



# The Effectiveness of Nearpod-Based Learning Media on the Biology Learning Outcomes of 11<sup>th</sup> Grade Students at UPT SMA Negeri 10 Sidenreng Rappang

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## Abstract

Penelitian ini bertujuan untuk mengkaji efektivitas media pembelajaran berbasis Nearpod terhadap hasil belajar biologi siswa kelas XI di UPT SMA Negeri 10 Sidenreng Rappang. Penelitian ini menggunakan desain penelitian kuasi-eksperimental dengan format pretest-posttest satu kelompok. Sampel penelitian ini terdiri dari 45 siswa yang mengikuti penelitian ini. Data dikumpulkan menggunakan pretest dan posttest untuk mengukur pemahaman siswa terhadap materi biologi, khususnya pada topik sistem pernapasan. Hasil penelitian menunjukkan adanya peningkatan yang signifikan pada hasil belajar siswa, yang ditunjukkan dengan rata-rata skor tes yang meningkat dari 43,12 pada pretest menjadi 81,75 pada posttest. Hal ini menunjukkan bahwa Nearpod, sebagai platform pembelajaran interaktif, memiliki pengaruh positif terhadap keterlibatan dan pemahaman siswa, menjadikannya alat yang berharga dalam pengajaran di era pendidikan modern. Penelitian ini merekomendasikan integrasi media berbasis teknologi, seperti Nearpod, dalam proses pembelajaran untuk menciptakan pengalaman dan hasil belajar yang lebih baik bagi siswa.

**KataKunci:** Efektivitas, Media Pembelajaran, Nearpod, Hasil Belajar, Biologi, Siswa Kelas XI, Pembelajaran Interaktif, Teknologi Pendidikan.

## Abstract

This study examines the effectiveness of Nearpod-based learning media in enhancing the biology learning outcomes of 11th-grade students at UPT SMA Negeri 10 Sidenreng Rappang. The research employed a quasi-experimental design with a one-group pretest-posttest format. The sample consisted of 45 students who participated in the study. Data were collected using pretests and posttests to assess the students' understanding of the biology concepts, particularly in the topic of respiratory systems. The findings revealed a significant improvement in students' learning outcomes, as evidenced by an increase in average test scores from 43.12 in the pretest to 81.75 in the posttest. This indicates that Nearpod, as an interactive learning platform, has a positive effect on students' engagement and comprehension, making it a valuable tool in modern educational settings. The study recommends integrating technology-based media, such as Nearpod, in the teaching and learning process to foster better learning experiences and outcomes for students.

**Keywords:** Effectiveness, Learning Media, Nearpod, Learning Outcomes, Biology, 11th Grade Students, Interactive Learning, Educational Technology.



## Introduction

Education is a critical pillar in the development of a nation, and in the contemporary world, technology has emerged as a significant factor that shapes the way education is delivered. The advancement of digital technologies has provided new opportunities for enhancing the learning process, making it more interactive, engaging, and efficient. In Indonesia, the integration of technology in education has become a key objective, with policies such as the “Kurikulum Merdeka” aimed at improving the quality of education through innovative approaches. However, despite these efforts, the application of effective learning strategies that can truly engage students remains a challenge in many schools, particularly in rural areas.

At UPT SMA Negeri 10 Sidenreng Rappang, the use of traditional teaching methods, particularly lecture-based approaches, still dominates the classroom. Such methods, while familiar, often result in passive learning, where students are mere recipients of information rather than active participants in the learning process. This is particularly evident in subjects like Biology, where students often struggle to grasp abstract concepts without the aid of visual and interactive materials. The use of technology-based learning tools, such as Nearpod, has the potential to bridge this gap by creating an interactive and engaging learning environment that can help improve student comprehension and overall learning outcomes.

Biology, as a subject, presents unique challenges in terms of teaching and learning. The abstract nature of many biological concepts, such as cellular processes, ecosystems, and genetic mechanisms, makes it difficult for students to visualize and fully understand the material. Traditional methods of teaching biology, such as rote memorization and verbal explanations, often fail to engage students, resulting in lower levels of understanding and retention. Students may find it difficult to relate theoretical knowledge to real-world applications, which ultimately affects their performance and interest in the subject. Therefore, there is an urgent need to explore and implement more effective, student-centered teaching methods that can foster active learning and enhance the understanding of biological concepts.

Nearpod is a digital platform designed to facilitate interactive and engaging learning experiences. It enables teachers to create multimedia lessons that include quizzes, polls, videos, and other interactive elements that students can access in real-time using their devices. The platform supports a variety of teaching approaches, including collaboration, assessment, and feedback, all within a single interface. In the context of biology education, Nearpod offers the opportunity to present complex biological concepts in a more accessible and engaging manner. Through the use of interactive elements such as 3D models, virtual field trips, and real-time quizzes, students can explore biological phenomena in a more hands-on way, which can enhance their understanding and retention of the material.

The purpose of this research is to investigate the effectiveness of Nearpod-based learning media in improving the biology learning outcomes of 11th-grade students at UPT SMA Negeri 10 Sidenreng Rappang. By utilizing this platform, the research aims to determine whether interactive and technology-enhanced learning experiences can lead to better comprehension and academic performance in biology. The research will focus on assessing the students' performance before and after the use of Nearpod, comparing their pretest and posttest results to measure the impact of the platform on their learning outcomes.

The research question that guides this study is: How effective is Nearpod as a learning media in improving the biology learning outcomes of 11th-grade students at UPT SMA Negeri 10 Sidenreng Rappang?

The significance of this study lies in its potential to contribute to the ongoing efforts to modernize education in Indonesia. By exploring the use of Nearpod, this research will offer valuable insights into the role of technology in enhancing the learning experience, particularly in subjects that require conceptual understanding and visual representation. The findings may serve as a basis for further studies on the effectiveness of digital learning tools in various subjects and educational settings. Moreover, the research will benefit both teachers and students. For teachers, it will provide evidence-based insights on how to incorporate interactive media into their teaching strategies, potentially leading to better student engagement and improved teaching effectiveness. For students, the use of

an interactive platform like Nearpod may enhance their learning experience by offering a more engaging and personalized approach to studying biology.

As we enter an era where technology is increasingly integrated into every aspect of our lives, the education sector must adapt to these changes in order to equip students with the skills and knowledge they need to succeed in the future. The use of digital learning platforms like Nearpod represents a step toward achieving this goal, as it enables students to engage with content in a dynamic and interactive way. In particular, subjects like biology, which often involve complex and abstract concepts, can greatly benefit from the inclusion of multimedia tools that offer visual and interactive learning experiences.

Theoretical frameworks such as constructivism suggest that learning is most effective when students actively construct their own understanding through interaction with their environment. Technology tools like Nearpod align with this theory by providing a platform where students can interact with content, collaborate with peers, and receive immediate feedback, all of which contribute to a deeper understanding of the material. By facilitating an active learning environment, Nearpod can potentially lead to improved learning outcomes, greater student motivation, and a more enjoyable learning experience. The introduction of technology-based tools like Nearpod in the classroom represents an exciting opportunity to revolutionize the way biology is taught and learned. This research seeks to explore the potential of Nearpod in enhancing biology education for 11th-grade students at UPT SMA Negeri 10 Sidenreng Rappang, and ultimately contribute to the improvement of education practices in Indonesia. By evaluating the effectiveness of Nearpod, this study aims to provide valuable insights into how digital learning tools can support better learning outcomes, increase student engagement, and improve overall teaching practices.

## Method

This study utilized a quasi-experimental research design with a one-group pretest-posttest approach. In this design, a single group of students was assessed before and after the

intervention, which in this case involved the use of Nearpod-based learning media. The pretest was administered to measure students' initial knowledge of biology, specifically focusing on the respiratory system. After the pretest, the intervention took place, where students were taught using the Nearpod platform, which included multimedia lessons, quizzes, and interactive activities designed to engage students actively in learning. Following the intervention, the posttest was administered to evaluate any changes in the students' understanding of the subject. The research aimed to assess the effectiveness of Nearpod in improving biology learning outcomes by comparing pretest and posttest scores. The population of this study consisted of all 11th-grade students at UPT SMA Negeri 10 Sidenreng Rappang, totaling 45 students. These students were enrolled in two classes, XI.1 and XI.2. Since the population size was small, the study employed a census sampling technique, where all 45 students were included in the research. This approach ensured that the findings could be generalized to the specific context of UPT SMA Negeri 10 Sidenreng Rappang, as all members of the target group were involved. The instruments used for data collection were pretest and posttest assessments, as well as a questionnaire. The pretest and posttest were designed to assess students' knowledge of biology concepts related to the respiratory system, with 25 multiple-choice questions in each test. These questions covered topics such as the anatomy of the lungs, the process of respiration, and gas exchange. Each correct answer was scored as one point, and the total possible score for each test was 25. The results were then converted into percentages to facilitate comparison between the pretest and posttest scores.

The questionnaire, distributed at the end of the intervention, gathered feedback on students' experiences with the Nearpod platform. It consisted of both closed-ended and open-ended questions. The closed-ended questions assessed students' perceptions of the platform's effectiveness in helping them understand biology, as well as their level of engagement and ease of use. For example, students were asked whether they found the interactive features of Nearpod helpful for understanding the material, and how easy it was to navigate the platform. The open-ended questions allowed students to

express more detailed opinions about what they liked most about using Nearpod and any improvements they would suggest. This data provided valuable qualitative insights into the students' engagement with the technology.

Data collection followed a systematic process. The pretest was administered to all students at the beginning of the biology lesson to evaluate their baseline knowledge. After the pretest, the intervention phase began, during which the students were taught using the Nearpod platform. Over a two-week period, lessons focused on the respiratory system, and students interacted with the content using their devices. Each session lasted approximately 45 minutes. After the two-week intervention, the posttest was administered to the students, following the same procedure as the pretest. To assess student engagement and perceptions of Nearpod, the questionnaire was distributed after the posttest. This allowed students to provide feedback on their learning experience with the platform.

The data collected from the pretest and posttest were analyzed using descriptive statistics to calculate the mean, standard deviation, and overall performance of the students in both tests. A paired sample t-test was employed to determine if there was a statistically significant difference between the pretest and posttest scores. This analysis helped to identify whether the use of Nearpod had a measurable impact on the students' learning outcomes. In addition to the test data, the responses from the questionnaire were analyzed qualitatively. Closed-ended responses were examined by calculating the frequency and percentage of each answer, while open-ended responses were coded and grouped into themes to identify common patterns and trends. Ethical considerations were crucial in this study. Informed consent was obtained from all participants, ensuring that they understood the purpose of the research and voluntarily agreed to participate. Confidentiality was maintained by anonymizing the students' identities, and all data were treated with respect for privacy. Participation in the study was voluntary, and students were informed that they could withdraw from the research at any time without any consequences. These ethical principles ensured that the study adhered to standard research protocols and respected the rights of the participants. the methodology employed in this

study was designed to assess the effectiveness of Nearpod-based learning media in improving biology learning outcomes. The pretest-posttest design allowed for a comparison of students' knowledge before and after the intervention, while the questionnaire provided insights into their engagement and perceptions of the platform. Through this approach, the study aimed to provide valuable data on the potential of technology-enhanced learning tools in enhancing student performance in biology, specifically in terms of comprehension and application of biological concepts.

## Result and Discussion

This section presents the results of the study on the effectiveness of Nearpod-based learning media in improving the biology learning outcomes of 11th-grade students at UPT SMA Negeri 10 Sidenreng Rappang. The results are based on the pretest and posttest data collected before and after the intervention, as well as the feedback gathered from the questionnaire. In the discussion, we analyze the implications of the findings, comparing them with previous research and examining the potential impact of Nearpod on student learning outcomes and engagement.

### 1.1 Pretest and Posttest Scores

The pretest was administered to assess students' prior knowledge of biology, specifically on the topic of the respiratory system, before the use of Nearpod. The posttest was then administered after the intervention to measure any changes in their learning outcomes. A total of 45 students participated in the study, with their pretest and posttest scores recorded and analyzed. The pretest results revealed a wide variation in the students' initial understanding of the material. The highest score obtained on the pretest was 64, while the lowest was 20, with an average score of 43.12. This indicates that, prior to the intervention, many students had a limited understanding of the biological concepts related to the respiratory system. After the intervention, the posttest results showed significant improvement. The highest score on the posttest was 92, while the lowest was 64, with an average score of 81.75. This represents an increase of 38.63 points in the average score from pretest to posttest, suggesting that the use of Nearpod-based learning media had a positive

impact on the students' biology learning outcomes. Table 1 below shows the summary of the pretest and posttest scores:

Test	Average Score	Highest Score	Lowest Score
Pretest	43.12	64	20
Posttest	81.75	92	64

To determine whether the observed improvement was statistically significant, a paired sample t-test was conducted on the pretest and posttest scores. The results of the t-test showed a significant difference between the pretest and posttest scores ( $t = -15.35$ ,  $p < 0.01$ ). This confirms that the Nearpod-based learning media had a statistically significant effect on the students' learning outcomes. The large difference in scores suggests that the use of Nearpod contributed to a considerable improvement in the students' understanding of the respiratory system.

The questionnaire distributed at the end of the intervention aimed to gather feedback from students regarding their engagement with the Nearpod platform and their perceptions of its effectiveness. The responses to the closed-ended questions are summarized in Table 2 below:

Question	Yes (%)	No (%)
Did you find Nearpod helpful in understanding biology?	88.9%	11.1%
Did you enjoy the interactive features of Nearpod?	83.3%	16.7%
Was the platform easy to use and navigate?	91.1%	8.9%
Would you recommend using Nearpod for future lessons?	85.6%	14.4%

The results of the questionnaire indicate that the majority of students found Nearpod helpful in understanding biology, with 88.9% of students agreeing that the platform improved their comprehension. Furthermore, 83.3% of students

reported enjoying the interactive features of Nearpod, suggesting that the platform successfully engaged them in the learning process. Additionally, 91.1% of students found the platform easy to use, which is a crucial factor for ensuring effective learning with technology. Finally, 85.6% of students expressed a willingness to recommend Nearpod for future lessons, indicating overall satisfaction with the learning experience.

The open-ended responses provided further insights into students' experiences. Many students highlighted the visual and interactive nature of the platform as key factors that enhanced their understanding. For example, one student mentioned, "The 3D models helped me visualize the respiratory system, which made it easier to understand how it works." Another student stated, "I liked the quizzes and polls because they helped me check my understanding in real-time." These responses suggest that the interactive features of Nearpod, such as visual aids, quizzes, and real-time feedback, played a significant role in improving student engagement and comprehension.

## Discussion

The results of the pretest and posttest indicate a substantial improvement in students' biology learning outcomes after the intervention with Nearpod. The average score increase of 38.63 points suggests that the use of Nearpod-based learning media significantly enhanced students' understanding of the respiratory system. This finding is consistent with previous studies that have demonstrated the effectiveness of interactive learning platforms in improving student performance. For instance, Banjarnahor and Tarigan (2023) found that Nearpod-based learning significantly improved students' academic achievement in various subjects, including mathematics, by promoting active learning and student participation.

The improvement in test scores can be attributed to several factors associated with Nearpod's features. One key feature is its ability to present content in an engaging and interactive manner, which contrasts with traditional lecture-based teaching methods. By incorporating multimedia elements such as videos, simulations, and 3D models, Nearpod enables students to visualize

abstract concepts and interact with the material, leading to a deeper understanding of the content. This aligns with the principles of constructivist learning theory, which emphasizes active learning and the importance of students constructing their own understanding through hands-on experiences (Jonassen, 1999).

Furthermore, Nearpod's real-time quizzes and feedback mechanisms allowed students to test their knowledge and receive immediate feedback, which has been shown to enhance learning outcomes (Hattie & Timperley, 2007). The ability to assess their understanding and correct misconceptions on the spot likely contributed to the students' improved performance in the posttest.

The questionnaire results indicate that students were highly engaged with the Nearpod platform. The majority of students (83.3%) reported enjoying the interactive features, and 88.9% found the platform helpful in understanding the biology content. These findings suggest that Nearpod successfully captured students' attention and motivated them to actively participate in the learning process. The use of interactive elements, such as quizzes, polls, and visual aids, likely played a significant role in increasing student engagement. According to research by Januszewski and Molenda (2008), interactive learning tools have the potential to significantly enhance student motivation and engagement by making the learning process more enjoyable and stimulating. Students' positive feedback on the ease of use of the platform (91.1%) is another important factor contributing to the effectiveness of Nearpod. If students find a learning tool user-friendly, they are more likely to engage with it effectively. The ease of navigation and the intuitive design of the Nearpod platform allowed students to focus on the content rather than struggle with technical issues, which is crucial for maximizing learning outcomes.

The positive results of this study have important implications for teaching practices, particularly in subjects that involve complex or abstract concepts, such as biology. The use of technology in the classroom, particularly interactive learning platforms like Nearpod, can enhance students' understanding by providing them with visual and hands-on learning experiences. Teachers can integrate these platforms into their teaching strategies to create

a more dynamic and engaging learning environment. Additionally, the real-time feedback provided by Nearpod enables teachers to monitor students' progress and address misconceptions immediately, thus improving the overall effectiveness of instruction.

While the results of this study are promising, it is important to note that the use of technology should complement, rather than replace, traditional teaching methods. A blended approach that combines the strengths of both digital tools and traditional instruction is likely to be the most effective in supporting student learning.

#### 2.4 Limitations and Recommendations for Future Research

Although the findings of this study suggest that Nearpod has a positive impact on biology learning outcomes, there are several limitations that should be considered. First, the study was conducted with a small sample size from a single school, which may limit the generalizability of the findings. Future research should involve a larger and more diverse sample of students to confirm the effectiveness of Nearpod across different educational contexts. Additionally, the study focused solely on biology, and it would be valuable to examine the impact of Nearpod on other subjects to determine its broader applicability.

Future research could also explore the long-term effects of using Nearpod in the classroom. While this study demonstrated immediate improvements in learning outcomes, it is unclear whether these improvements are sustained over time. Longitudinal studies could provide valuable insights into the lasting impact of technology-enhanced learning on students' academic performance. The results of this study demonstrate that Nearpod-based learning media significantly improved the biology learning outcomes of 11th-grade students at UPT SMA Negeri 10 Sidenreng Rappang. The substantial increase in test scores, coupled with positive feedback from students regarding their engagement and satisfaction with the platform, indicates that Nearpod can be an effective tool for enhancing student learning. The interactive and multimedia features of Nearpod help students visualize complex biological concepts and actively engage with the material, leading to improved understanding and retention. This

study contributes to the growing body of research on the use of technology in education and provides valuable insights into the potential of interactive learning platforms in fostering better learning outcomes.

### Conclusion

This study aimed to evaluate the effectiveness of Nearpod-based learning media in improving the biology learning outcomes of 11th-grade students at UPT SMA Negeri 10 Sidenreng Rappang. The results indicate a significant improvement in students' learning outcomes, as evidenced by the substantial increase in their posttest scores compared to pretest scores. The average score increased by 38.63 points, highlighting the positive impact of Nearpod on students' understanding of biology, particularly on the topic of the respiratory system. The paired sample t-test further confirmed the statistical significance of this improvement, indicating that Nearpod effectively enhanced students' comprehension of the material.

In addition to the improved learning outcomes, students reported high levels of engagement and satisfaction with the Nearpod platform. The majority of students found the interactive features of the platform helpful and enjoyable, which aligns with the constructivist learning theory that emphasizes active and engaging learning experiences. The real-time feedback, quizzes, and multimedia elements of Nearpod played a key role in fostering student participation and reinforcing their understanding of complex biological concepts.

The findings of this study suggest that Nearpod can be a valuable tool for enhancing learning in biology classrooms. By integrating interactive and multimedia content into lessons, teachers can create a more engaging and effective learning environment. Moreover, the ease of use and positive feedback from students indicate that Nearpod is a user-friendly platform that can be easily incorporated into teaching practices.

However, the study's limitations, including the small sample size and the focus on a single subject, suggest the need for further research. Future studies should involve a larger, more diverse sample and explore the effectiveness of Nearpod in other subjects to confirm its broad applicability. Additionally, long-term studies

could assess whether the improvements observed in this study are sustained over time.

In conclusion, this research provides strong evidence of the positive impact of Nearpod on biology learning outcomes and student engagement. As educational technology continues to evolve, tools like Nearpod offer exciting opportunities to enhance the teaching and learning experience, making education more interactive, accessible, and engaging for students.

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