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The Use of H5P Interactive Video as a Learning Medium to Improve Vocational High School Students' Learning Outcomes

Andriansyah Wahyu Eko Prastya*, Arie Eko Cahyono, Noviana Mariatul Ulfa

Universitas PGRI Argopuro Jember, Jawa St. No.10, Jember, East Java, 68121, Indonesia
*Corresponding author, email: andriansyahwahyu452@gmail.com

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Abstract
This classroom action research (CAR) was conducted to improve student learning outcomes in a vocational high school through the integration of H5P-based interactive video within a Problem-Based Learning (PBL) model. The study involved two cycles consisting of planning, implementation, observation, and reflection. In Cycle 1, students engaged with H5P videos containing embedded quizzes and participated in collaborative discussions. However, only 33.33% of students reached the minimum mastery criteria. Based on these results, improvements were made in Cycle 2, including the use of guiding questions and individual accountability strategies. The second cycle showed significant improvement, with 83.33% of students achieving learning mastery. The findings suggest that H5P-based interactive videos effectively enhance engagement, participation, and conceptual understanding among vocational students. The use of interactive video not only supports independent learning and collaboration but also stimulates higher-order thinking skills through visual, auditory, and contextual input. Therefore, integrating H5P interactive media into PBL is a promising approach for improving student performance in vocational education.

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1. Introduction

In the context of education in Indonesia, especially in relation to the role of vocational high schools, it is crucial to understand how the education system must adapt to address industry needs and improve the quality of the workforce. Quality education is key in creating globally competitive human resources. This is where the implementation of various relevant and innovative educational strategies becomes important.

First, the creative-productive learning approach, as described by Ali et al. (2023), is very effective in improving the work readiness of vocational students. Their research shows that the Teaching Factory model can be a rich method of real practice, helping students develop the skills needed in the workplace. This aligns with the importance of learning technology integration in improving teaching effectiveness and preparing students for the ever-evolving world of work (Subroto et al., 2023).

Despite these objectives, vocational high schools face several challenges in the learning process. One of the main issues is student dissatisfaction with certain subjects, particularly those perceived as difficult or monotonous. To address this challenge, the implementation of more interactive and engaging learning media presents an effective solution. One increasingly popular medium is the interactive video, which not only presents information visually but also allows students to interact directly with the content. Interactive videos incorporate various elements such as quizzes, practice questions, and simulations that enable students to assess their understanding of the subject matter. Interactive video development is also applied in various educational contexts. Hidayah et al. (2023) reported that interactive learning videos designed with a combination of sound, motion, and text elements can significantly improve students' concept understanding.

H5P is an open-source platform that allows educators to develop interactive learning content, including videos. It enables the integration of various interactive components such as quizzes, questions, and simulations into instructional videos. These elements enhance student engagement and encourage active participation in the learning process. One relevant study suggests that interaction in videos can enhance the personalized learning experience, where students engage in quizzes and activities integrated into the videos (Akram et al., 2023).

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The use of interactive videos in education is expected to improve students' learning outcomes. Unlike traditional passive learning methods, interactive videos encourage students to actively engage with the content, which increases their involvement in the learning process. These findings align with the results of other studies that state the use of fun methods in learning, such as integrating educational games, can increase student interest and enthusiasm (Muhtarom et al., 2022). Numerous studies have demonstrated that learner interaction with educational media increases motivation and engagement, ultimately improving academic performance.

H5P, as an HTML5-based interactive learning platform, offers educators the ability to design and deliver learning videos tailored to students' needs and characteristics. According to Rahmi et al. (2024), H5P has been shown to be effective in facilitating understanding through direct interaction, which is a vital element in the teaching and learning process. This is reinforced by other studies that show H5P can enhance collaboration and communication among students, helping develop their social and interpersonal skills in a blended learning context.

The effectiveness of interactive videos in enhancing comprehension has been validated in various studies. Mayer (2009), in his research on multimedia learning, concluded that interactive media such as videos containing quiz elements can enhance students' understanding of course material. This occurs because learners are given opportunities to test their knowledge, reinforce their understanding, and improve memory retention. Furthermore, interactive videos allow students to review difficult content and receive immediate feedback, which assists in correcting misconceptions.

The cognitive theory of multimedia learning suggests that learners process information more effectively when it is presented through multiple sensory modalities, such as visual and auditory channels. For example, interactive videos combine text, images, sounds, and animations, which facilitate more efficient information processing. As stated by Mayer (2014) in *The Cambridge Handbook of Multimedia Learning*, presenting information through dual channels allows for deeper cognitive processing, which enhances comprehension. Therefore, the use of interactive videos, which integrate multimedia elements, aligns with cognitive learning theory and is expected to improve learning outcomes.

Vocational high schools have a strategic role in preparing students with practical skills applicable to industry settings. Learning in vocational education should not only focus on theoretical content but also offer opportunities for students to observe and understand how concepts are applied in practice. Interactive videos provide a solution by linking theory with real-world application, as students can observe how subject matter is implemented in authentic scenarios. Direct interaction in learning plays a crucial role in improving student engagement and concentration. Through this interaction, students are not only passive recipients of information, but also play an active role in the learning process. Research shows that active learning methods, such as group discussions and problem-based learning, can significantly improve student performance in science, technology, engineering, and math (Freeman et al., 2014).

The success of implementing interactive videos depends significantly on the quality and relevance of the media used. Educational media that match students' characteristics and the subject matter have been shown to significantly enhance learning outcomes. Interactive videos, which provide both visual and auditory stimuli, support comprehension and offer flexible access to content anytime and anywhere. The use of interactive video media in the context of learning in vocational high schools can increase the effectiveness of student learning by providing opportunities to practice the practical skills taught and reinforce the theory already learned (Fitrisia et al., 2023).

The advancement of information and communication technologies offers significant opportunities for creating more effective learning environments. Through the use of interactive videos, students can engage with educational content in a more dynamic and enjoyable manner. This not only improves conceptual understanding but also helps students develop essential digital skills required in today's technology-driven industries. As such, integrating technology into teaching and learning is particularly relevant for vocational high schools, which aim to prepare students for technologically advanced workplaces.

This study also aims to explore the extent of student and teacher acceptance of interactive videos, including those developed using H5P, as an instructional tool. The research employed a classroom action research (CAR) method involving observations and interviews. Expected outcomes include the development of interactive learning videos (e.g., H5P-based videos) that can be used in teaching, as well as research findings that provide recommendations for integrating interactive videos in classroom settings. It is anticipated that incorporating H5P videos will enhance student engagement and improve learning outcomes.

The integration of interactive learning technologies, particularly H5P-based videos, has been shown to increase student engagement and improve comprehension of instructional material. H5P supports the development of interactive multimedia content that incorporates quizzes, tasks, and live discussions, thereby fostering active learning. In a study by Yaas (2024), it was found that the application of interactive content in

the form of videos and interactive books can increase student engagement in receiving material, showing that this media serves as a means of delivering information as well as a tool to increase student engagement and motivation to learn. Interactive videos have been shown to be one of the effective tools in improving student recall, as revealed by Hidayah et al. (2023), who pointed out that the interactive features in this medium allow students to repeat the material in a more in-depth and interesting way. H5P, as a tool for creating interactive content, has been shown to encourage student participation in discussions and problem solving, leading to better learning outcomes (Rikawati & Sitinjak, 2020).

The integration of interactive learning technologies, particularly H5P-based videos, has been shown to increase student engagement and improve comprehension of instructional material. The use of interactive videos also has a positive impact on the understanding of the concepts of the material learned, especially in distance learning situations where students need resources that can be accessed independently (Bello, 2023; Sudira et al., 2023).

2. Method

This study employs a quantitative approach with the type of classroom action research (CAR), which aims to improve student learning outcomes through the use of H5P-based interactive video media. The subjects of this study were tenth grade students at a vocational high school, along with the subject teacher. The research was conducted at the school where the researcher teaches, over the course of one semester during the current academic year.

The research was carried out in several cycles, each consisting of the following stages: problem identification, action planning, implementation of action, observation and data collection, reflection on action, and revision and planning of the subsequent cycle. During the problem identification stage, the researcher conducted interviews with teachers and students, and analyzed previous student learning outcomes to identify challenges encountered in the learning process.

In the action planning stage, the researcher designed H5P-based interactive videos tailored to the subject matter and prepared a lesson plan that integrated the use of the video. During the implementation stage, the interactive videos were used in the teaching and learning process in the classroom. Students were encouraged to actively participate by answering quizzes and engaging in discussions after viewing the videos.

Observation and data collection were conducted systematically by recording student interactions throughout the learning process and collecting learning outcome data through quizzes, formative tests, and documentation of classroom activities. In the reflection stage, the researcher analyzed and compared learning outcomes before and after the intervention to evaluate the effectiveness of the H5P-based learning media.

Based on the results of this reflection, the researcher collaborated with the partner teacher to revise and plan improvements for the following cycle, with the aim of refining instructional strategies. Data collection techniques in this study included learning outcome assessments and documentation, using instruments such as observation sheets, interview guides, and evaluation questions. The data analysis was conducted using a comparative descriptive technique to assess the improvement in student learning outcomes across cycles.

Finally, the researcher compiled a comprehensive report of the research process, including findings and recommendations. This report was submitted to the school and shared with fellow teachers as a basis for evaluating and developing future technology-based learning practices.

3. Results and Discussion

3.1. Results

In this study, the implementation of Cycle 1 involved the use of H5P-based interactive video as a learning medium in the classroom. The purpose of this intervention was to improve student learning outcomes by presenting the material in a more engaging and easy-to-understand format. Activities in Cycle 1 included playing interactive videos, administering embedded quizzes, and facilitating active discussions with students after viewing the videos. The researcher observed the learning process and collected data through post-lesson achievement tests. The results of the Cycle 1 test are presented in Figure 1, which illustrates an improvement in student learning outcomes following the use of the H5P interactive video.

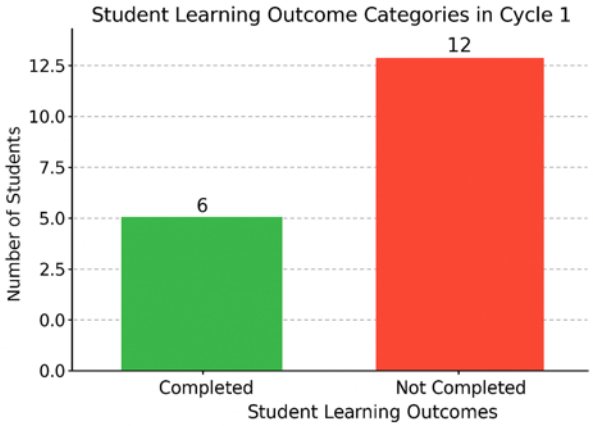

Figure 1. Cycle 1 Results

Based on Figure 1, it is shown that in Cycle 1, 6 students achieved the minimum mastery criteria, while 12 students did not, resulting in a classical completeness rate of 33.33%. Since this percentage is still below the expected standard of 75%, Cycle 2 was conducted as a follow-up to enhance learning outcomes. The test results at the end of Cycle 2 are presented in Figure 2.

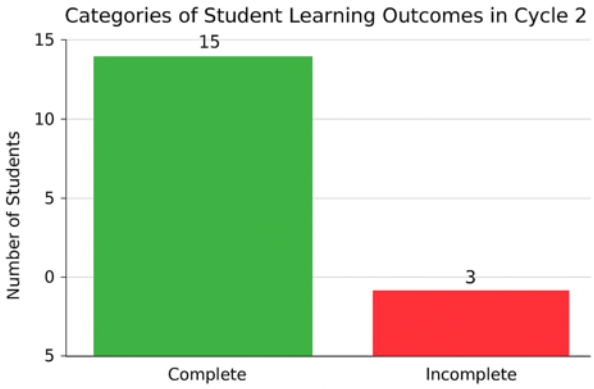

Figure 2. Cycle 2 Results

According to Figure 2, 15 students achieved complete learning outcomes, while only 3 students did not meet the criteria. This resulted in a classical completeness of 83.33%, indicating a significant improvement in student performance compared to the previous cycle. As the completeness rate exceeded the minimum threshold of 75%, conducting Cycle 2Iwas deemed unnecessary.

A summary of the results from Cycle 1 and Cycle 2 is presented in Figure 3.

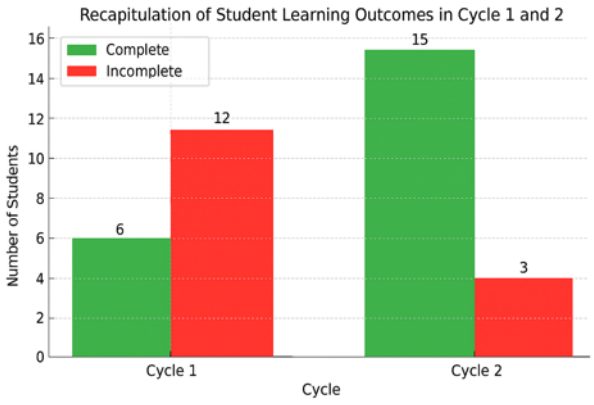

Figure 3. Learning Outcomes Summary

3.2. Discussion

This research was conducted in one of the vocational high schools using the Classroom Action Research (CAR) model, which consists of four stages: planning, implementation, observation, and reflection. In the learning process, H5P-based interactive video media was utilized and integrated with the Problem-Based Learning (PBL) model as an effort to improve student learning outcomes.

Moreover, the integration of H5P with the PBL model is considered effective in fostering a deep understanding of concepts. Problem-Based Learning (PBL) has been proven effective in stimulating students to think critically and solve real problems related to everyday life. Sartika et al. (2024) asserted that PBL encourages students to actively seek solutions, which when combined with interactive media such as H5P makes students' learning experience more contextual and interesting. Research by Metri (2022) also shows that PBL requires students to think critically and analytically and to use learning resources that are relevant to the problems they face. In this context, the role of interactive media in PBL becomes very important in strengthening students' understanding of the subject matter.

In the context of vocational education, this approach is particularly suitable, as vocational high school students require a strong grasp of practical applications. The use of technology-based media, particularly interactive videos, has been shown to be significant in improving higher-order thinking skills in students, including analysis, evaluation, and synthesis of information. Hayya' (2023) points out that the integration of technology in learning allows students to engage actively and more deeply in the learning process. The use of interactive videos increases student engagement by presenting more engaging content, which allows students to understand the material more effectively and actively participate in the learning that takes place.

In the context of using H5P in learning, research shows that this technology not only provides opportunities for students to learn independently, but also encourages collaboration among them. Damayanti and Nuzuli (2023) state that H5P allows students to engage in interactive learning experiences, giving them the opportunity to actively participate in the educational process. Interactive features such as quizzes, reflective questions, and external links can increase student activity and support their involvement in meaningful learning.

In Cycle 1, the teacher implemented PBL with the support of H5P interactive videos as a stimulus to spark students' curiosity about the material. These videos helped students understand phenomena visually and contextually. After watching the video, students were directed to engage in group discussions, complete the student worksheet, and present the results. An evaluation at the end of Cycle 1 showed that out of 18 students, 6 (33.33%) achieved mastery, while 12 (66.67%) did not. This indicated that most students had not yet met the minimum criteria for mastery, necessitating improvements in the next cycle.

Reflections from Cycle 1 revealed several areas for improvement, such as low student engagement and the dominance of certain group members during discussions. As a follow-up, in Cycle 2, the teacher provided more structured guiding questions, offered rewards for active students, and required each student to write their name on the LKPD as evidence of individual participation. H5P video media was reused with variations and relevant topics to maintain student interest.

The evaluation results of Cycle 2 indicated a significant improvement in student learning outcomes. A total of 15 students (83.33%) achieved mastery, and only 3 (16.67%) did not. This suggests that the use of H5P interactive videos within the PBL model effectively enhanced student learning outcomes.

With a classical completeness rate of ≥ 75% achieved in Cycle 2, a follow-up cycle was deemed unnecessary. Based on the findings, it can be concluded that the use of H5P interactive video media is effective in improving student learning outcomes in vocational high schools, as it successfully captures attention, increases active participation, and aids in conceptual understanding through engaging and contextual visualizations.

4. Conclusion

Based on the results of the research conducted over two cycles, it can be concluded that the use of H5P-based interactive videos within the Problem-Based Learning (PBL) model effectively improves the learning outcomes of vocational high school students. This is evidenced by the increase in the number of students who achieved mastery, from 6 students in the first cycle to 15 students in the second cycle. The average class score also increased, along with a significant improvement in overall learning mastery. This improvement occurred because students were more actively engaged in the learning process, supported by relevant video stimuli and appropriate reflection strategies implemented by the teacher. These findings suggest that H5P interactive videos can be effectively utilized as a learning medium to enhance student achievement.

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