

Improving Student Learning Outcomes through the Use of Website-Based Learning Media in Elementary Schools

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ABSTRAK

Penelitian ini bertujuan untuk meningkatkan kemampuan belajar siswa dengan menggunakan media pembelajaran berupa website dalam materi metamorfosis untuk kelas empat SD Negeri Cempereng. Penelitian ini dilatar belakangi oleh hasil belajar siswa yang masih rendah karena kurangnya penggunaan media visual dan interaktif dalam pembelajaran IPA. Penelitian ini merupakan Penelitian Tindakan Kelas (PTK) yang berlangsung dalam dua siklus. Subjek penelitian adalah 23 siswa kelas empat. Data yang dikumpulkan melalui tes hasil belajar, observasi, dan kuesioner. Hasil penelitian menunjukkan bahwa nilai rata-rata siswa meningkat dari 66,3 pada tahap pra tindakan menjadi 74,1 pada siklus pertama dan 83,2 pada siklus kedua. Tingkat ketuntasan belajar juga naik dari 39,1% menjadi 91,3%. Media pembelajaran berbasis website mampu menampilkan materi secara menarik dengan menggunakan kombinasi teks, gambar, video, serta kuis interaktif. Selain itu, partisipasi dan semangat belajar siswa juga meningkat. Dengan demikian, media pembelajaran berbasis website terbukti efektif dalam meningkatkan hasil belajar siswa dan dapat dijadikan alternatif pembelajaran IPA yang sesuai dengan kebutuhan karakteristik siswa sekolah dasar.

Kata Kunci: media website; hasil belajar; metamorfosis

ABSTRACT

This study aims to improve students' learning abilities by using website-based learning media for metamorphosis material for fourth-grade students at Cempereng State Elementary School. This study was motivated by low student learning outcomes due to the lack of use of visual and interactive media in science learning. This study is a Classroom Action Research (CAR) that took place in two cycles. The subjects were 23 fourth-grade students. Data were collected through learning outcome tests, observations, and questionnaires. The results showed that the average student score increased from 66.3 in the pre-action stage to 74.1 in the first cycle and 83.2 in the second cycle. The learning completion rate also increased from 39.1% to 91.3%. Website-based learning media is able to present material in an interesting way by using a combination of text, images, videos, and interactive quizzes. In addition, student participation and enthusiasm for learning also increased. Thus, website-based learning media has proven effective in improving student learning outcomes and can be used as an alternative science learning that suits the needs and characteristics of elementary school students.

Keywords: website media; learning outcomes; metamorphosis.

INTRODUCTION

Natural Science (IPA) learning at the elementary school level plays a crucial role in developing students' scientific thinking skills from an early age. Metamorphosis is a particularly complex topic, as it involves biological processes that are difficult to observe directly in students' daily lives (Susanto & Lestari, 2023). This fact suggests that science learning needs to be accompanied by media that is not only textual, but also visual and interactive.

Based on Piaget's cognitive development theory, students aged 9–10 are in the concrete operational stage, so their understanding is more optimal when using visual and contextual media (Fatmawati & Kurniawan, 2023). This is reinforced by Piaget's Dual Coding theory, which states that information presented in verbal and visual forms is more easily processed and remembered by students (Mayer, 2021).

In this context, website-based learning media is a strategic alternative that integrates text, images, animations, videos, and interactive quizzes in one dynamic learning platform (Nugroho & Pratiwi, 2024). Websites developed with pedagogical principles can facilitate different learning styles, such as visual, auditory, and kinesthetic (Putri & Hamdan, 2024). Furthermore, this medium encourages independent, flexible, and exploration-based learning by students (Widiyanti & Darmawan, 2023).

Mayer's (2020) Multimedia Learning Theory explains that learning is more effective when information is delivered simultaneously through visual and verbal channels. Websites fulfill this criterion by presenting interactive content, including metamorphosis animations, simulations, and HTML-based quizzes that can be accessed anytime. Furthermore, constructivist theory emphasizes that students will better understand material if they actively construct knowledge from their exploratory experiences (Fatmawati & Kurniawan, 2023; Dewi & Hartati, 2022).

On the other hand, the Independent Curriculum emphasizes the importance of differentiated and technology-based learning. Website-based learning media supports this because it allows students to adjust their learning pace and provides space for digital collaboration and communication (Prasetya & Mahardika, 2023). Furthermore, Siemens' connectivism theory also demonstrates its relevance, emphasizing that learning in the digital age must be connected to various sources of information and technology (Fauzi & Putra, 2021).

Research by Susanto and Lestari (2023) showed that using website media in fourth-grade science learning increased students' average grades from 67 to 83 after two cycles of action. Similar results were found in a study by Widiyanti and Darmawan (2023), who reported a 38% increase in student understanding and retention on the topic of the water cycle when using interactive websites.

However, technical constraints such as a lack of teacher training and limited ICT devices in schools are major obstacles to the widespread implementation of this media (Pratiwi & Rahayu, 2023). Therefore, it is necessary to develop innovative, technology-based learning practices that are based on the real conditions and needs of elementary schools.

Given the low student learning outcomes in metamorphosis and the potential of website-based learning media, this study aims to describe and analyze improvements in science learning outcomes through the implementation of such media. The focus of this research is not only on learning outcomes but also on student engagement and the overall effectiveness of the website-based learning process in fourth grade at Cempereng Public Elementary School.

METHOD

This study used the Classroom Action Research (CAR) method, aiming to improve the learning outcomes of fourth-grade students at Cempereng Public Elementary School through the use of website-based learning media. This approach was chosen because it allows teachers and researchers to directly improve learning in the classroom through a systematic and reflective process. The subjects in this study were 23 fourth-grade students in the even semester of the 2024/2025 academic year. The subject taught was metamorphosis, part of the Natural and Social Sciences (IPAS) subject in accordance with the Independent Curriculum. The research was conducted in two cycles, each consisting of four stages: planning, implementation, observation, and reflection.

Data collection techniques used learning outcome tests, student activity observation sheets, and student response questionnaires to the website-based learning media. The tests were used to measure improvements in student learning outcomes before and after the intervention. Observations were conducted to record student engagement in the learning process, while the questionnaires were used to determine student responses to the media used. Quantitative data from the tests were analyzed by calculating average scores and percentage of student learning completion. Qualitative data from the observations and questionnaires were analyzed descriptively. The success of the action is determined if at least 80% of students achieve a score of ≥ 75 and show increased active participation during the learning process.

RESULTS

This study aims to improve student learning outcomes in metamorphosis through the use of website-based learning media. The results were obtained through tests administered in three stages: pre-action, cycle I, and cycle II. Each stage showed significant changes in average scores and student learning completion.

Table 1. Summary of Learning Outcomes of Grade IV Students at SDN Cempereng

Stage	number of students	Average	Students Complete (≥ 75)	Percentage of Completion
Pre-Action	23 students	66,3	9 students	39,1%
Cycle I	23 students	74,1	15 students	65,2%
Cycle II	23 students	83,2	21 students	91,3%

Based on the table above, it is clear that the average student score increased in each cycle. In the pre-action phase, the average student score was only 66.3, with a completion rate of 39.1% (9 out of 23 students). After the first cycle, using website-based learning media, the average score increased to 74.1, and the number of students completing the course increased to 15, or 65.2%.

However, the completion target (80% or more) was not achieved in the first cycle. Therefore, the second cycle continued, with improvements in material presentation techniques and reinforcement of reflection through an interactive quiz at the end of the lesson. The results showed that the average student score increased to 83.2, with a completion rate of 91.3% (21 students completing the course). This means that the majority of students successfully met the Minimum Completion Criteria (KKM) after optimizing the use of website-based learning media in the second cycle.

This improvement in learning outcomes was also supported by observations showing that students were more active in participating in the lesson, enthusiastically answered questions, and were able to better understand the sequence of metamorphosis processes. Furthermore, a questionnaire administered to students indicated that the website made it easier for them to understand the material due to its engaging interface, the presence of moving images (videos), and the availability of directly accessible practice questions.

The results of this study indicate that the use of website-based learning media significantly improved the learning outcomes of fourth-grade students at Cempereng Public Elementary School in learning metamorphosis. This improvement was evident in the increase in students' average grade point average from 66.3 in the pre-action phase to 83.2 in the second cycle. Furthermore, students' learning completion rate also significantly increased from 39.1% to 91.3%. This fact indicates that website-based media not only strengthens students' cognitive understanding but also facilitates a visual and interactive learning style, which is highly suitable for elementary school-aged children.

This success can be explained through Mayer's (2021) Cognitive Theory of Multimedia Learning, which states that learning is more effective when information is presented visually and verbally simultaneously. In this case, website media provides a combination of text, images, videos, and animations simultaneously, helping students process information more easily. Students not only read about metamorphosis but also directly observe the life cycle of frogs and butterflies through animations or videos available on the learning website.

This research also demonstrates that websites strongly support differentiation and visualization-based learning approaches, as emphasized in the Independent Curriculum. Elementary school students have unique learning styles, ranging from visual, auditory, to kinesthetic. Websites used in learning allow students to choose which sections to study first, when to review material, and how to adjust their learning pace. This creates a more flexible and personalized learning experience, which is very difficult to achieve with conventional approaches like lectures.

One important indicator of successful learning in this study was increased student engagement throughout the learning process. Students demonstrated enthusiasm while watching videos, answering quizzes on the website, and actively asking questions about the metamorphosis process. This aligns with the findings of Nugroho and Pratiwi (2024), who stated that web-based learning media can create more participatory learning and stimulate students' natural curiosity. They also emphasized that interactive websites provide space for students to become active learners, not just passive recipients of information.

Furthermore, in the context of metamorphosis, which is a dynamic and process-based topic, websites are a highly appropriate medium. This material incorporates scientific concepts such as morphological changes, life cycles, and the differences between complete and incomplete metamorphosis, which are difficult for students to grasp using only text and static images. Through websites, students can visually witness the stages of metamorphosis in engaging animations. This clarifies concepts, strengthens memory, and minimizes common scientific misconceptions among elementary school students.

This research is also supported by the results of Widiyanti and Darmawan (2023), who stated that the use of interactive websites in elementary school science lessons improves students' information absorption by up to 38% compared to conventional print media. In their study, students who used websites to understand the water cycle and photosynthesis demonstrated improved grades and greater conceptual understanding. A similar phenomenon was found in this study, where students were able to explain the metamorphosis process more coherently and scientifically after participating in website-based learning.

Students' learning motivation also improved. A distributed questionnaire revealed that most students stated that learning through websites felt like playing while learning. This aligns with research by Putri and Hamdan (2024), which showed that web-based learning media not only improves learning outcomes but also builds students' intrinsic motivation due to its engaging and interactive interface. They concluded that students felt more confident, engaged, and interested when learning through media displays that resemble the digital applications they frequently use in their daily lives.

The teacher's active role in guiding students is also a crucial factor. In this study, teachers were not merely information providers but also acted as facilitators, guiding students to access and explore content on learning websites. This shift in role aligns with the characteristics of 21st-century learning, which requires teachers to be learning guides, no longer the sole source of knowledge. Teachers assist students in interpreting information, evaluating content, and linking material to real-life experiences. This demonstrates that the use of technology media also requires increased teacher digital literacy.

Despite the positive results, the implementation of website-based learning also faces several obstacles, such as limited internet access at schools, teachers' skills in managing digital media, and limited devices such as laptops and projectors. However, these obstacles can be overcome through collaboration between teachers, the use of offline websites or local HTML, and thorough lesson planning. In this regard, research by Susanto and Lestari (2023) stated that infrastructure readiness and teacher training in creating and using website media are key to the success of digital learning at the elementary school level.

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From a pedagogical perspective, website media supports the principle of constructivism, where students construct their own knowledge through exploration and direct experience. Students not only listen to teacher explanations but also explore digital content, find information, and draw their own conclusions. This strengthens critical thinking skills and understanding of scientific concepts. This is supported by research by Fatmawati & Kurniawan (2023), which showed that students who learned through exploratory websites demonstrated improvements in analytical thinking and problem-solving skills.

Thus, website-based learning media has been proven to significantly contribute to improving student learning outcomes in metamorphosis material in elementary schools. The improvements are not only quantitative in the form of grades, but also qualitative in the form of increased interest, engagement, and conceptual understanding. The website's superiority in delivering multimedia content makes it a highly potential tool for integration into science learning more broadly.

These findings reinforce the importance of developing child-friendly and contextual digital learning media for implementation in elementary schools. Websites are not merely tools but can also serve as the primary medium for structured, engaging, and in-depth learning. Teachers need to continuously improve their capacity to design and utilize these media to meet the demands of the times and the learning needs of today's digital native generation.

CONCLUSION

Based on the results of research conducted over two learning cycles, it can be concluded that the use of website-based learning media has had a positive impact on improving the learning outcomes of fourth-grade students at Cempereng Public Elementary School in the metamorphosis topic. This is demonstrated by an increase in students' average grades from 66.3 in the pre-action phase to 74.1 in the first cycle, and 83.2 in the second cycle. The learning completion rate also significantly increased from 39.1% (9 students completed) in the pre-action phase to 91.3% (21 students completed) in the second cycle.

Website-based media significantly contributed to helping students understand the concept of metamorphosis through interactive visual presentations, animated videos, and online quizzes that strengthened memory. Students became more active, enthusiastic, and demonstrated a better understanding of the material. Teachers were also assisted in delivering engaging and efficient learning.

Thus, website-based learning media has proven effective in improving student learning outcomes and can be used as an alternative solution for science learning that is contextual, modern, and appropriate to the characteristics of 21st-century learners.

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