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Research Paper

Descriptive Analysis of the Need and Availability of Biology Teaching Aids at SMA Negeri 2 Kota Jambi

Adelia Cintana Putri^{1*}, Dwi Desti Yulistiani², Epi Ramayani³, Mia Aina⁴, M Erick Sanjaya⁵,
Muhammad Yusuf⁶, Dian Arisandy Eka Putra Sembiring⁷

¹²³⁴⁵⁶⁷ Pendidikan Biologi, Jurusan PMIPA, FKIP, Universitas Jambi, JL Jambi Muara Bulian KM. 15, Mendalo Indah,
Jambi Luar Kota, Muaro Jambi Regency, Jambi, Indonesia

*Corresponding author: acintanaputri@gmail.com

Phone Contact: 085231296492

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ABSTRACT

This study aims to analyze the need and availability of biology teaching aids at SMA Negeri 2 Kota Jambi and identify the direction of its development in supporting biology learning. The method used was descriptive analysis, involving teacher interviews and the distribution of questionnaires to 35 students. The study's results show that the availability of teaching aids in schools remains limited and has not fully met learning needs. Most students (62.86%) prefer visual media such as drawings and diagrams, while most development suggestions include 3D models (31.43%) and learning videos (22.86%). These findings confirm that students more easily understand biological concepts through visual and interactive media. Therefore, the development of teaching aids in schools is recommended to focus on visual-interactive media relevant to the teaching material, as well as on improving teachers' ability to design contextual, straightforward teaching aids, so that biology learning becomes more interesting, effective, and meaningful.

Keywords: Biology Teaching Aids; Media Needs; Interactive Learning.

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INTRODUCTION

Learning biology at the high school (SMA) level requires an interactive and concrete approach to help students understand abstract concepts, such as the immune system, medicinal plants, or other biological processes (Atikah.2023; Mulianingtias.2024). However, there is often a gap between the needs of students and the availability of adequate learning media, including teaching aids. Biology teaching aids play an important role as visual and practical means that can increase students' understanding, interest, and motivation to learn (Panjaitan et al., 2021; Safitri & Hidayati, 2023). This research is focused on a descriptive analysis of the need and availability of biological teaching aids at SMA Negeri 2 Kota Jambi, which aims to identify shortcomings and potential for the development of more effective learning media.

This problem is based on the findings of previous research that show that students often have difficulty in understanding biological material due to the lack of innovative media. For example, Dewantara et al. (2020) found that 67.2% of students consider immune system material to be the most difficult, with 93.3% of students expecting the development of new media such as interactive multimedia based on Problem Based Learning. This is in line with the survey of Safitri and Hidayati (2023) of biology education students, where 61.5% of respondents strongly agreed that the use of biology learning media can enrich the learning experience, and 59% stated that the media provides a more diverse learning experience. In addition, Panjaitan et al. (2021) emphasized that field observation-based learning media, such as the medicinal plant inventory booklet, has high validity (average 1 with very high criteria) and is effective in improving student understanding.

In the field of science, teaching aids training has been shown to be successful in improving teachers' ability to integrate practice into learning. Fahmi et al. (2023) reported that thermophysical teaching aids training for high school physics teachers achieved a success rate of 81.56%, which supports interactive learning and increases student interest. Similarly, Rahma et al. (2023) analyzed the need for simple teaching aids in physics learning in Bengkulu City High School, concluding that teaching aids are needed to train students' science process skills, especially in motion materials. The innovation of interactive teaching aids was also discussed by Noviani et al. (2025) through the development of MOBILBUT for mathematics, which achieved 83.9% validation and 83.3% practicality, showing the potential for adaptation to biology. Salsabila and Agustin (2024) compared the effectiveness of simple teaching aids with PhET in experiential learning, where simple teaching aids were more effective (83% of student responses) than PhET (79%). Finally, Arifanti (2024) through teaching aids training

mathematics at the Muhammadiyah DIKDASMEN Foundation, Palopo City, emphasizing the importance of teachers' creativity to minimize students' learning difficulties.

Based on the review, there is an urgent need to analyze the condition of biological teaching aids at SMA Negeri 2 Kota Jambi. The formulation of the problem in this study includes: the extent of the need for students and teachers for biological teaching aids and how the current availability of biological teaching aids and aims to describe the need and availability of biological teaching aids in order to provide development recommendations in accordance with the local context. This research is expected to contribute to improving the quality of biology learning through a descriptive approach based on empirical data.

METHOD

This study uses a descriptive analysis method that aims to systematically describe the use of props in the Ecosystem Diversity material. The descriptive method is used to describe phenomena that occur naturally without manipulating research variables, Sugiyono (2017) explained that this method aims to obtain an accurate picture of facts and relationships between phenomena. This approach is considered appropriate because the research does not focus on testing hypotheses, but describes the actual conditions related to the use of teaching aids in the biology learning process. Data was obtained through interviews with teachers to find out what tools are needed but still not available in the school, and literature review as a supporting theory for five scientific articles published in the last ten years (2015–2025).

Limited facilities and infrastructure, including learning aids, are a common obstacle in the learning process in secondary school. Herwiningsih (2025) found that "not all schools have adequate learning facilities and infrastructure, including the availability of teaching aids," and this condition has an impact on students' low understanding of abstract material. Thus, this research is important to identify the need for teaching aids in biology learning so that the learning process becomes more concrete and meaningful for students.

RESULT

Based on the results of observation and the distribution of questionnaires carried out on 35 respondents, data was obtained on the availability and need of teaching aids in learning activities. The data is presented in the following Diagram.

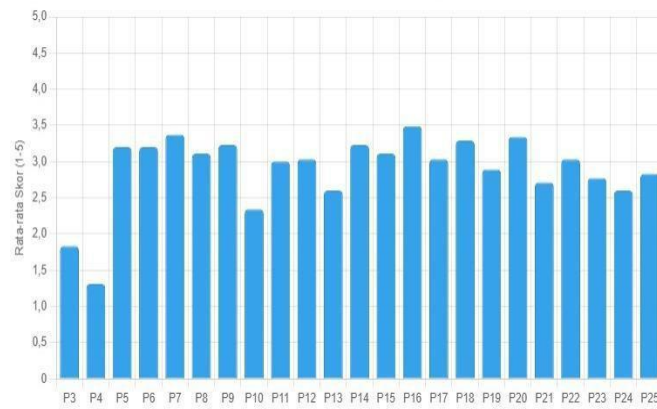


Figure 1. Diagram of the results of learning media variation and student involvement

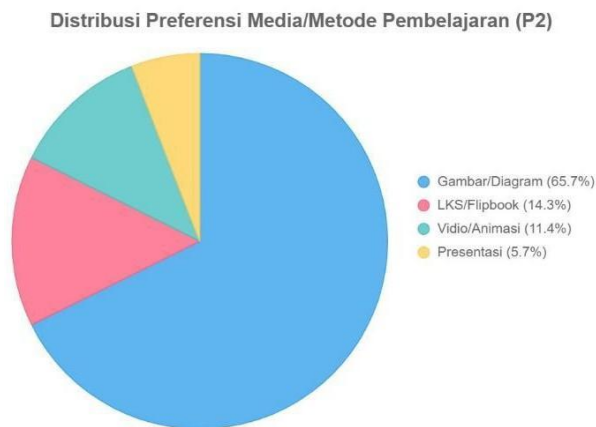


Figure 2. A diagram of the results of media preferences/learning methods in the classroom

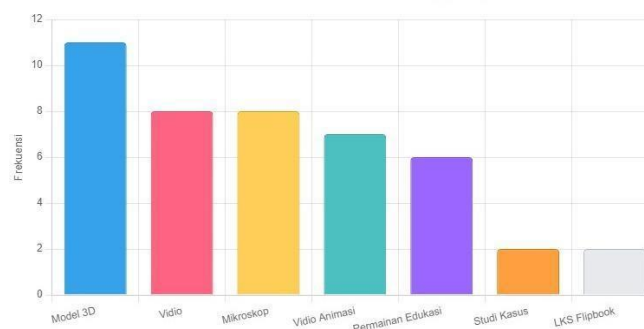


Figure 3. Diagram of the results of prop development suggestions

DISCUSSION

Based on survey data from 35 respondents, an overview of perceptions and needs regarding biology learning design, particularly regarding teaching aids and visual media, was obtained. The results of the analysis in Figure 1 show the average Likert score for 23 questions ranging from 1.31 to 3.49. The highest score (3.49) shows a positive perception of the variety of learning media and active involvement of students. On the other hand, the value (1.31) is the lowest, indicating obstacles in the technological aspect or limited digital media facilities. The consistency of scores close to the "agree" category indicates that students have a positive perception of the use of media and teaching aids, even though they are not optimal. This corroborates the findings of Sawitri et al. (2024) that the limitations of teaching aids in schools reduce students' training in science process skills. The findings of Hiasa et al. (2025) that teachers need to prioritize technology in the manufacture of learning aids relevant to current developmental needs through EduGame-based media. Thus, the provision of varied and technology-based teaching aids is an urgent need to support active student engagement and improve the quality of biology learning at the secondary school level.

Based on figure 2, as many as 62.86% of respondents chose pictures or diagrams as the most preferred learning medium. Meanwhile, LKS/flipbooks (14.29%) and videos/animations (11.43%) ranked next. The dominance of visual media shows that students can better understand biological material through concrete representations that facilitate visualization, for example, in the context of ecosystem diversity. These findings are in line with the results of Widiatmoko and Sufyan's (2025) research which shows that visual booklet-based media has a very high level of validity in improving concept understanding. Mediums such as images, diagrams, and flipbooks have been shown to strengthen the connection between theory and field observation. Thus, the development of biological teaching aids in schools should prioritize simple but informative visual media.

Based on the diagram as shown in figure 3, regarding suggestions for the development of props, the results showed that 3D models (31.43%) were the most submitted suggestions, followed by videos and microscopes (22.86% each), as well as animated videos (20%) and educational games (17.14%). These suggestions affirm the need for students to have access to interactive media that allows for hands-on exploration of biological phenomena. These findings are consistent with the research of Ritonga et al. (2025), which found that interactive media based on Problem-Based Learning is able to improve understanding of abstract immune system concepts. Meanwhile, Septioningrum and Mayub (2022) emphasized that teacher-made training aids can increase students' creativity and participation in practice-based learning.

The overall results confirm that the availability of teaching aids in schools has not fully met students' needs. Utami and Nurhikmayati (2025) Teaching aids function as a bridge between theory and practice that can foster interest and curiosity in learning biology. Kumalasari et al. (2023) added that training in making teaching aids can improve teachers' skills and strengthen the integration of practice in the learning process. Therefore, the development of biology learning media at SMA Negeri 2 Kota Jambi should be directed toward the creation of visually interactive teaching aids (e.g., 3D anatomical models, video simulations, and digital microscopes) that are in line with the characteristics of school materials and facilities.

In addition, it is necessary to evaluate technical obstacles such as limited equipment or teachers' ability to utilize technology. Budiyo et al. (2025) emphasized the importance of teachers' creativity in developing simple, contextually relevant teaching aids that are easy to implement in the classroom. Thus, the results of this study not only describe the current conditions of need and availability of biological teaching aids but also provide practical guidance for developing learning designs that are more effective, adaptive, and relevant to the demands of the 21st century.

CONCLUSION

The study's results show that the need for biological teaching aids at SMA Negeri 2 Kota Jambi is relatively high, while their availability remains limited. Students show a strong preference for visual and interactive learning media that help them understand abstract concepts in biology. Therefore, the development of teaching aids should focus on 3D models, videos, and digital microscopes that align with the characteristics of the school materials and facilities. In addition, teacher training in creating simple teaching aids needs to be improved to encourage creativity and enhance learning effectiveness. This research emphasizes the importance of collaboration between teachers, schools, and related parties to realize biology learning that is more contextual, engaging, and skills-oriented for the 21st century.

DATA AVAILABILITY STATEMENT

The datasets generated and analyzed during the current study are not publicly available due to institutional policies and the protection of student and teacher confidentiality, but de-identified data may be obtained from the corresponding author upon reasonable request. Any shared dataset will exclude personal identifiers and will be provided in aggregated or anonymized form only. No custom code or software was developed for this study; all analyses were conducted using standard spreadsheet and statistical software as described in the Method section.

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GENERATIVE AI STATEMENT

The AI tool was not used to generate original scientific content, research ideas, data, or analyses. All AI-assisted outputs were critically reviewed, edited, and verified by the authors for accuracy, originality, and appropriateness. No confidential, personally identifiable, or sensitive data was entered into the AI system. The authors remain fully responsible for all content of this article, and no AI tool is credited as an author or co-author.

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