



Interactive Image-Based Media for Enhancing English Vocabulary Learning in Primary Schools: A Qualitative Study

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ABSTRACT

English vocabulary learning in elementary school plays an important role as a foundation for advanced language skills; however, conventional approaches often lead to student demotivation, passivity, and difficulties in comprehension. This study aimed to describe the implementation process, obstacles, and strategies in using image-based interactive media for English vocabulary learning among fourth-grade students at Muhammadiyah Elementary School PK Andong. This study employed a qualitative descriptive approach and was conducted through observations, interviews, and documentation. Data validity was ensured through source and technique triangulation. Data analysis followed Creswell's qualitative model, which consisted of three stages: organizing and understanding the data by thoroughly reading transcripts and field notes; grouping and analyzing the data by categorizing and describing findings related to interactive media; and interpreting the data to assess effectiveness, identify obstacles in using interactive media, and draw relevant and accountable conclusions. The research results indicated that the implementation process was carried out gradually through the use of images, videos, and quizzes, which increased students' focus and enthusiasm through concrete visualization. The main constraints included limited instructional time and variations in students' abilities, particularly among slow learners. Effective strategies included scaffolding, vocabulary repetition, pronunciation guidance, and interactive quizzes for evaluation. Image-based interactive media was proven effective in improving students' vocabulary mastery; however, it required careful planning, optimal classroom management, and adaptation to students' characteristics.

Keywords: interactive media; visual learning; vocabulary acquisition; primary education; English learning

INTRODUCTION

English as an international language plays an important role in life. As an international language, English is used for global communication. Recognizing the importance of using English, English language learning must be provided as early as possible in every school. English language learning in elementary schools was implemented in the 1994 curriculum as a local content. Local content can be understood as a subject that supports the potential of the area where learning takes place. The learning package can be based on the characteristics of the environment and culture, including customs, arts, and languages that are considered necessary by the community [1], [2]. It would be better to introduce English learning for elementary schools (SD) earlier [3].

English language learning in elementary school is the initial learning stage that serves as the foundation for learning English at the next level. In the current era of globalization, English language skills have become highly valuable, especially among

students at the elementary education level. One of the main keys to understanding and communicating in English is a good command of vocabulary. Vocabulary mastery in English lessons is very important for understanding the material being taught. English language learning in elementary schools must be tailored to the characteristics and cognitive development of students [4], [5].

Although the role of English vocabulary mastery is very important in primary education, the reality in the field often shows similar challenges in various elementary schools in Indonesia. Other factors that contribute to low vocabulary mastery among students include the limitations of teachers in providing enjoyable learning that is appropriate for the characteristics of elementary school students, a dense curriculum that is oriented towards achieving targets, and differences in language proficiency levels among students. Specific indicators of low learning motivation, such as lack of enthusiasm, minimal active participation in class, and giving up quickly when faced with difficulties, are also highly relevant in this context [6], [7].

Given the various problems in conventional English vocabulary learning, which consistently impact students' low learning outcomes, learning innovation is needed [3]. The application of interactive media is a promising solution because it can create a fun learning atmosphere, encourage active student involvement, and relate the subject matter to real-life contexts. A number of studies have shown that the use of interactive media can increase students' interest and motivation to learn, strengthen their memory of new vocabulary, and encourage students to participate more actively in English learning in elementary school.

The facts on the ground show that English learning at SD Muhammadiyah PK Andong is still dominated by conventional methods. Teachers more often explain the material verbally and write it on the board, then ask students to take notes. This pattern of learning causes learning activities to tend to be passive because students only receive information without meaningful interaction. In addition, the lack of variety in learning media makes students quickly bored, unmotivated, and consider English vocabulary difficult to understand. These findings are in line with the results of observations, where students appear to be less enthusiastic and not fully engaged during learning before the use of interactive media is implemented.

Research discussing the development of media to support the English learning process has been studied previously and has resulted in improvements in learning outcomes. According to Orakci [8], interactive learning media based on 2-dimensional animation presented in three languages (English, Indonesian, and Balinese) can improve students' vocabulary mastery. In addition, according to Brutman et al. [9], the use of multimedia for teaching English vocabulary to fifth-grade students resulted in a 95% learning completion rate. Similarly, according to Syawaluddin, and Aeni [10], digital interactive learning media that combines visual, audio, and interactive elements can improve English language skills in elementary schools in Medan. Furthermore, according to Dey & Munshi [11], the use of interactive learning media in English lessons in elementary schools using the Systematic Literature Review method reinforces that interactive learning media can improve learning outcomes based on several articles that have been studied. The results show that the use of interactive media such as Microsoft PowerPoint, Micro Flash multimedia, Canva-based educational games, the Articulate Storyline application, snakes and ladders, and word cards (train word cards) are proven

to be effective in improving vocabulary mastery, learning motivation, and active student engagement. Based on the above explanation, interactive learning media has been proven to improve the learning outcomes of elementary school students in increasing their English vocabulary mastery. However, there is a gap in research, namely the absence of studies discussing image-based interactive media in improving English vocabulary learning outcomes in 4th grade elementary school.

This study is based on three main theoretical foundations. First, Mayer's multimedia learning theory emphasizes that learning will be more effective when information is presented through the integration of verbal and visual elements. Second, Vygotsky's scaffolding theory emphasizes the importance of gradual support from teachers so that students can learn optimally in accordance with their proximal development zone. Third, learning motivation theory, which explains that an interesting and meaningful learning environment can increase students' intrinsic motivation. These three theories form the conceptual basis for the application of image-based interactive media in English vocabulary learning.

This is what prompted researchers to conduct an in-depth study of the English learning process in elementary schools, particularly in fourth grade. Fourth grade was chosen as the subject of this study based on the cognitive development characteristics of students at the concrete operational stage, where learning is more effective when accompanied by concrete and interesting visual stimuli. Students at this level tend to understand material more easily through visual displays than abstract explanations, so they need media that can help them associate vocabulary with real objects. This study aims to explain the process, obstacles, and implementation strategies for using interactive image-based media in English vocabulary learning in elementary schools.

MATERIALS AND METHODS

Research Design

This study uses a qualitative approach based on Creswell's guidelines, which emphasize in-depth exploration of the meanings and processes experienced by participants. The qualitative approach was chosen because it was in line with the research objective of helping researchers gain an in-depth understanding of the process of students thinking and drawing logical conclusions when learning English vocabulary. The qualitative approach was chosen because it was able to reveal the dynamics of the classroom, teacher strategies, and student responses in a comprehensive manner (), which could not be optimally explained through a quantitative approach. Data validity was tested through source and technique triangulation, while data analysis followed Creswell's analysis steps, namely organizing data, reading all data, coding, developing themes, presenting findings, and interpreting data meaning [12].

The focus of this study is to describe the application of interactive media in teaching English vocabulary to fourth-grade students. The research subjects consisted of one English teacher and 24 fourth-grade students at Muhammadiyah PK Andong Elementary School, Boyolali Regency, Central Java, aged 9–10 years. The subjects were selected purposively, considering that the teacher had applied image-based interactive media in learning and the students had diverse learning characteristics, including students with slow thinking abilities. The use of interactive media aimed to increase motivation and

vocabulary comprehension effectively. The researcher conducted an in-depth analysis of the implementation of learning, the obstacles encountered, and the teacher's strategies in delivering the material. Data were collected through interviews, observations, and documentation. The research was conducted at SD Muhammadiyah PK Andong, Jalan Kacangan-Pelemrejo Km. 0.5, Kacangan Village, Andong District, Boyolali Regency, Central Java 57384.

Data Sources and Collection Techniques

This study uses data in the form of descriptions and information related to the use of interactive learning media in teaching English vocabulary to fourth-grade students at Muhammadiyah PK Andong Elementary School. The data includes the types of media used, the objectives and reasons for the selection of media by teachers, student responses and motivation, and obstacles encountered during the learning process. Primary data sources were obtained directly from English teachers and fourth-grade students who provided information about the application of interactive media and the obstacles encountered, while secondary data sources were school documents, such as syllabi, lesson plans, learning notes, and relevant scientific literature. The main informants for this study were fourth-grade English teachers, with fourth-grade students as supporting informants to determine their responses, motivation, and learning experiences using interactive media.

Data collection techniques in this study included in-depth interviews, classroom observation, and documentation. Individual interviews were conducted with English teachers and fourth-grade students to understand their views on the use of interactive media in English vocabulary learning, with the help of writing instruments for note-taking and devices for voice recording and photo or video documentation. Observations were conducted directly during the learning process to observe the use of interactive media by teachers and student responses. Documentation supplemented the data through photos of activities, video recordings, learning tools such as lesson plans and interactive media, and student work.

Data Analysis and Validity Techniques

To ensure data validity, this study applied triangulation, which included source triangulation by comparing data from English teachers, 4th grade students (), and supporting documents such as syllabi and lesson plans; technique triangulation by comparing data from observations, interviews, and documentation; and time triangulation by collecting data at different moments to ensure consistency and avoid situational bias. In addition, the researcher conducted member checks by confirming the results of interview transcripts and observation notes with the research subjects to ensure that the interpretation of the data was accurate, to increase the reliability and validity of the data, and to build trust between the researcher and the participants. Data analysis was conducted using the Creswell model through three stages of coding. The open coding stage was carried out by identifying units of meaning from observation, interview, and documentation data. The axial coding stage was used to group and connect categories such as the implementation process, obstacles, and learning strategies. The selective coding stage was carried out to formulate core themes that represented the research findings as a whole. Data validity was ensured through triangulation of sources and techniques, as well

as member checks. Data analysis used Creswell's qualitative approach through three stages: organizing and understanding the data by thoroughly reading the transcripts and notes; grouping and analyzing data by categorizing and describing findings related to interactive media; and interpreting and drawing conclusions to assess the effectiveness and constraints of using interactive media and to produce relevant and accountable conclusions [12].

RESULTS AND DISCUSSION

Result

The research results were obtained through observation, interviews, and documentation. Data were collected to determine the effectiveness of interactive media in increasing students' motivation, independence, and conceptual understanding. The following is a description of the research results based on the data collection techniques used.

3.1. Observation Results

Observations were conducted during learning activities. The first meeting was on the topic of introducing body part vocabulary. The teacher showed a short video containing animations and audio pronunciations of the vocabulary. When the media was shown, the students showed high attention and appeared focused on following the video. Several students enthusiastically imitated the pronunciation of the vocabulary without being asked by the teacher. The students' interest in the interactive media was evident from their expressions, such as sitting upright, staring at the screen, and moving their lips to follow the video's audio. After the video ended, the teacher gave pronunciation exercises. Most students appeared confident when pronouncing the words, although there were some students who were still hesitant and spoke softly.

Overall, the classroom atmosphere during the first meeting was conducive, active, and productive. The video greatly helped students understand vocabulary through visual representation. However, three students were found to be passive during the lesson. They sat at the back of the classroom, observing without actively participating and only participating after the teacher directly instructed them to do so. This shows that there are variations in the level of student activity. The results of this observation show that interactive media can create an active, enjoyable, and collaborative learning atmosphere. Students are more involved in the learning process and show increased attention and understanding of English vocabulary.

3.2. Teacher Interview Results

Based on the results of interviews with English teachers, it was found that teachers had a positive view of the use of interactive media. According to the teachers, learning using media such as videos and quizzes was more effective than conventional learning because students could see real examples and understand the material more easily.

Teachers stated:

"It's better to use visual media because children can see examples directly from the media. Usually, there are also projects in the media. But I rarely use it because learning time is limited, only 30 minutes a week, and I have to complete four chapters in one semester."

The teacher explained that the implementation of interactive media is still constrained by limited learning time, which is only 30 minutes per week. With this duration, teachers must adjust so that all material is conveyed, so that the use of media can only be done for about 15 effective minutes. Nevertheless, the teacher assessed that the students' response to the media was very positive. Whether using books or media, students remained active and enthusiastic during learning activities. The teacher also assessed that interactive media can significantly increase student motivation to learn, mainly because it provides a more interesting and contextual learning experience. The teacher also added that interactive media can increase student motivation to learn because of its attractive visual display and involvement of students' emotions. However, some students still need intensive assistance so that they do not have difficulty understanding the content of the media.

In addition, the teacher revealed that students in the Takhfiz class were quicker at memorizing English vocabulary because they were accustomed to the memorization method, while students in the Science class needed more time to master the vocabulary. These differences in characteristics also affect the effectiveness of interactive media in learning. Thus, the teacher concluded that interactive media is effective in improving learning outcomes, but it needs to be adjusted to the characteristics of each class and the available learning duration.

3.3. Results of Student Interview 1

Based on the results of an interview with one of the 4th grade students at Muhammadiyah PK Andong Elementary School, it was found that learning using media in the form of pictures or videos was preferred over textbooks. The student argued that media made the material easier to understand and more enjoyable.

According to him:

"I prefer learning using media such as videos or images because they are more clear and easy to understand. When using books, it usually takes longer to understand."

The student also said that media helps him understand the material more quickly and clearly because he can see real examples. The student also said that learning using media is more enjoyable and helps him focus better. He admitted that he is more enthusiastic about learning when the teacher shows videos or pictures because they are interesting and easy to understand.

In addition, the student assessed that interactive quizzes helped him remember the material he had learned and increased his motivation to practice. However, he also mentioned that sometimes he still needed the teacher's help to understand the content of the media, especially if there were parts that were difficult to understand. Overall, students considered interactive media to be more effective than textbooks because the learning process became faster and more interesting. This shows that interactive media can increase student engagement while accelerating their understanding of English vocabulary.

3.4. Results of Student Interview 2 (Slow Thinker)

Based on the results of an interview with one of the students who has slow thinking skills at SD Muhammadiyah PK Andong, it was found that the use of interactive media helps with understanding the material, especially in English lessons. Students find it easier to

understand the material explained through videos than just by reading books. However, students admit that they still need direct guidance from teachers when using the media, especially in understanding instructions and answering interactive quizzes. After receiving explanations from the teacher, the student was able to participate in the activities properly.

According to him:

"I understand better when the teacher explains using visual media because I can see the pictures directly. But when it comes to quizzes, I still need the teacher's help because sometimes I don't understand."

This student's slow thinking is evident in the process of understanding information, which tends to take longer than his classmates, especially when given new instructions or material that requires analysis. This student is often unable to process information independently quickly, requiring repetition and concrete examples to understand the task. Although he needs assistance, the student stated that he likes learning using media because the presentation is attractive and makes learning more enjoyable. According to him, media such as animations and videos make lessons less boring, even though he still feels he understands better when the teacher explains directly using textbooks. These results show that for students with slow thinking skills, a combination of interactive media and direct explanations from the teacher is the most effective learning strategy.

3.5. Documentation Results

Based on the documentation results, data was obtained in the form of the Lesson Plan (RPP) used by teachers during the English vocabulary learning process. The RPP document contains learning components such as objectives, vocabulary material, media used, learning steps, and evaluation forms. Analysis of the RPP shows that the use of interactive media is not a spontaneous activity in the classroom but has been systematically designed by teachers since the planning stage. This can be seen from the inclusion of images, videos, and interactive quizzes as a means of delivering material as well as a tool for learning evaluation. Thus, the RPP documentation supports the findings from observations and interviews that the application of interactive media in vocabulary learning has been well integrated into learning planning, rather than just appearing as an additional activity during the learning process.

3.6 Theoretical Implications

3.6.1 Practical Implications for Elementary School Teachers

Elementary school teachers can use interactive media such as short videos (5-10 minutes) to introduce body part vocabulary, as observations show an increase in focus and independent pronunciation in 80-90% of students, although 3 passive students require direct guidance. This strategy is effective in both Takhfiz (fast memorization) and Science (slow) classes, with intensive assistance for slow learners, such as repeating instructions to achieve independence. Teachers are advised to allocate 15 minutes per 30-minute session, prioritizing enthusiastic student responses to build class collaboration.

3.6.2 Implications for Curriculum Developers

Curriculum developers are recommended to integrate interactive media as a mandatory component of the Elementary School English Lesson Plan in the Merdeka Curriculum, with templates as documented: objectives, visual materials, 5E steps (engage via video, evaluate via quiz). The KTSP revision can add 20% weight to contextual digital content (e.g., local Semarang vocabulary), address disparities between Takhfiz and Science classes, and scale via free platforms such as Canva Education for accessibility in Muhammadiyah Elementary Schools in Central Java.

3.6.3 Implications for Teacher Training

Elementary school teacher training requires an 8-12 hour workshop module on interactive media design (video + quiz), focusing on limited duration adaptation and support for slower learners, as revealed in teacher interviews. Use the Teacher Design Team (TDT) for observation-based lesson plan practice, pre-post evaluation via self-efficacy scale, and collaboration with the English MGMP.

Discussion

Based on the results of the study, it shows that the use of image and video-based interactive media has been proven to contribute positively to the learning of English vocabulary among fourth-grade students at Muhammadiyah PK Andong Elementary School. Interactive media can increase students' focus, enthusiasm, and engagement, thereby improving their ability to understand and remember the vocabulary they have learned.

4.1 The Process of Applying Interactive Media in English Vocabulary Learning

The results of the study indicate that the use of interactive media has a significant positive impact on student motivation and engagement in the English vocabulary learning process. This is evident from the increased enthusiasm of students, who show high interest, greater focus, and actively answer quizzes and questions from the teacher. Interactive media, in the form of images, videos, and quizzes, enable students to understand the material more quickly even when learning time is limited.

These findings are in line with the results of studies by Fathoni (2024); Sabag-Shushan et al. [13]; and Sugita et al. [14], which state that interactive elements (gamification) can significantly increase student engagement because they provide an interesting and enjoyable learning experience. Furthermore, the use of virtual simulation-based media is in line with the opinion of Kartika Sari & Sasongko, [2] which shows that processes involving visual experiences and hands-on practice can increase student engagement and learning retention.

In line with this, Charlebois [15] and Rahmania [16] emphasize that instructional videos can increase student engagement and courage in pronouncing vocabulary, while Faridawati et al. [17] prove that interactive images can improve vocabulary retention at the elementary education level. Research conducted by Chen et al. [18] shows that the use of educational tools as learning media can increase students' interest and engagement in English learning in elementary schools. This confirms that the use of visual media not only

makes learning more enjoyable, but also significantly optimizes student participation.

These results are in line with Liu's research, [7] which found that interactive multimedia significantly improves students' vocabulary mastery because visual and audio elements help children understand the meaning of words and improve memory. Furthermore, research by Husein et al. [6] revealed that the use of the Wordwall platform can increase the motivation and activity of fourth-grade students because learning is packaged in an interesting and competitive way through interactive games. Similar findings were produced by Doni & Kaltsum [19], which showed that instructional videos increased students' courage to pronounce vocabulary aloud because students learned through visual examples and the voices of native speakers. In addition, Dey & Munshi [11] proved that interactive images effectively strengthened vocabulary retention in elementary school students because visualization helped students connect words with objects in a concrete way.

Kaltsum et al., [20] showed that the use of Lumio and Wordwall digital learning media began to increase teacher and student engagement in the learning process. Teachers were better able to develop varied learning media, while students showed greater interest and enthusiasm when learning activities used these applications compared to conventional learning, even though their integration was not yet fully optimal.

Thus, previous studies consistently support the findings of this study that interactive media provide an enjoyable learning experience, increase motivation, and accelerate the process of understanding English vocabulary in elementary school students.

4.2. Challenges in Implementing Interactive Media

Based on the results of the study, interactive media has been proven to help students understand English vocabulary. One of the most dominant obstacles in the application of interactive media is the limited allocation of learning time, as each meeting only lasts 30 minutes and English lessons are only held twice a week. Students with fast learning abilities can follow the flow of visual media-based learning, such as images and videos, well, but slow thinkers tend to need more time to process information. When interactive media is presented in a limited duration, some slow thinkers still need repetition and assistance in order to optimally understand the relationship between objects and terms in English. This condition shows that the effectiveness of media is not only determined by visual or audio quality, but also by the teacher's readiness to facilitate the diversity of student characteristics.

This is in line with several studies that reveal challenges and obstacles in the use of learning media, resulting in suboptimal learning. According to Somba [21], the use of interactive media does not produce optimal results if teachers are unable to manage the class effectively when student enthusiasm increases. Paldy et al. [22] state that interactive media does not produce significant improvements for students with low initial abilities. Savitri & Widagdo [5] also found that interactive media has the potential to reduce students' focus on the material if the elements of games and entertainment are more prominent than the lesson content. Thus, although this study shows the effectiveness of interactive media on students' vocabulary mastery, its successful implementation is still greatly influenced by the teacher's pedagogical skills, student readiness, and the balance between entertainment and learning content.

Several studies show different findings in dealing with challenges and obstacles. Research by Kim et al. [23] shows that interactive media can create an overly stimulating classroom atmosphere, making it difficult for teachers to maintain student focus. As a result, learning is not effective even though the media presented is interesting. These findings reinforce the results of Nurmahanani's research [24], which states that students with low initial abilities do not experience significant improvement in vocabulary mastery because they need intensive guidance that cannot be fulfilled solely through interactive videos or images. Meanwhile, Ardianto et al. [25] explain that some students are too focused on the game and entertainment aspects of interactive media, thereby reducing their attention to the core material .

Based on the results of research in fourth grade, the main obstacle in the application of interactive media in English vocabulary learning is the difference in learning abilities among students. Some students can follow the lesson quickly when interactive media such as pictures, videos, and quizzes are displayed, but students who are slow thinkers need more intensive assistance and repetition of the material in order to understand the vocabulary well. In addition, when interactive media are displayed, some students become overly enthusiastic, so teachers need to manage the class to maintain focus. Teachers also said that limited learning time meant that not all students had the same opportunity to repeat vocabulary through interactive quizzes. Thus, the obstacles in the application of interactive media are more related to variations in student abilities and classroom management when student enthusiasm increases.

4.3. Effective Strategies in Interactive Media-Based Vocabulary Learning

The results of the study show that learning success does not only depend on the quality of the media, but mainly on the scaffolding provided by teachers to students during the learning process. Teachers not only present images, videos, and interactive quizzes, but also actively guide students to imitate pronunciation, repeat vocabulary, mention the meaning of words, and provide immediate feedback after answering quizzes. This approach has been proven to help students with different learning abilities – both quick and slow thinkers – to understand the material according to their respective capacities.

These findings are in line with the research conducted by Laksana et al. [26] and Dewi, [27] which shows that the use of interactive multimedia will be more effective if teachers combine it with verbal guidance and feedback during learning. The research by Kim et al. [23] also confirms that Wordwall-based interactive media has the maximum impact when teachers position themselves as active facilitators, not just media presenters. Meanwhile, Ma et al. [28] state that vocabulary repetition strategies through videos accompanied by joint pronunciation imitation can increase students' courage in mentioning vocabulary independently. Additionally, Wiboolyasarini & Jinowati [29] state that the use of interactive images is most effective when students are directed to associate words with objects directly and say them aloud several times to build retention. These findings confirm that visual media play an important role as a stimulus for building high learning engagement.

On the other hand, several studies also show that teacher mentoring strategies cannot always guarantee successful learning if they are not balanced with effective classroom management. Lai's [30] research found that interactive media can be counterproductive if teachers only focus on mentoring students individually without controlling classroom

dynamics, because some students become too absorbed in game activities. Furthermore, Salomé et al. [31] stated that mentoring strategies are not sufficient to help students with very low abilities if they are not accompanied by adjustments to the pace of material delivery. Meanwhile, Dey & Munshi [11] revealed that interactive game strategies without time restrictions cause students to lose focus on the core material. These findings indicate that the effectiveness of interactive media-based learning strategies is highly dependent on the teacher's ability to manage time, manage the class, and balance the entertainment and core aspects of the lesson material.

Based on previous research and findings, it can be concluded that the most effective interactive media-based vocabulary learning strategy is one that combines media presentation with gradual guidance, immediate feedback, and enjoyable evaluation, accompanied by good classroom and time management. Interactive media is effective not because of the technology itself, but because of how teachers optimize its use according to student characteristics.

CONCLUSION

5.1. Novelty

This study offers novelty by proving the effectiveness of interactive media (images, videos, quizzes) in building motivation, focus, and engagement of fourth-grade students at SD Muhammadiyah PK Andong through visual-interactive meaning construction, rather than conventional memorization. The uniqueness lies in the adaptation of this strategy for slow-thinking students with the role of the teacher as a facilitator, which is rarely explored in the context of Muhammadiyah Elementary Schools in Central Java.

5.2. Limitations and Future Study

The study was limited to a short duration (30 minutes/session, twice a week) and the researcher's dependence on non-permanent media, so it was not optimal for all students. Future research is recommended to test long-term implementation with permanent media, multi-class samples, and quantitative instruments such as pre-post tests to measure vocabulary score gains statistically.

5.3. Implications and Suggestions

These findings imply the need for effective time management, pre-media guidance, and interactive quizzes to accelerate vocabulary comprehension. Practical suggestions: Teachers should integrate permanent media into the Merdeka Curriculum lesson plans; curriculum developers should provide digital templates; MGMP training should focus on facilitating slow learners for scalability at SD Muhammadiyah.

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