but as a pedagogical tool to facilitate conceptual understanding.

The improvement of students' digital literacy identified in this study encompasses three main domains: cognitive, affective, and social. In the cognitive domain, students demonstrated the ability to understand the main message of videos, interpret visual symbols, and relate digital information to their prior knowledge. This aligns with [Gilster and Glister \(1997\)](#) concept of digital literacy, which highlights that its core lies in an individual's ability to interpret, evaluate, and manage information across various digital formats. In the affective domain, students showed a positive attitude toward the use of technology in learning. They began to realize that digital devices are not merely tools for entertainment but productive media that can make learning more engaging and meaningful. Meanwhile, in the social domain, the implementation of microlearning-based instruction encouraged collaboration, reflection, and interaction among students. Activities such as watching and discussing videos together in class strengthened communication, enhanced digital empathy, and fostered a habit of sharing knowledge responsibly a concrete manifestation of digital citizenship practices in the elementary school environment.

These three domains collectively support the development of digital citizenship character as defined by [Ribble \(2015\)](#), which emphasizes ethical behavior, responsibility, and safety in digital spaces. This means that through microlearning, teachers not only transfer knowledge but also guide students to become wise and ethical users of technology.

However, this study also identified several implementation challenges. The main obstacles relate to technological infrastructure limitations, internet access, and teachers' technical skills in video production and editing. These findings reinforce the research of [Maula and Hadi \(2024\)](#), which found that the success of improving digital literacy in elementary schools highly depends on the availability of supporting facilities and teachers' digital competence. Therefore, systemic policy support is needed, including the provision of adequate infrastructure, strengthening teachers' capacity through continuous professional development, and establishing active digital learning communities at both school and regional levels.

Overall, the findings of this study affirm that short-video-based microlearning is an effective, contextual, and relevant learning strategy aligned with the spirit of the Kurikulum Merdeka. This approach not only enhances cognitive learning outcomes but also fosters responsible digital character through meaningful digital literacy practices. In the context of border areas such as Bengkayang, microlearning serves as an adaptive solution that bridges resource limitations with the need for innovative, technology-based learning.

CONCLUSION

This study concludes that the implementation of short-video-based microlearning plays a significant role in enhancing digital literacy among elementary school students in Bengkayang Regency. Through concise, engaging, and contextualized learning strategies, students become more active, develop the ability to critically understand digital information, and demonstrate positive and responsible attitudes toward technology use. Microlearning not only strengthens students' cognitive skills in comprehending the material but also fosters awareness of digital ethics and collaboration within technology-based learning environments.

Furthermore, the study emphasizes that the success of microlearning implementation is strongly influenced by teachers' competence in integrating pedagogy, content, and technology (TPACK), as well as adequate digital infrastructure support. Challenges such as limited internet access, insufficient devices, and time constraints for content design remain obstacles that need to be addressed through continuous professional development and supportive policies from schools and local government authorities.

Overall, short-video-based microlearning is an innovative and relevant approach to strengthening digital literacy and supporting the implementation of the Kurikulum Merdeka in elementary schools, particularly in border areas such as Bengkayang. This model can become an effective alternative in efforts to transform digital learning at the elementary education level in Indonesia.

Future research can further explore the long-term impact of microlearning on enhancing students' digital literacy competencies and digital character, particularly within more personalized and sustainable learning models that adapt content and learning pace to individual students' needs. This approach is expected to enrich more personalized, efficient, and technologically aligned digital learning models for the future of education.

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