

Implementation of Wakelet-Based “Smart-Hub Media” to Enhance Critical Thinking and Self-Regulated Learning Among Students

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Abstract

In the era of digital educational transformation, the integration of innovative learning technologies plays a crucial role in shaping autonomous and high-order thinking skills among vocational school students. This research is motivated by the low critical thinking skills and self-regulated learning of tenth-grade MPLB 1 students at SMK Negeri 1 Kota Malang, due to the issue of using conventional and passive learning media. This research aims to implement Wakelet-based ‘Smart-Hub Media’ as an integrated digital ecosystem to improve both aspects. The method used is Classroom Action Research (CAR) based on Kurt Lewin’s model, conducted across two cycles with a subject pool of 30 students. Data on critical thinking were gathered via pre-test and post-test designs and subsequently analyzed using an Independent Samples T-Test, while self-regulated learning data were assessed using a percentage-based questionnaire. The results of the study showed a significant increase in students’ critical thinking skills, with the class average score soaring from 49.1 (initial) to 93.4 at the end of cycle II, successfully exceeding the Minimum Completion Criteria (KKM) with $t(\text{count}) > t(\text{table})$ at a significance level of 0.05. Concurrently, the self-regulated learning questionnaire yielded an average score of 84%, falling into the ‘Very High’ category. It is concluded that the implementation of Wakelet-based ‘Smart-Hub Media’ is effective and feasible for enhancing students’ critical thinking and self-regulated learning.

Keywords: Critical Thinking, Learning Media, Self-Regulated Learning, Smart-Hub Media, Wakelet.

1. Introduction

In the ever-changing global dynamics, technology plays a role as a bridge for humans in maximizing the technical skills needed to face the challenges of the times. This is in line with the opinion of Jayanti et al. (2023) who stated that technological developments greatly influence many aspects of life, including education or the learning process. In its implementation, a technology-based view focuses on a flexible and competency-based curriculum. This encourages the formation of an interactive learning ecosystem, which aims to provide students with problem-solving skills and prepare them mentally to face changes in the ever-evolving world of work. Learning is not only that, but it will also help humans to remain important, creative, and able to make meaningful contributions to the progress of civilization throughout the world. In fact, to make a meaningful contribution to education, everything starts with the fundamental aspects of the teaching and learning process. One such aspect is learning media in schools.



Learning media is a very important part of the teaching and learning process. This media can convey information in a more interesting way, so that students can more easily understand the essence of the lesson (Zulaika., 2022). This was also conveyed by Fauziah (2026) who stated that along with the development of the times, the use of multimedia technology such as videos, online quizzes, and interactive simulations has been proven to be very helpful for students in understanding difficult material in a more realistic and interesting way as a learning tool. One example of interactive learning media integrated with technology is Wakelet. Wakelet is an application that is easy to use for both teachers and students and is highly compatible with various LMS and other learning tools (Mahdiannur, 2021). Wakelet is also a platform that allows users to store, organize, display, and share content that has been stored in Wakelet in cyberspace (Sanjaya, 2023). Wakelet's role is certainly to help teachers in creating various learning activities in one ecosystem such as learning resources for students, teachers, and parents, bulletins, media for assessment, portfolios, projects, and educational games that can help students develop 5C skills, namely communication, critical thinking, collaboration, creativity, and curation.

One of the skills that students need to develop is critical thinking skills. Critical thinking ability is a thinking process that deeply finds the relationship between various disciplines to make a decision through a problem-solving process in a creative way (Setianingsih, 2024). Therefore, in the learning process at school, one effort to improve critical thinking skills is to select appropriate and precise learning media to address a problem in the classroom. This is in line with Rahmawati, (2022) who stated that critical thinking skills have an important role in solving problems in everyday life, one of the implementations of which is the selection of appropriate learning media as a bridge for a smooth learning process and encouraging students to improve critical thinking.

The function of learning media is not only as a means to improve critical thinking skills, but also to facilitate student access to facilitate direct activities in the learning process. This includes student independence or Self-Regulated Learning (SRL). According to Zimmerman, someone can be said to have self-regulated learning if they try to activate metacognition, behavior, and motivation in their independent learning process. Patimah, (2021) stated that independent learning is a process that involves self-adjustment starting with systematic planning, monitoring, controlling, and evaluating to achieve learning goals. Therefore, students who have good self-regulated learning will have an understanding in determining their own suitable learning strategies, managing emotional intelligence, having motivation, being able to control their time, as well as the tasks they have (Setyaningsih, 2020).

Conversely, students who lack self-regulated learning will struggle to be confident in facing life situations, especially in learning (Gandi et al., 2023; Rifqoh et al., 2026). Therefore, the role of learning platforms or media can help facilitate hands-on activities, which significantly contribute to developing self-regulated learning. Students with strong self-regulated learning are able to systematically manage their strategies, time, and motivation. This, in turn, contributes to improved learning patterns and influences students' critical thinking skills. Based on these challenges, this study aims to implement a Wakelet-based "Smart-Hub Media" as an integrated digital ecosystem to address learning limitations and enhance students' cognitive and behavioral outcomes. More specifically, this research seeks to answer the following operational research questions. How can the implementation of Wakelet-based "Smart-Hub Media" improve the critical thinking skills and Self-Regulated learning of tenth-grade MPLB 1 students at SMK Negeri 1 Malang.

2. Literature Review

Based on observations in Class X-MPLB 1 at SMK Negeri 1 Malang, efforts are needed to improve self-regulated learning and critical thinking. This is because the learning media in Class X-MPLB 1 still utilizes simple verbal and visual approaches, such as whiteboards, printed images, simple PPT, and stationery. These media are generally passive, require an active role from the teacher, and underutilize digital technology. Field research also shows that students don't have individual textbooks. This makes it difficult for them to organize their learning resources and makes it difficult for them to independently monitor their progress. Without an integrated platform, digital media's potential as a learning tool risks becoming a distraction for students. To address this issue, a platform is needed that acts as a unified and organized digital learning ecosystem within a single platform. Due to the lack of learning media, students are unable to demonstrate critical thinking patterns in each lesson. This is because students only learn during school hours using media provided by the teacher. However, when studying individually at home, students face limitations. Therefore, critical thinking patterns in X-MPLB 1 students are still lacking in their implementation. Only a few students are able to express their critical opinions regarding a phenomenon or case study in the lesson. Therefore, it is necessary to improve critical thinking skills and learning independence in students.

Empirical observations in Class X-MPLB 1 at SMK Negeri 1 Malang revealed that the current use of passive, traditional learning media heavily restricts student interaction and individual resource management, which directly correlates with low autonomy and weak analytical habits during lessons. Scholars have firmly established that text-heavy, unintegrated instruction induces cognitive passivity, whereas modern vocational instruction demands a shift toward student-directed regulation. Learners who actively manage their cognitive paths, monitor their progress, and utilize strategic planning demonstrate vastly superior knowledge retention and conceptual understanding (Rusdi et al., 2023). In the modern educational landscape, the optimization of both SRL and high-order cognitive development is increasingly facilitated through purposeful technology integration. Digital platforms should not merely act as static repositories but rather as immersive, interactive ecosystems that prompt critical reflection and logical problem-solving. Empirical findings reveal that integrating multimodal content (such as videos, simulations, and immediate feedback systems) inside organized tools like Wakelet can significantly enhance cognitive regulation, boost intrinsic motivation, and sharpen critical thinking by presenting authentic case studies (Kusmaharti & Yustitia, 2022).

This research aims to provide a solution in the form of a Wakelet-based "Smart-Hub Media." Wakelet was chosen as the main pillar (hub) because of its ability to curate various digital content into a single, systematic navigation. Within this ecosystem, several web platforms, such as Genially, present material interactively and visually to enhance learning monitoring. Digital quizzes include Quizalize, an interactive assessment platform used as an instant evaluation tool to provide rapid feedback to students. Platforms like Padlet are also available for end-of-lesson reflection sessions. The integration of several platforms in one container, "Smart-Hub Media", aims to facilitate the three main phases of Self-Regulated Learning according to Schunk and Zimmerman (Sugandi, 2013). There are three main phases in the independent learning cycle, namely: designing learning, monitoring learning progress while implementing the design, and evaluating learning outcomes in full. Through this "Smart-Hub Media" platform, students not only consume content, but also learn to manage their own knowledge acquisition process in one smart, creative digital gateway and of course improve student independence in organizing their learning resources.

2.1. Previous Research

This research is important to carry out considering that the existence of an interactive learning platform assisted by Wakelet shows that the presentation of material and media in learning is more adaptive to learn and is in accordance with the modern era and students' learning interests (Muttarisah et al., 2023). In addition, wakelet facilitates learning content, media sources, and the use of effective media technology to improve students' critical thinking (Ristiarni & Jatningsih, 2025). However, what differentiates this research from previous research is the media display aspect which makes it easier for students to follow the steps in independent learning. Wakelet is integrated into several web application features such as Genially as content material, Learning Videos, Quizalize and Quiziz as short assessments or quizzes, Google Drive as a place to collect assignments, and Padlet functions as a reflection at the end of learning into one ecosystem called "Smart-Hub Media". The features of Wakelet's "Smart-Hub Media" are tailored to meet specific needs, including discussion forums, evaluations, quizzes, and practice videos. These features encourage students to participate more actively, express their opinions, and provide a platform for learning anytime, anywhere. The purpose of this study is to implement a platform called "Smart-Hub Media" as a student learning medium to overcome problems and measure the differences in self-regulated learning and self-thinking of students in class X-MPLB 1 at SMK Negeri 1 Malang.

3. Methods

This research was conducted in class X-MPLB (Office Management and Business Services) at SMK Negeri 1 Malang with a population consisting of 30 students. The sampling technique was to provide treatment using learning media in the form of Smart-Hub Media assisted by Wakelet in the Basic Subject of the Expertise Program. Efforts to improve competency in solving learning problems are carried out collaboratively between students, teachers, and lecturers. This involves addressing problems encountered during learning and conducting evaluations that are then improved collaboratively using Classroom Action Research (CAR).

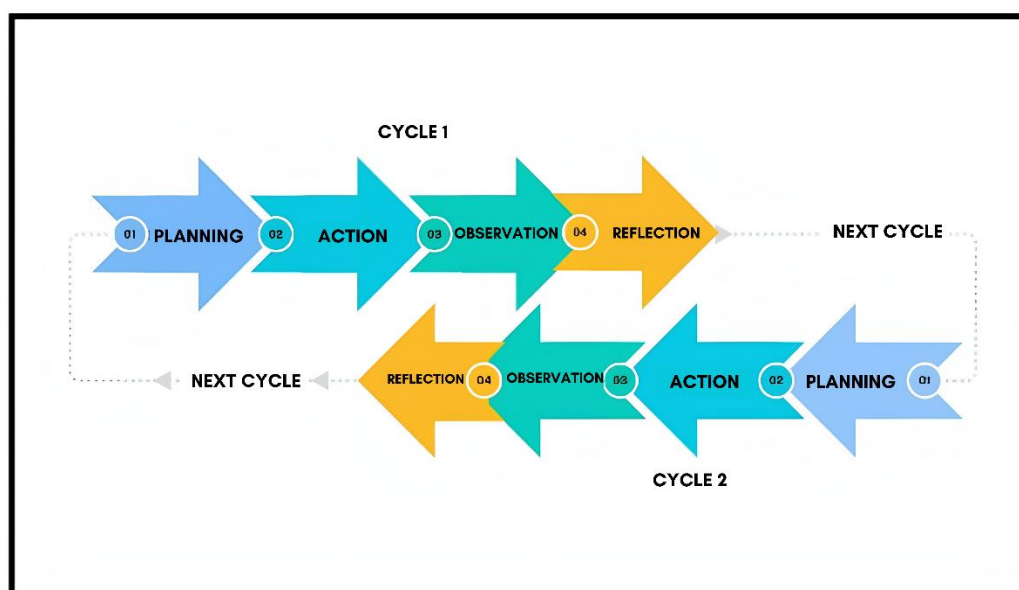


Figure 1. Classroom Action Research Flow Kurt Lewin's Action Research Model

Source: Utomo et al. (2024) modified by researchers

The classroom action research used is based on Kurt Lewin, which contains four steps in conducting PTK using the action research model, namely 1) Planning; 2) Action; 3) Observation, and 4) Reflection. This research was carried out by providing pre-cycle actions to determine initial capabilities and continued with the implementation of 2 cycles.

Before classroom implementation, the “Smart-Hub Media” platform underwent a formal digital learning media evaluation. The content layout, navigation structure, and technical feasibility of the integrated Wakelet ecosystem were validated by two Teaching Assistant students from the State University of Malang using a structured media validation questionnaire. Additionally, the 10 critical thinking essay items and the SRL questionnaire indicators were subjected to expert judgment review to evaluate their alignment with the curriculum competencies of Oral and Written Communication in the Office Management and Business Services (MPLB) program. This content validity check ensured that the case studies accurately stimulated high-order thinking and properly targeted metacognitive, motivational, and behavioral constructs.

This study uses data collection techniques in the form of tests to measure critical thinking skills in the form of pre-tests and post-tests completed by students, then the data is analyzed using an independent sample t-test to determine differences in students’ levels of critical thinking. To ensure objectivity and validity in measuring students’ critical thinking skills, the evaluation of the 10 case study essay questions was guided by a structured assessment framework adapted from Facione’s critical thinking indicators. Student responses were systematically graded using a 4-point analytical scoring rubric (scores 1 to 4) across four core dimensions of Interpretation, Analysis, Evaluation and Inference

Data collection to measure learning independence or Self-Regulated Learning (SRL) is done by using a questionnaire that has been filled out by observers and students, the data is analyzed using descriptive presentation by being given a questionnaire containing questions according to metacognitive, motivational, and behavioral indicators. The researcher served as both data collector and instrument. During the study, the researcher was assisted by two observers, both Teaching Assistant students from Universitas Negeri Malang. The topic or material used for the study is oral and written communication in Class X, Semester II.

4. Results and Discussion

4.1. Research Results

This research is using Wakelet-assisted interactive learning media in the form of “Smart-Hub Media” on Oral and Written Communication material, which is used in class X of the Office Management and Business Services expertise program. Smart-Hub Media can be accessed online at the following link: <https://wakelet.com/wake/nDKOCmxbhxyagsiig2wZB> which can be customized to suit your device, such as a mobile phone, tablet, or PC. This interactive learning media contains material that has been processed to be more engaging and structured without downloading it. This platform includes several multimedia learning tools that can enhance self-regulated learning, such as images, videos, assessments, games, and reflection forums. It also features numerous integrations with learning websites like Genially, Quizalize, and Padlet, all of which can support this learning tool in Class X-MPLB 1. The Smart-Hub Media interface is shown in Figure 2 below.

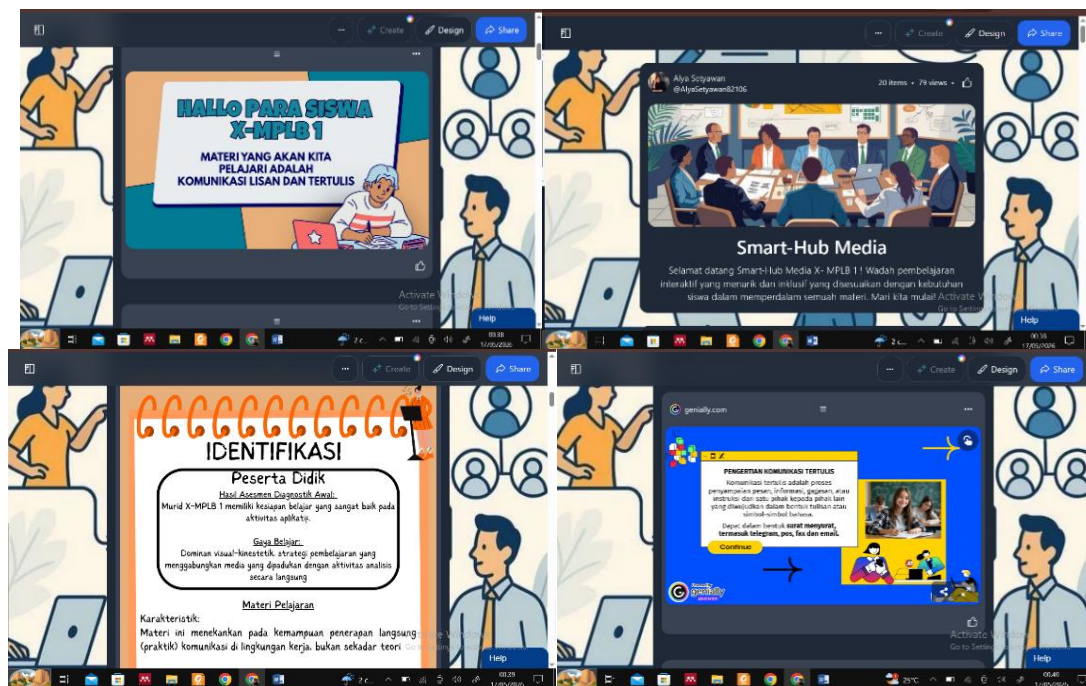


Figure 2. Smart-Hub Media Display for Improving Self-Regulated Learning

This research focuses on the implementation of “Smart-Hub Media” assisted by Wakelet in improving critical thinking skills and learning independence of class X-MPLB 1 students at SMK Negeri 1 Malang. The implementation of the action was carried out in two cycles, with cycle I taking place on April 28-29, 2026, cycle II on May 4-6, 2026. This research was conducted over three lesson hours, divided into 3 x 45-minute cycles. This time was deemed sufficient to conduct the research, which included planning, action, observation, and reflection.

4.1.1. Cycle I

In cycle I, the researcher carried out action planning, including preparing Deep Learning Lesson Plan with oral and written communication materials, preparing pre-test and post-test questions which were used for initial assessment of critical thinking skills in solving problems. The implementation of the actions in cycle I was carried out by conducting learning on the basics of office management with oral and written communication materials. Before the teacher presented the outline of the learning material, the teacher first gave pre-test I questions to determine students’ critical thinking skills regarding the subject matter to be taught. After completing the Pre-test I questions, the teacher delivered material to students about oral and written communication through “Smart-Hub Media” assisted by Wakelet which contained various materials in the form of case studies and real problems regarding the process of implementing communication in the office sector. The teacher provided instructions on how to access Smart-Hub Media so students could maximize learning on their devices. At the end of the lesson, students took a post-test on cycle 1 to measure their critical thinking skills after completing the first cycle.

Based on the actions in cycle I, the researcher reflected on the results of the implementation of the actions. To improve critical thinking skills through “Smart-Hub Media” assisted by Wakelet which contains various materials in the form of case studies and real problems has not shown maximum results as seen from students’ post-test scores. The problems faced include some students having quota constraints so they cannot access Smart-Hub Media during the learning process. Based on the reflection results, it can be concluded

that the implementation of learning in cycle I did not produce optimal results. Therefore, further action is needed in the form of cycle 2.

4.1.2. Cycle II

The implementation stages of cycle II research included: teachers preparing lesson plans with the same material, namely oral and written communication. Adding several case studies in the form of assignments on Smart-Hub Media. The teacher prepared Pre-test and Post-test questions for cycle 2. The methods used in learning were lectures, questions and answers, quizzes, and discussions on solving case study questions using Smart-Hub Media assisted by Wakelet in the entire teaching and learning process. The learning activities planned for cycle II are a revision of the deficiencies and weaknesses carried out in cycle I.

The implementation of actions in cycle II was carried out by carrying out learning in the form of material presentation by the teacher, then students completed individual or group assignments regarding the material and problems in office communication that had been provided on Smart-Hub Media. Before the teacher delivers the outline of the learning material, the teacher first gives Pre-test II questions to determine the students' abilities regarding the subject that will be taught. After completing the Pre-test II questions, the teacher delivered the material to the students, then the teacher introduced various concepts to the students and explained the principles of the material and asked the students to discuss them. Students completed assignments both individually and in groups using Smart-Hub Media throughout the classroom learning process. At the end of cycle II, students completed a post-test.

Based on the actions in Cycle II, the researchers discussed the results of the implementation. Efforts to improve students' critical thinking skills through Smart-Hub Media assisted by Wakelet have shown considerable results. This is evidenced by the high level of student engagement in learning activities and the satisfactory results of the post-test in Cycle II.

A. Critical Thinking

Table 1. Critical Thinking Test Scores Before and After the Intervention

Item	Cycle 1 Score		Cycle 2 Score	
	Pre-test	Post-test	Pre-test	Post-test
The highest score	68	86	88	100
Lowest Score	35	56	63	88
Total Score (30 Students)	1473	2273	2347	2802
Average	49.1	75.7	78.2	93.4
Sd. Deviasi	9.97	7.80	6.48	4.57
Varians	99.40	60.94	42.04	20.93

Source: Data processed by the authors (2026)

The table 1 above shows an increase in the average critical thinking skill score in each cycle. Therefore, the teaching and learning process using Smart-Hub Media, supported by Wakelet, has a positive impact on the learning process, as seen in the increase in the average class score in each cycle. The Pre-test score, consisting of 10 case study essay questions administered in cycle 1, showed an average of 49.1. This indicates that students' critical thinking skills in solving case study questions are low before any action is taken.

In Cycle I, classroom action was provided by introducing Wakelet-assisted Smart-Hub Media, which contains various links to materials and independent learning steps that students can utilize. After completing the learning activities, at the end of the cycle, students took a post-test and obtained an average score of 75.7. According to the post-test results, there was

an increase in the average score, but it did not meet the Minimum Completion Criteria (KKM) set by the school. Therefore, it was necessary to continue to Cycle II.

Cycle II in the second week began with students completing a Pre-test and obtaining an average score of 78.2. These results were not much different from the Post-test in cycle I. Therefore, the researcher continued the learning process using Smart-Hub Media assisted by Wakelet by prioritizing students solving a problem in the material of oral and written communication in the office. All students have access to Smart-Hub Media, allowing them to independently organize sub-topics. This allows students to become more familiar with and understand the learning better than in Cycle I. This is clarified by the post-test results in Cycle II, which obtained an average score of 93.4, categorized as very good and meeting the Minimum Completion Criteria (KKM). The results in Cycle II demonstrated an improvement in students' critical thinking skills in answering case study questions.

Table 2. Results of the Influence of Actions

Cycle 1	
t count	11.53
T table (5%)	2.00
Conclusion	HO Rejected
Cycle 2	
t count	10.46
T table (5%)	2.00
Conclusion	HO Rejected

Source: Data processed by the authors (2026)

Tables 2 shows the results of the influence of the action using the Independent Sample T-Test method with a calculated t value of 11.53 and a t table (5%) of 2.00. Then the results in cycle II were calculated t value of 10.46 and a t table (5%) of 2.00. The results of the two cycles indicate that the calculated t value is greater than the t table. This means that Ho is rejected, meaning there is a difference. Therefore, in cycle I and cycle II, it was concluded that there was an influence of learning using Smart-Hub Media on the average value of students' critical thinking skills.

B. Self-Regulated Learning

Table 3. Classification of Self-Regulated Learning

Category	Percentage
Very high	81% - 100%
High	61% - 80%
Medium	41% - 60%
Low	21% - 40%
Very low	0% - 20%

Source: Data processed by the authors (2026)

Table 4. Average Self-Regulated Learning Scores of Class X-MPLB 1

No.	Indicator	Sub-questions	Results
1.	Metacognitive	1) Able to make a study plan such as determining what to study, determining study time, and determining study steps to achieve better learning results independently.	85%

No.	Indicator	Sub-questions	Results
		2) Able to determine what you want to achieve after studying, and can determine learning goals according to what you like and need.	
		3) Able to assess whether by using Wakelet, learning activities become effective and learning objectives are truly achieved.	
		4) Able to assess whether by using Wakelet, learning activities become effective and learning Before ending the study session, be able to recheck the entire sequence of materials in Wakelet to ensure that no links, videos, or assignments are missed.	
2.	Motivational	1) Able to do tasks without depending on other people and confident in being able to complete them well	82%
	2) Enjoy studying the material on Wakelet because the visual display and variety of media mean you don't get bored quickly.		
	3) Believe that learning through Wakelet helps me understand the material more deeply than just reading a textbook. This is because it provides various links to reference sources.		
3.	Behavior	1) Able to choose a learning model that suits your interests, such as reading textbooks, listening to explanations, or watching explanatory videos on Wakelet media.	84%
	2) Able to consciously keep digital distractions away, such as closing YouTube/game tabs or turning off message notifications, while I study the material on Wakelet.		
	3) Able to create a conducive learning environment such as arranging a comfortable place, avoiding distractions such as turning off cell phone notifications, providing the necessary stationery and managing time so that learning is more focused and effective.		
Average			84%

Source: Data processed by the authors (2026)

Table 4 shows that the average self-regulated learning results for X-MPLB 1 students are 84%, which is categorized as very high according to Arikunto (2010). In the metacognitive aspect, with the achievement of 85% of class X-MPLB 1 students, it means they are able to plan, determine, and organize learning goals, and are able to monitor their own development and evaluate their learning activities independently. The motivational aspect with a result of 82% shows that the class is more confident, responsible, and motivated to learn without relying on others. The behavioral aspect of 84% means that the class is able to adjust their behavior in learning, such as adjusting the type of learning, behavior and conditions for effective learning. Finally, it is concluded that Smart-Hub Media assisted by Wakelet is able to improve students' self-regulated learning.

C. Teacher and Student Activity Actions

Learning activity data was obtained from observations with two observers, and obtained through field notes on student and teacher activities in the Wakelet-based “Smart-Hub Media” implementation to improve critical thinking and self-regulated learning for students. The success of teacher activity actions can be seen in Table 5 below:

Table 5. Teacher Activity Performance Across Cycles I and II

No.	Aspect	Cycle I		Cycle II	
		%	Description	%	Description
1.	Pre-Learning	100%	Very good	100%	Very good
2.	Learning Activities	100%	Very good	100%	Very good
3.	Main activities	100%	Very good	100%	Very good
4.	Closing Activities	100%	Very good	100%	Very good
Average		100%	Very good	100%	Very good

Source: Data processed by the authors (2026)

Table 5 confirms that the success of teacher activities during the implementation of Wakelet-based “Smart-Hub Media” from cycle I to cycle II is at the “Very Good” level. Teachers have prepared RPMs that are aligned with the subject matter before the teaching and learning activities begin. Teachers create an ideal situation at the initial stage of learning so that students are ready to receive learning. The main activities in cycles I and II were implemented in the same manner. The main activities began with the provision of a stimulus in the form of 10 essay Pre-test questions on oral and written communication. After students completed the pre-Post-test questions, the teacher provided feedback on their results. The teacher then assisted students in acquiring knowledge using Smart-Hub Media with Wakelet. Students explore their knowledge of the media. At the end of the core activities, students begin to understand the use of Smart-Hub Media in their learning process. At the end of the cycle, they continue with post-test work. The learning activity concludes with a collaborative evaluation and reflection.

4.2. Discussion

This research produces interactive learning media by utilizing digital features to display material discussions that are more concise and easier to understand, making it easier for students to explore learning media. Wakelet is a feature that can be used by educators to create learning content and design a more varied learning process, not just in the form of lectures or a set of ordinary instructions (Fidiastuti et al, 2022). This study produced a Wakelet-assisted Smart-Hub Media containing learning materials such as videos, images, quizzes, games, reflection forums, and discussions that support student learning to be more independent and enjoyable. The reason for choosing Wakelet was because of its ease of integration with interactive learning media assisted by Wakelet, which has been proven to support the improvement of student self-regulated learning. This is evidenced by the many features in the learning media that facilitate exploration and provide students with interest in independent learning.

Before the introduction of Wakelet-assisted Smart-Hub Media, students only learned using conventional learning media, which resulted in less-than-optimal learning independence, as they were accustomed to relying on teacher-provided materials. Students also lacked textbooks, so learning took place solely at school. At home, students struggled because they lacked a learning platform that facilitated learning anywhere and anytime. The implementation of Smart-Hub Media assisted by Wakelet for X-MPLB 1 students at SMK Negeri 1 Malang was carried out in coordination with the school and teachers, preparations

such as gadgets, internet connections and tools needed during learning. This research was assisted by two teaching assistant students as observers. The implementation phase began with the provision of stimuli to guide students toward the signs. The stimulus was provided through a Pre-test consisting of 10 essay questions to initially assess students' critical thinking skills. After the stimulus is given, students are introduced to the Wakelet-assisted Smart-Hub Media which includes instructions for use, materials, learning videos, quiz games, a place to collect assignments and a reflection forum at the end of the lesson. Teachers and students identified issues they encountered, such as accessing Smart-Hub Media during the lesson. At the end of the first cycle, students' critical thinking skills were demonstrated through a post-test.

In cycle II, it begins by giving a Pre-test to start the session before continuing learning. The main activity in this cycle is to provide students with opportunities to complete individual and group assignments on case studies and real-world problems presented in Smart-Hub Media. All student learning processes utilize these media and are monitored by the teacher and two observers. In Cycle II, it began to become apparent that students were more comfortable using Smart-Hub Media in the classroom learning process. At the end of Cycle II, students were given a post-test, similar to the one in Cycle I, to assess their critical thinking skills.

The results of the Pre-test and Post-test in cycle I showed that the t count was 11.53 and the T table (5%) was 2.00. This means that there was a change after the action was carried out with an average Pre-test value of 49.1 and a Post-test of 75.7. There was an increase in the average value in cycle I but it was not optimal. Therefore, it was continued in cycle II with the acquisition of t count of 10.46 and T Table (5%) with a result of 2.00 with an average Pre-test value of 78.2 and a Post-test of 93.4 which showed that the results of cycle II showed significant changes in students' critical thinking skills. In cycle II, the average student score increased, surpassing the Minimum Completion Criteria (KKM). This is evidenced by the rejection of H_0 in both cycles. Therefore, the implementation of Classroom Action Research using Smart-Hub Media with Wakelet's assistance successfully improved students' critical thinking skills.

The integration of various web application links into interactive learning media can improve three indicators of self-regulated learning including metacognitive, motivational, and behavioral. This aligns with research (Prameswari et al., 2019) that found that self-regulated learning using interactive web-based media can maximize the independence of students' thoughts, feelings, and actions to achieve their desired goals. In the study by Agustin and Firmansah (2025), it was also stated that web-based interactive media was successful in increasing students' learning independence. The Smart-Hub Media research assisted by Wakelet resulted in a self-regulated learning questionnaire for class X-MPLB 1 students of 84%, which means it is in the very high category and can be said to be successful. In the metacognitive aspect, with 85% of students achieving this, it means they are able to plan, determine and organize learning objectives, students are able to monitor their own development and evaluate their learning activities independently.

The motivational aspect with a result of 82% shows that students are more confident, responsible, and motivated to study without depending on other people. The behavioral aspect of 84% means that the class is able to adjust their behavior in learning, such as adjusting the type of learning, behavior and conditions for effective learning. Therefore, it is concluded that Smart-Hub Media assisted by Wakelet is able to improve self-regulated learning of class X-MPLB 1 students in the learning process. This pattern implies that tech-integrated vocational instruction must go beyond structural usability; it requires teachers to intentionally embed

gamified feedback loops, peer collaboration, and highly contextualized industry case studies within the platform to elevate student engagement and internalize their learning motivation

5. Conclusion

This study has explained the implementation of interactive learning media assisted by Smart-Hub Media assisted by Wakelet which helps improve students' critical thinking skills and learning independence in oral and written communication materials in the basic subjects of the expertise program in class X-MPLB 1. Tests on the implementation of classroom action research in cycles I and II showed significant differences in critical thinking and self-regulated learning outcomes. Therefore, it was concluded that Smart-Hub Media is suitable for use in classroom learning, as validated by researchers, teachers, observers, and students.

In the ongoing process, it is recommended that teachers further enrich learning media that encourage students to explore the media being studied. Teachers are advised to pay more attention to students' understanding in learning so that students have a deeper understanding and self-control in learning. Students should strive to be bold in expressing their opinions and actively participate in discussions. Future researchers are advised to pay more attention to media content to provide more accurate, up-to-date examples, with a more organized and structured presentation to ensure students' understanding is clear and understandable. They should also provide more effective and meaningful media visuals. Crucially, to validate and extend these findings, future research should focus on replicating this study across multiple classes or different schools, and adopting quasi-experimental or experimental methodologies that incorporate a distinct comparison group.

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