

Transforming Biology Education : The Need for Interactive Learning Media to Enhance the Experience of Eighth-Grade Students

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Abstract: This study aims to identify the need for the use of learning media at SMPN 11 Pekanbaru. Learning media serve as tools to assist teachers in delivering material and facilitate students' understanding of the lessons. The research was conducted from November 13 to December 2024, utilizing survey and quantitative descriptive methods. The results from interviews and observations indicate that the current learning media are less engaging and varied, leading to difficulties for some students in comprehending the material. The instructional materials applied are still limited to textbooks and worksheets. According to the questionnaire, the impact indicator of using learning media received the highest score (82%), while the indicators for student difficulties and engagement received the lowest score (68%). The overall total score reached 74%, categorizing it as "good." This suggests that implementing interactive learning media at SMPN 11 Pekanbaru is essential to support a more effective learning process. Learning media can serve as a solution to address students' difficulties in understanding the material and enhance students' interest and motivation. The researchers recommend visual learning media, such as flashcards, for further use. These flashcards consist of small cards containing images, words, symbols, and materials that can make learning more enjoyable and interactive.

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Introduction

Education is a process of developing the potential possessed by learners to face various challenges in the future. As a means to cultivate quality and educated human resources (Hendriyani et al., 2018), education can also be understood as a humanistic process known as "humanizing humans" (Pristiwanti, 2022). Improvements must be made in several aspects to achieve optimal educational quality, including the quality of activities during the learning process. The learning process involves individuals acquiring knowledge, skills, and positive values through various learning resources (Rohani, 2020). This process is an interaction between teachers and learners to achieve predetermined learning objectives (A. P. Wulandari et al., 2023). Learning and teaching play a crucial role in achieving educational goals, developing self-potential, and enhancing the quality of learners' lives (Faizah & Kamal, 2024). In this context, learning media has become essential in supporting the interaction between teachers and students.

Learning media encompass everything used to convey messages from the sender to the receiver, thereby stimulating learners' thoughts, feelings, and interests during the learning

process. This media also serves as an aid for educators to ensure that learning activities proceed effectively (Hasan et al., 2021). One effective example of learning media is flashcards, which are practical and easy-to-use graphic media consisting of two sides; one side contains images, text, or symbols, while the other side includes descriptions, answers, and explanations that help students remember or understand concepts related to the pictures on the cards (Hayati, 2022). Learning media has been shown to assist students in comprehending material, and various types of media are available for selection. Types of learning media include audio, visual, audio-visual, and instructional aids. With these multiple media types, teachers can provide effective stimuli that elicit positive responses from learners (Wahyuni, 2018). Similarly, Magdalena et al. (2021) identified six basic types of learning media: print media, audio media, visual media, motion projection media, and replica objects (miniatures). These media types significantly support students in understanding material according to their needs. Therefore, the use of learning media during the learning process is crucial.

The importance of using learning media lies in its ability to foster new interests and desires, enhance motivation, and provide positive psychological influences on learning (A. P. Wulandari et al., 2023). Learning media facilitate teachers in delivering material that can be well understood by learners (Indriani, 2024). The use of practical and innovative learning media is one of the key factors for success in the learning process (Winangsih et al., 2023). Learning media can significantly enhance students' understanding and motivation in biology education. In biology education, learning media have the potential to cultivate new interests, increase motivation, and provide positive stimuli for learners (T. A. J. Wulandari et al., 2018). Learning media are highly effective in the biology learning process, as they can help students grasp abstract concepts, make the material more engaging, and enhance interaction between teachers and students during the learning process. Examples of learning media that can be applied in biology education include educational videos, flashcards, instructional aids, posters, and virtual laboratories.

Biology is a branch of science that studies living organisms based on their levels of organization and interactions with the environment. The knowledge produced in biology encompasses a collection of facts and concepts. Not all concepts in biology are concrete and easily observable; some are abstract and difficult to observe directly (Ariyanto et al., 2018). Biology education is part of science that includes facts, laws, and principles derived from scientific processes (Agnafia, 2019). The key aspects of biology education include students' ability to recognize the limitations of their knowledge, possess a strong curiosity to acquire new knowledge, and apply it in everyday life (Ulfa, S., 2018). Several relevant studies indicate that learning media can enhance students' learning outcomes. One study by Eko & Wahyuni (2023) states that the development of flashcard media is deemed appropriate and effective for use as a learning medium because it can improve students' learning outcomes, foster curiosity, and elicit positive responses. The calculations revealed that the Content Validity Index (CVI) was more significant than the table CVI, which was 1.00, thus validating the flashcard media. Student responses to the flashcard learning media were assessed across three dimensions: cognition, affection, and conation. The questionnaire analysis showed that students provided positive responses, with an overall score percentage of 84.68% in the "very strong" category, where the cognition dimension reached 85.73%, the affection dimension 84.57%, and the conation dimension 83.75%.

Based on the review outlined above, it can be concluded that using learning media is a crucial aspect of the learning process, as it helps students understand the material, enhances their interest in learning, and results in positive learning outcomes. Therefore, the selection of media must be conducted appropriately according to the needs of the students. In light of this background, this study aims to analyze the initial needs of eighth-grade students at SMPN 11 Pekanbaru to use learning media.

Research Method

This research was conducted at a public junior high school in Pekanbaru City, specifically at SMPN 11 Pekanbaru, located at Jl. Perkasa No. 28, Bambu Kuning, Rejosari, Kec. Tenayan Raya, Pekanbaru City. The study occurred in the classroom during interviews and questionnaire administration with the eighth-grade science teacher at SMPN 11 Pekanbaru. The research method employed was a survey, utilizing instruments like interview sheets and questionnaires. Survey research is a data collection technique that describes or explains a population obtained from a sample through interviews and questionnaires.

In quantitative research, the population is defined as the area of generalization that includes objects or subjects with specific characteristics determined by the researcher for the study to conclude. Meanwhile, a sample is a portion of the population with a number and characteristics corresponding to that population (Suriani et al., 2023). The population in this study consists of all eighth-grade students at SMPN 11 Pekanbaru, while the sample comprises one eighth-grade class, specifically class 8.6, with a total of 35 students. The sample was selected using simple random sampling techniques by the researcher.

Data collection techniques are procedures used by researchers to obtain the necessary information. The following are the data collection techniques employed by the researcher to gather data:

a) Interview Sheet

The interview sheet includes 23 questions for the science teacher and eighth-grade students at SMPN 11 Pekanbaru. The indicators of the questions in this interview sheet encompass curriculum, learning resources, interest and motivation, biology material, implementation of learning, and evaluation of learning. This interview sheet is designed to provide guidance and limitations during the question-and-answer process, ensuring that the results obtained can be substantiated (Ruspendi, 2016).

b) Questionnaire

The questionnaire contains questions and statements to analyze the need to use learning media at SMPN 11 Pekanbaru. The scale used in the response questionnaire is the Guttman scale. This questionnaire aims to identify students' responses regarding the need for learning media among eighth-grade students at SMPN 11 Pekanbaru. The questionnaire will be administered to 35 students. The type of questionnaire used is a closed questionnaire, where alternative answers are provided, allowing respondents to select from the available options. This questionnaire consists of 15 items with indicators that include the use of learning resources, the impact of learning media, difficulties, and student engagement.

c) Data Analysis Technique

The data analysis technique employed is quantitative descriptive analysis. Quantitative descriptive refers to data presented in numerical form obtained from the field, or it can also be categorized as qualitative data presented in numerical form (Ramdhan, 2021). This quantitative descriptive data analysis technique involves statistics that study how to collect,

organize, present, and analyze data in numerical form, thereby providing a structured, concise, and clear depiction of a phenomenon, which subsequently allows for the drawing of specific interpretations or meanings (Siregar, 2021). The data objects in this quantitative research include sample and population data. The formula used in the data analysis technique by the researcher is the percentage formula, as stated by Arikunto (in Meutia, 2022):

$$P = F/N \times 100\%$$

Description:

P= Percentage

F= Frequency of answer score

N= Number of respondents

The research findings were converted based on five assessment criteria categories and then interpreted as percentages using the eligibility criteria outlined in Table 1.

Table 1. Interpretation values

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

Source : Sulistyorini & Listiadi (2022)

Result and Discussion

This research was conducted at SMP Negeri 11 Pekanbaru on November 13, 2024. Interviews and observations with the science teachers and eighth-grade students revealed that the school had implemented the Merdeka Curriculum. Survey results indicated that a significant portion of the students experienced difficulties in comprehending specific subject matter. Textbooks and Learning Activity Sheets (LKS) remained the primary teaching materials. The teaching media employed lacked diversity, occasionally incorporating video lessons and PowerPoint presentations. Teachers expressed a need for supplementary media to facilitate and enhance the delivery of instructional content to students.

Analysis of the initial student needs assessment questionnaire, completed by 37 eighth-grade students from SMPN 11 Pekanbaru, is presented in Figure 1. The figure displays the results for each indicator within the questionnaire.

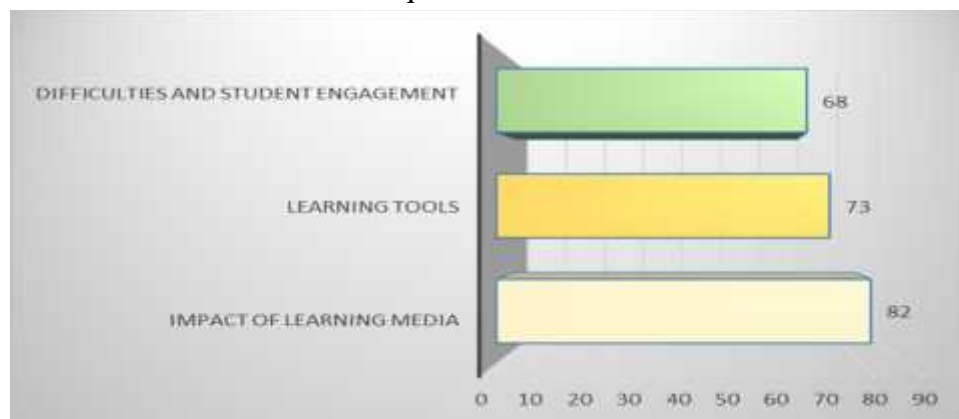


Figure 1. Indicator Chart of Students' Initial Needs Questionnaire

Based on the initial student needs assessment questionnaire results (Figure 1), the following observations were made across the three indicator aspects: Indicator (1), concerning the impact of teaching media, achieved an average score of 82%, categorized as "excellent." This represents the highest score among the indicators. This high score is attributed to the significant need to teach media among teachers and students. Using teaching media during instruction facilitates student comprehension and simplifies the teacher's material delivery. This finding is supported by relevant research, such as Ridwan et al. (2021), highlighting the ease with which teaching media enables teachers to convey instructional content. Classrooms often comprise students with diverse learning abilities. Teaching media offers a solution to enhance student understanding of the learning content.

Indicator (2), concerning teaching resources, achieved an average score of 73%, categorized as "good," as shown in the table above. This suggests that the teaching resources available at the research school support effective teaching. The availability of these resources facilitates effective teaching and learning processes, contributing to the achievement of learning objectives. This aligns with the research of Rafianti et al. (2018), which posits that students can develop various skills if educators develop lesson plans that encourage critical thinking and problem-solving.

Indicator (3), concerning student difficulties and engagement, received the lowest average score among the indicators, at 68%, categorized as "good." This indicator included questions assessing student engagement during instruction. However, the student needs assessment questionnaire results revealed that many students reported low engagement and difficulties in comprehending the learning material. This is attributed to the limited variety and engagement of the teaching media used at the research school, hindering effective student comprehension. Engaging in teaching media can enhance student attention and improve initial responses to the learning process (Apriliani & Radia, 2020).

The average score across the three indicators was 74%, categorized as "good." This indicates a significant need for interactive biology teaching media for eighth-grade students at SMPN 11 Pekanbaru. The use of such media can enhance student achievement and motivation. Teaching media can make learning more engaging, for example, through visually appealing designs incorporating images and animations (Kuswanto & Radiansah, 2018). Flashcards, for instance, are a visual teaching medium that can foster student interactivity and engagement. Flashcards are small cards with images or symbols that enhance memory and aid comprehension of concepts related to images, shapes, and sizes, adaptable to classroom needs (Eko & Wahyuni, 2023). Their advantages include portability, concise and specific content that enhances memory, and interactive nature. This research is further supported by Lailusmi's research (in Irawan et al., 2023), which demonstrates that the success of flashcards lies in their ability to capture attention and stimulate learning interest. Flashcards can address student comprehension difficulties and increase engagement, making learning more enjoyable and interactive (Nikmah & Wijayadi, 2021). This aligns with Permendikbud No. 22 of 2016, which emphasizes the importance of motivating students through enjoyable, inspiring, interactive, and challenging learning experiences. Enjoyable learning experiences promote student engagement and enthusiasm through teaching media.

Interactive teaching media are effective and beneficial for students, contributing to long-term learning outcomes and improved performance due to enhanced graphics, animations, and simulations (Nadzif et al., 2022). Using teaching media in instruction creates effective, active, and beneficial learning experiences. This is particularly crucial in science,

where engaging teaching media can enhance memory retention of what is often perceived as a difficult and uninteresting subject (Indriani, 2024).

Conclusion

Based on the interviews, observations, and questionnaire results, it was found that a portion of the students experienced difficulties in comprehending the subject matter due to the limited variety of teaching media employed by the instructors, with textbooks and Learning Activity Sheets (LKS) serving as the primary teaching materials. The questionnaire identified three key aspects of initial student needs: the impact of teaching media, teaching resources, and student difficulties and engagement. The aspect of teaching media impact achieved the highest average score (82%), categorized as "excellent," while the aspect of student difficulties and engagement received the lowest average score (68%), categorized as "good." The overall average score for this research was 74%, categorized as "good." Interactive teaching media, such as flashcards, is recommended to facilitate student comprehension and create a more engaging and interactive learning environment.

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