Bio-Lectura: Jurnal Pendidikan Biologi,
Vol. 13, No. 2, October 2026, 102-114

ANALYSIS OF STUDENT RESPONSES TO POSTER MEDIA IN SCIENCE LESSONS ON THE DIVERSITY OF LIVING THINGS

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ABSTRACT

Biodiversity is a broad and abstract topic that often requires visual media to connect scientific concepts with students' everyday experiences. This descriptive qualitative study aimed to describe students' responses to the use of posters in a science lesson on the diversity of living things. Data were collected through semi-structured interviews with five of 14 Grade VII students, who were purposively selected based on their classroom participation, and through the science teacher's observation sheet on lesson implementation. The data were analysed using the interactive model (data condensation, data display, and conclusion drawing) combined with thematic coding. The informants responded positively to the visual appeal of the posters, perceived the posters as making the material easier to understand, and linked the content to familiar objects in their surroundings. They also reported understanding the material better than before, and each informant was able to re-explain one aspect of biodiversity (genetic diversity, species diversity, ecosystem diversity, a general definition, or threats) in their own words. These are self-reported perceptions and short explanations; learning outcomes were not measured. Informants were also critical of using posters in every lesson, mainly because of paper waste. Because the findings come from a small, purposively selected group in one class, they are not intended to be generalised.

ARTICLE HISTORY

Received 09October 2026
Revised 08 October 2026
Accepted 28 October 2026

KEYWORDS

Media Posters,
Student Responses,
Science Learning,
Biodiversity,
Descriptive Qualitative

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ISSN 2339-241X (print/ISSN) 2598-2427 (online ISSN)
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https://journal.unilak.ac.id/index.php/ BL

INTRODUCTION

The diversity of living things is a broad and often abstract topic in science education. Students are required to understand and distinguish between three levels of biodiversity—genetic, species, and ecosystem diversity—while also becoming familiar with the associated terminology and examples of organisms (Putri, 2020). Studies in Indonesia show that students still hold misconceptions about biodiversity (Ilhamdi, Rahmani, & Syazali, 2022), and a review of abstract biological concepts reports that learning difficulties are related to how visual representations are used in teaching (Gafur, Yustina, Suryawati, & Hadriana, 2024). Effective visualization is therefore needed so that students can connect the concepts they learn with their surrounding environment.

One visual medium widely used in instruction is the poster. Posters combine images and concise text with eye-catching colors, which can make the subject matter more concrete (Anggraheni & Saifuddin, 2021). Multimedia learning theory holds that people learn more deeply from words and pictures together than from words alone (Mayer, 2021), and a dual-coding perspective points in the same direction (Mas Bakar, Anugrah, Jasmal, & Jannah, 2025). However, the benefit of a visual depends on how it is designed and used, because information that is poorly organized can overload learners (Sweller, van Merriënboer, & Paas, 2019).

Several studies have examined posters in biology and science education. On the topic of environmental pollution, Jumadin, Rapi, Mustami, and Syarbini (2023) reported higher learning outcomes in a class that used posters than in a class that did not. In Grade XI biology, Sulastri, Ariandani, and Asri (2025) found that posters were associated with higher motivation and learning outcomes than conventional methods. For biodiversity specifically, a folded poster developed by Ariani, Syamswisna, and Titin (2019) was judged valid and feasible by five expert validators, and a poster on the conservation of living things was developed to improve the knowledge of Grade IV elementary students (Ayuni, Munandar, & Junita, 2020). Harsono, Rosanti, and Seman (2019) also argue that choosing appropriate instructional media, including posters, can improve the quality of student learning.

Most of this work treats the poster as a variable whose effect on learning outcomes or product feasibility is measured through quantitative or Research and Development (R&D) designs. Student responses are often reported together with learning outcomes (Septian, Farid, Syaifuddin, & Hastuti, 2021) or captured with closed-ended Likert-scale questionnaires; for example, Anggraheni and Saifuddin (2021) reported positive perceptions of posters on plant structure and function based on six questionnaire indicators. Such approaches show how far students agree with predefined statements, but they say little about students' own reasons, meanings, and reservations. This matters because a medium that students enjoy may still provoke critical attitudes, such as saturation when the same medium is used repeatedly, a concern raised in other subjects (Tangdiung, Hasan, Misnah, & Windayanti, 2026). In the poster studies we reviewed, we did not find an interview-based account that explores students' reasoning about posters on biodiversity together with their view of how often posters should be used.

This gap forms the basis of the present study, which offers three contributions. First, it uses interviews to explore the reasons behind students' responses rather than only their level of agreement. Second, it examines affective and cognitive aspects, connections to daily experiences, and students' attitudes toward the frequency of poster use, including environmental concerns. Third, it complements the interviews with the science teacher's

observation of lesson implementation. The study was conducted in a Grade VII class at a madrasah in Salawati, Southwest Papua, Indonesia. Research Question: How do students respond to the use of poster media in science lessons covering the topic of the diversity of living things? Research Objective: To describe and analyze students' responses to poster media, covering their learning experiences, the role of visuals in comprehension, the connection between posters and daily experiences, their perceived improvement in understanding, their attitudes toward the frequency of poster use, and their ability to re-explain the material to peers.

METHODS

1. Research Approach

This study employs a descriptive qualitative approach, as its objective is to understand students' meanings and experiences regarding the use of poster media from their own perspectives, rather than to test cause-and-effect relationships between variables. It is a small-scale study of one class and one lesson.

2. Research Subjects

The study took place at MTs Muhammadiyah 3 Salawati. All 14 Grade VII students in the class took part in a science lesson on the diversity of living things that used poster media. Five of them were selected as interview informants using purposive sampling (Campbell et al., 2020). The selection criterion was classroom participation during the lesson—asking questions, giving answers, and joining discussions—as judged by the science teacher who observed the lesson. Student activeness is a commonly examined indicator of engagement in science classes (Wulandari & Asriyanti, 2026), and active students were expected to articulate their experiences more fully, so that the interviews would yield information-rich data (Malterud, Siersma, & Guassora, 2016). This criterion has a clear drawback: active students may be more verbally fluent and more positive about the lesson than their quieter classmates, so the sample does not represent the whole class. We return to this point in the limitations.

3. Research Ethics

Permission to conduct the study was obtained directly from the science teacher of the class. Participation was voluntary: the purpose of the study was explained to the students, and the informants gave oral consent before the interviews. Students were informed that they had the full right to decline to answer or to stop at any time without any effect on their grades. Interviews were recorded with the students' permission, and the recordings and transcripts were stored securely and were accessible only to the research team. Informants are identified by their initials in this article.

4. Data Collection Technique

Data were collected through semi-structured interviews that were recorded and subsequently transcribed verbatim. The interviews were conducted in Indonesian at the

school on September 16, 2026, by the second author, who was not the students' regular teacher, and each interview lasted about 30 minutes. The quotations reported here were translated into English by the authors. The interview guide consisted of eight questions designed to explore students' experiences, perceptions, and understanding after learning with posters, namely:
1) Science learning experiences using posters.
2) The role of images on posters in aiding understanding.
3) The connection between poster content and daily experiences.
4) The improvement in understanding compared to before using posters.
5) A comparison of the enjoyment or ease of learning with posters versus learning without poster media.
6) Students' opinions on whether teachers should use poster media more frequently.
7) Students' feelings about the use of posters in every science lesson.
8) Students' ability to re-explain material from the posters to peers who do not yet understand it.
In addition to the interviews, the science teacher observed the lesson and assessed its implementation using a structured assessment sheet with eight aspects (listed in Table 3), including the alignment of poster design and content with student characteristics, the link between poster content and science concepts, classroom interaction and management, and evaluation and reinforcement at the end of the lesson. Each aspect was rated on a scale of 1 to 4 (1 = Poor, 2 = Adequate, 3 = Good, 4 = Excellent), and the sheet included space for qualitative notes and an overall conclusion on the suitability of the posters. This assessment describes how the lesson was implemented; it is not a measure of student learning or of the effectiveness of the poster.

5. Data Analysis Technique

Data analysis followed the interactive model of data condensation, data display, and conclusion drawing (Sa'adah, Rahmayati, & Prasetiyo, 2022), combined with thematic coding following Braun and Clarke (2019). The transcripts were read repeatedly, coded line by line, and the codes were grouped into categories and then named as themes. Coding was carried out by the second author, and differences in interpretation were resolved through discussion among the authors. Because the interview guide was organized by topic, the six themes partly follow the structure of the questions (Table 1); reasons within each theme, such as why informants rejected frequent poster use, emerged inductively from the data. Given the small, purposively selected sample, we do not claim data saturation; we report only that the data were sufficient for the limited descriptive aim of the study (Braun & Clarke, 2021; Malterud et al., 2016).

6. Trustworthiness of the Data

Trustworthiness was addressed through source triangulation (comparing responses from different informants to the same questions) and method triangulation (comparing the interview results with the teacher's assessment of lesson implementation), which aims to reduce bias by viewing the same phenomenon from more than one perspective (Luthfiyani & Murhayati, 2024). Because the two sources address different questions (students' perceptions versus the implementation of the lesson), the teacher's assessment is used as complementary information and not as a confirmation of the students' accounts. The study

also followed the criteria of credibility, transferability, dependability, and confirmability (Fikri, Murhayati, & Darmawan, 2025; Nowell, Norris, White, & Moules, 2017). The teacher's scores were converted into a percentage using P = (total score obtained ÷ maximum score) × 100% and interpreted with categories adapted from Wahyuni and Zulyusri (2023), who developed them for validating teaching materials: 0–20% (very poor), 21–40% (poor), 41–60% (fair), 61–80% (good), and 81–100% (very good). Here the categories describe the quality of implementation and are not a test of instrument validity.

RESULTS

Based on the thematic coding of the interview transcripts, six themes emerged regarding the informants' responses to the use of posters in the science lesson on the diversity of living things, as summarized in Table 1. Quotations are translated from Indonesian. All claims below refer to the five informants only.

Table 1. Summary of Themes from the Analysis Results

Theme	Indicator (Question No.)	Response Trend
1. Affective response to poster-based learning	Q1, Q5	All five informants expressed positive views (fun, easy, enjoyable).
2. The role of visuals in facilitating understanding	Q2	All five informants said the images were helpful, citing various reasons.
3. Posters as a link to real-world experiences	Q3	All five informants gave concrete examples (animals, plants, nature, water, coral reefs).
4. Perceived improvement in conceptual understanding	Q4	All five informants reported understanding better than before.
5. Attitudes toward the frequency of poster usage	Q6, Q7	All five informants answered "No" to more frequent use; responses to continuous use were lukewarm.
6. Ability to re-explain the concept of the diversity of living things	Q8	All five informants re-explained one aspect of the material, at varying levels of depth.

1. Affective Responses to Poster-Based Learning

Regarding the question about the learning experience, all five responses were positive, as illustrated by the following quotes:

"It was an exciting experience, and I was able to understand everything."
"It was exciting; I learned and understood what a poster is."

"It was exciting and fun, and it made understanding the Science subject easy."
"It was exciting and easier to understand."
A similar pattern emerged in the fifth question, which compared poster-based learning with learning without posters: all informants said learning with posters felt more exciting or easier, with one stating simply, "Yes, and it was exciting." These findings are in line with Anggraheni and Saifuddin (2021), who reported positive student perceptions of posters, and with Sulastri, Ariandani, and Asri (2025), who found higher motivation with posters in biology. The answers, however, are short and use general words ("exciting," "easier"), so they do not show which poster features, such as color, pictures, or text layout, produced the enjoyment. The positive response may also partly reflect novelty: one informant said the lesson taught "what a poster is," which suggests the medium was not routine for the class. This possibility is relevant to the later finding on repeated use (Theme 5). Finally, because the informants were selected for being active, their enthusiasm cannot be assumed to represent the whole class.

2. The Role of Visuals in Aiding Comprehension

When asked why the images on the posters aided comprehension, the informants gave a range of explanations that went beyond saying that the images were appealing.

"The reason is that it makes understanding easier. Personally, when I read [the poster], it feels like I am inside the story." (Y)
"Because it is easier to understand, since you can see it directly on the poster."
"Because I can understand it better, thanks to the images on the poster."

Y's response is noteworthy because he does not simply say that the image is good; he describes reading the poster as being "inside the story," a form of imaginative engagement with the visual material. Other informants stressed being able to "see it directly." These remarks are consistent with multimedia learning principles, which hold that combining pictures and text supports a richer mental representation than text alone (Mayer, 2021; Mas Bakar et al., 2025). Our data, however, are self-reports, so they cannot show that the posters reduced cognitive load or improved comprehension; cognitive load research would require measures of load or performance (Sweller et al., 2019). Visuals can also hinder understanding when they are poorly designed or misread (Gafur et al., 2024), a possibility that the informants did not mention but that deserves attention in future studies.

3. Posters as a Link Between Subject Matter and Everyday Experience

The third question explored how the subject matter related to the informants' daily experiences. All five were able to name concrete things on the posters that reminded them of daily life.

"Chicken... forest... nature and plants."
"Trees, then plants, nature, and water."
"Animals, nature, plants, and water."
"Coral reefs, animals, and forests."

All informants could cite real-world examples without hesitation, and several were

specific (chicken, coral reefs, forests). This suggests that the posters were able to connect the abstract idea of the diversity of living things with objects familiar to the informants. Other answers, such as "nature" and "water," are general and do not show whether the informants linked them to genetic, species, or ecosystem diversity. The pattern is consistent with the approach of Ariani, Syamswisna, and Titin (2019), who built biodiversity posters on local plant inventories, although that study assessed feasibility with expert validators and not students' connections to daily life. It indicates that local, contextual content may help students relate the topic to their surroundings, but the present data do not allow a stronger claim.

4. Perceived Improvement in Conceptual Understanding

Regarding the fourth question, all informants reported that their understanding was better after learning with posters. This is a self-report: no pre-test or post-test was used, so the improvement was not measured.

"I understood it very well because there were images and definitions included, and it was more enjoyable."
"Thanks to the posters, I was able to understand the science lesson better than before."
"I understood it better because the images made it interesting, making it easier for us to grasp the concepts."

The reasons the informants gave were consistent: it was the combination of images and verbal definitions, rather than images alone, that they associated with understanding, which fits the multimedia and dual-coding arguments discussed above (Mayer, 2021; Mas Bakar et al., 2025). Jumadin, Rapi, Mustami, and Syarbini (2023) found higher learning outcomes in a poster class than in a control class, but through an objective test. Our informants' perceptions point in the same direction, yet they cannot confirm that a similar gain occurred, and they should not be read as evidence of the effectiveness of posters.

5. A Critical Stance on the Frequency of Poster Use

This theme differs from the usual emphasis of earlier poster studies, which mostly report favorable views. When asked whether teachers should use posters more frequently, all five informants answered "No."
"No." (Z)
"No, because it’s a waste of paper." (J)
"No." (R)
"No, because once the lesson is over, they often get thrown away." (Y)
"No." (N)
Only two informants gave reasons, and these were practical and environmental: paper posters were seen as single-use items that are thrown away. They did not say that they were bored with the medium. This pattern is consistent with the seventh question, on using posters in every lesson, where reactions were lukewarm compared with the enthusiasm for the first and fifth questions.
"Fun, but just okay."
"Just okay."
"Fun, well... you know... pretty good, pretty good."

This contrast is analytically important: a positive affective response to posters (Theme 1) did not translate into a wish for more frequent use. Two explanations are possible. One is concern for resources, which the informants stated themselves. The other is saturation or loss of novelty from repeated use of the same medium, which the informants did not state, but which is suggested by the lukewarm answers and by reports of boredom with routine methods in other subjects (Tangdiung et al., 2026). The second explanation is tentative, and one-word answers limit what can be inferred; follow-up probing would be needed. Concern about paper waste is a point we did not find discussed in the poster studies reviewed here. Anggraheni and Saifuddin (2021) used digital posters, which are easy to access on mobile devices; digital or laminated reusable posters could therefore be options to explore in response to the informants' concern, although this study did not test them.

6. Ability to Re-explain Concepts

The eighth question gives the most direct, although still indirect, indication of what the informants understood. Each of the five informants chose a different aspect of biodiversity to re-explain, as presented in Table 2.

Table 2. Informants' Re-explanation of the Concept of the Diversity of Living Things

Informant	Concept Explained	Quote (lightly edited)
N	Ecosystem diversity	"Habitat variations—such as forests, rivers, and oceans—influenced by abiotic factors (temperature, pH)... give rise to new species... resulting in stable ecosystems."
Z	Genetic diversity	"Variation in genetic material (DNA) within a species or population, resulting from mutation, recombination, and the movement of individuals between populations. Examples: free-range chickens, black Silkie chickens, and white broilers; in humans, variations in skin color and blood type."
J	Species diversity	"The number and variety of living species in a given area."
R	General definition of biodiversity	"The variation of life forms on Earth—encompassing the diversity of genes, species, and ecosystems—serves as the foundation for the natural balance that supports human life."
Y	Threats to biodiversity	Deforestation (70% of plants at risk), climate change, invasive species, unsustainable use, overfishing, and even mass fish die-offs along the coast.

Taken together, the five explanations touch on the three levels of biodiversity (genes, species, and ecosystems), a general definition, and threats to biodiversity. Each informant, however, explained only one aspect, so the data cannot show that any individual

understood the whole topic. The scientific accuracy of the explanations also varies. Z's explanation of genetic diversity is largely accurate and uses examples (chicken varieties, human skin color and blood type) that show variation within a species, which suggests an ability to apply the concept beyond recall. R's general definition is acceptable. J's answer describes species richness, the number of species, but species diversity also takes the relative abundance of species into account. N's explanation is partly accurate: abiotic factors help determine habitat types, but they do not directly "give rise to new species," which involves evolutionary processes, and ecosystem diversity does not by itself imply stability. Y's list of threats is reasonable, but "70% of plants at risk" is an unsourced figure that should be treated as the informant's recollection, and mass fish die-offs are an event rather than a category of threat. Because the explanations may also reflect the teacher's verbal delivery and not the posters alone, they indicate what the informants could say after the lesson, not what the poster caused them to learn. These inaccuracies also suggest that posters, like other media, need to be accompanied by teacher checking of students' understanding.

7. Teacher's Assessment of Lesson Implementation

To complement the interviews, this study also uses the science teacher's assessment of the implementation of the lesson on the diversity of living things with poster media in Grade VII at MTs Muhammadiyah 3 Salawati on September 16, 2026. The assessment used a sheet with eight aspects, as presented in Table 3.

Table 3. Results of the Supervising Teacher's Assessment of the Implementation of Instruction Using Poster Media

No	Aspect Evaluated	Score (1–4)	Category
1	Alignment of material with the lesson plan (RPP)	4	Excellent
2	Clarity of material delivery using poster media	3	Good
3	Suitability of poster design/content for Grade VII students	4	Excellent
4	Ability to link poster content with science concepts	3	Good
5	Interaction and classroom management during the lesson	3	Good
6	Response to student questions/comments	4	Excellent
7	Lesson time management	4	Excellent
8	Evaluation/reinforcement at the end of the lesson	3	Good

Based on Table 3, the total score obtained was 28 out of a maximum of 32 (8 aspects × a maximum score of 4). The percentage score was calculated using the formula:

$$P = (28 \div 32) \times 100\% = 87.5\%$$

The 87.5% score falls within the 81–100% range, corresponding to the "very good" category of lesson implementation (adapted from Wahyuni & Zulyusri, 2023). The teacher

also concluded on the sheet that the poster medium was effective and suitable for continued use in teaching this topic. We report this as the teacher's professional judgment; it is not supported by a measurement of student learning in this study and therefore is not treated as evidence of effectiveness. The assessment comes from one rater and one lesson, and inter-rater reliability could not be checked. Teachers' competence in delivering a lesson is also linked to learning effectiveness in general (Jumrawati & Lina, 2025), so a high implementation score may reflect the quality of the teaching as much as the posters.

8. Synthesis of Findings

Overall, the interview data show a consistent pattern among the five informants: they described the poster-based lesson as enjoyable, found the visuals helpful, linked the content to familiar objects, reported understanding better than before, and were each able to re-explain part of the material, with varying accuracy. The teacher rated the implementation of the lesson highly. The study also identifies an important nuance: enthusiasm for posters did not mean a wish to use them in every lesson, and the informants raised concerns about paper waste. The teacher's observation that delivery needs verbal elaboration, so that the lesson does not merely repeat the text on the posters, is in line with the informants' own references to definitions and explanations. For practice, these findings suggest that teachers in similar settings consider varying media and combining posters with verbal explanation and checks of understanding, but they are limited to the context studied.

CONCLUSION

Based on a thematic analysis of interviews with five Grade VII students, the informants' responses to the use of posters in a science lesson on the diversity of living things were generally positive. They found the learning experience enjoyable and accessible; they said that the visual elements made the material easier to understand and helped them link it to real-world objects such as animals, plants, and aquatic ecosystems. All five reported understanding the material better than before, and each was able to re-explain one aspect of biodiversity, although the accuracy of these explanations varied and learning outcomes were not measured.

The science teacher's assessment of the lesson implementation gave a score of 87.5% ("very good"), and the teacher judged the poster medium suitable for continued use. This shows that the lesson was implemented well, but it does not by itself establish that posters improve learning.

The study also found that a positive reception of the posters did not mean that the informants wanted them used in every lesson. They rejected more frequent use, with two informants citing paper waste, and their lukewarm responses to continuous use may point to saturation, although this was not stated by the informants. The teacher further observed that material delivery needed verbal elaboration so that the lesson did not merely repeat the text on the posters. These findings underline the value of varying instructional media and strengthening delivery strategies, and of exploring digital or reusable posters, so that the benefits of posters can be used without monotony or resource waste.

This study has several limitations. It involved only five informants from one class, who were selected for being active in class and may therefore be more articulate and more positive than their classmates; the data are self-reported perceptions from a single lesson, translated from Indonesian; there was no pre-test or post-test; the implementation assessment came from

one rater; and consent was oral, with permission obtained from the science teacher, without written parental consent or formal ethical clearance. The findings therefore cannot be generalized. Future research should involve more informants, use maximum-variation sampling that includes less active students, combine interviews with pre-test and post-test measures of learning outcomes, observe more than one lesson, and compare paper posters with digital or reusable ones.

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