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Need Assessment of Teaching Material for Classification Living Things at Junior High School

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Abstract: This study aims to analyze the need for interactive multimedia-based teaching materials for classifying living things in order to improve students' classification and problem-solving abilities. The research was conducted at SMP Negeri 8 Bayung Lencir using a descriptive method through interviews, observations, and documentation. The research results indicate that the teaching of living organism classification is still teacher-centered, with minimal use of visual and digital media, and has not yet utilized the potential of the surrounding environment. The teaching materials used are limited to textbooks with simple and non-contextual illustrations, which impact the low classification skills and weak contextual problem-solving abilities. The diverse learning styles of students and limited access to biodiversity necessitate varied, interactive, and technology-based teaching materials. The needs analysis shows that students expect teaching materials that are easy to understand (98.82%), interesting (96.47%), contextual (89.41%), independent (81.18%), and technology-based (94.12%). Additionally, 100% of teachers stated the importance of interactive multimedia teaching materials for improving students' classification and problem-solving abilities. The results of this study serve as the basis for the need to develop interactive multimedia-based teaching materials that are relevant to student characteristics and support effective, engaging, and contextual 21st-century science learning.

Keywords: Classification of living things; Classification skills; Interactive multimedia; Needs analysis; Problem-solving

Introduction

The classification of living things is an important foundation in the study of Natural Sciences (IPA) because it is directly related to the ability to recognize, understand, and group the various types of living things found on Earth. Classification activities not only train students' cognitive abilities in observing and grouping, but also encourage critical thinking and problem-solving skills within the context of biodiversity in their surrounding environment. Therefore, learning about the classification of living things becomes an important foundation for understanding basic biological concepts and building students' scientific literacy from an early age (Nopriadi et al., 2022; Luzyawati et al., 2023; Ananda, 2024).

Field observations indicate that students' low ability to classify living things impacts their ability to solve environmental problems. Student learning outcomes on the topic of classification are still low, with a student mastery rate of 30.70%. Additionally, various sources mention that this is due to a lack of direct experience and limited learning resources available at school, as well as students' limited access to their surroundings (Syarif et al., 2025). This leads to a lack of student understanding of environmental issues.

The current generation is generally less interested in understanding the environmental crisis (Salguero et al.,

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2024). This is supported by various previous studies which show that students have not yet been able to classify living things according to the principles of classification rules. According to A'yun & Erman (2019) research, students' ability to classify invertebrate animals in the animal kingdom is still low. This is also supported by the fact that student motivation is still in the moderate category for the topic of classifying living things (Ratnawati et al., 2020). Additionally, student activity is low, which impacts students' low mastery scores on classification material (Anwar & Hujjatusnaini, 2024).

Classification ability is closely related to problem-solving ability. Problem-solving is defined as a person's process and ability to solve problems, where the methods or strategies for solving the problem cannot be immediately determined. Problem-solving requires a person's ability to understand the problem and create a problem-solving plan, implement the problem-solving plan, review (checking) it again, and recheck it during the process (Mardatillah et al., 2021). This ability is very important because it aligns with current demands. Problem-solving in science learning is becoming an essential skill that not only tests conceptual understanding but also encourages students to apply knowledge in real-world contexts. Classification skills and problem-solving abilities are complementary basic skills in 21st-century science learning.

The classification of living things serves as a framework for recognizing patterns and relationships between organisms, which in turn forms the basis for thinking when formulating problem-solving strategies in daily life. Problem-solving encourages students to think critically through a systematic approach. Therefore, integrating these two abilities into science learning is essential so that students not only understand concepts but are also able to apply them critically and creatively in real-world contexts.

Various efforts are being made to improve these two abilities. Previous research confirms that interactive learning designed to include and utilize multimedia is effective in improving students' understanding of the classification of living things. Interactive digital learning materials can provide additional learning experiences and motivation for students (Kosasih, 2021; Munandar et al., 2023). Additionally, an approach that combines visual, auditory, and kinesthetic elements is effective in improving understanding of biological classification concepts (Ayimbila et al., 2021). Support also comes from the Invertebrate Interactive Dichotomous Key media, which was validated and proven suitable for use in classification learning (Ristanto et al., 2020). Multimedia-based worksheets on the invertebrate subtopic are effective in improving student learning outcomes (Titin et al., 2022). Multimedia learning products on the concept of Arthropoda are also able to increase students' self-regulation and motivation (Endris & Suhartini, 2022). An activity-based textbook on Animalia-Invertebrata material for high school students provides active learning experiences (Cahyono & Ambarwati, 2025). The development of interactive media on the topic of living things classification has been proven effective in improving student understanding (Munandar et al., 2023). Efforts are also being made to improve problem-solving skills, including those by Fadwa et al. (2024) in biology class, utilizing a problem-based learning (PBL) module.

Method

This research is descriptive research. The purpose of this study is to determine the learning profile of living-things classification at SMP Negeri 8 Bayung Lencir on the material of living things classification. The population in this study consists of the students of class VII and the supporting field conditions for learning at SMP Negeri 8 Bayung Lencir in the 2025/2026 academic year. Data collection techniques in this study were carried out in several ways, namely questionnaires, interviews, observations, and tests. In this study, questionnaires were given to students to determine their characteristics in terms of identity, access to technology, learning styles, and learning material needs. Questionnaires were also given to science teachers to determine their learning material needs in terms of content relevance, expectations for learning materials, learning challenges, interactive multimedia learning material needs, environmental utilization in learning, current learning material quality, and school support.

Observations were conducted to gather information related to needs analysis in terms of teaching materials, curriculum, media, and infrastructure at the school. Interviews were conducted with teachers to analyze the need for teaching materials on the classification of living things in order to obtain information regarding students' abilities in classifying living things, students' ability to differentiate taxonomic levels, students' understanding of concepts, the connection between learning and environmental issues, learning constraints, and the potential of the surrounding environment as a learning resource. Tests were given to assess the non-content classification abilities of the students. The aspects of classification ability studied are recording each observation separately, finding similarities and differences, contrasting characteristics, comparing group characteristics, determining the basis for grouping, and connecting observation results (Hernawati et al., 2021). The data obtained were analyzed qualitatively and descriptively by describing

the findings based on existing patterns, themes, and discoveries.

Results and Discussion

The material on classifying living things is a part of the 7th-grade science curriculum. The learning achievement (CP) states that by the end of Phase D, students are able to classify living things and objects based on observed characteristics (Depdikbud, 2022). In science learning, the classification of living things is a process of grouping living things based on the similarities in characteristics they possess. Essentially, the classification of living organisms is a method used to group them into specific categories or units called taxa (Rifa'i et al., 2020). Students' process skills demanded in science learning, including the material on classifying living things according to Depdikbud (2022), include observing, questioning and predicting, planning and conducting investigations, processing, analyzing data and information, evaluating and reflecting, and communicating results.

The material on classifying living things discusses the kingdoms of organisms in the environment. The five-kingdom classification system, starting from monera, protista, fungi, plantae, and ending with animalia, is studied through their characteristics and types. This material requires many visual examples so that students can differentiate and categorize living things. Exploration and observation are essential for learning this.

Learning Strategies

The learning strategy for classifying living things used is still teacher-centered. Students are still taught using the lecture method, so they are only passive listeners. Learning is limited to memorizing taxonomic levels, types of living things, and various kingdoms, as well as some examples from the book. Activity sheets that practice collaboration, problem-solving, and discussion are not available. This condition limits learning because students participate less in activities related to discovering the concept of classifying living things and its application in real life.

Additionally, learning activities only take place inside the classroom without any variation in teaching methods to stimulate students' curiosity. Practical work or scientific investigations are never carried out, and observations of living things were limited to observing pictures in student textbooks and living thing cards, even though learning about the classification of living things requires direct experience to strengthen students' conceptual understanding.

The students' surrounding environment is also underutilized for learning. The school environment actually holds potential for biodiversity, even though biodiversity is still low. However, plants and animals that are suited to the environmental characteristics there can be used as real objects for observation, identification, and classification activities of living organisms. Thus, students' opportunities to develop scientific thinking skills, science process skills, and problem-solving skills are still very limited. In fact, the learning of living things classification should be designed to be more contextual, linking the material to the realities of the students' surrounding environment, and providing them with opportunities for exploration, discussion, and problem-solving activities that promote meaningful learning.

The practice questions are limited to those in the student textbook. There are no questions developed by the teacher to practice classification skills that are contextual to the students' environment. The evaluation questions created are limited in their taxonomic level to low cognitive levels (C1-C2) and do not train higher-level question abilities. In fact, the ability to classify is a topic that requires high-level skills, including analysis. This condition indicates that the available questions have not fully trained students' higher-order thinking skills, particularly in the context of classifying living organisms. As a result, students tend to only memorize concepts without mastering the analytical and problem-solving skills that should be the primary goal of science education. In other words, there is a gap between the demands of 21st-century learning, which emphasizes critical thinking skills, and evaluation practices that are still focused on rote memorization. In fact, responding to the demands of the 21st century, Wang & Jia (2023) through a systematic review confirmed that the most effective framework for improving critical thinking in science and STEM education is by integrating active learning strategies and digital technology.

Based on the description above, it is shown that the teaching of living organism classification still does not facilitate learning in accordance with the characteristics of science. In fact, according to research by Sapitri et al. (2022), teaching living organism classification using guided inquiry can improve students' learning outcomes in the material of living organism classification. Inquiry-based learning has great potential to develop students' collaborative skills through problem-solving activities (Agustini et al., 2024). Science learning, including the material on classifying living things, should emphasize the scientific process, encompassing observation, classification, and problem-solving. The research results indicate that students are not yet engaged in observing, grouping, and identifying activities.

This less student-involved learning strategy impacts students' low classification abilities, as evidenced by the fact that many students have not yet

mastered solving living organism classification problems, even though the problems provided are still in the lower order thinking skill (LOTS) category. This is evident from the learning outcomes and teacher interviews regarding classification skills. Students tend to memorize taxonomic levels without truly understanding them, lacking the ability to categorize into the correct kingdom.

The role of the teacher is very important in designing learning, especially for the subject matter of classifying living things. This is because the material on classifying living things is very important to teach. Based on curriculum analysis, data indicate that this material is suitable for 7th-grade middle school students, can introduce living things and biodiversity, encourages problem-solving and classification skills, and is also suitable for using various types of media.

Teaching Materials and Media

The media used so far have been limited to the images in the book and printed cards of living organisms from the five kingdoms. The images on the classification cards provide examples of living things in general and are less contextualized to the types of living things in the students' environment. Learning does not use media such as PowerPoint as a learning aid for classifying living things. Other digital media such as photo collections, videos, and interactive media are also not yet available.

The types of living organisms in the surrounding environment are not utilized as a learning medium. In fact, the surrounding environment contains various types of plants, fungi, and animals that can be utilized. These three types of living organisms can represent examples for each of the plant, fungi, and animal kingdoms. Literature references and student worksheets are very limited. Student worksheets containing media such as images of different types of living things are also unavailable to assist students in learning about the classification of living things.

The teaching materials used in the learning process are student handbooks. The teaching materials are limited to the Class VII Science textbook, which covers the topic of classifying living things. Students do not have personal books they can use for studying outside of school hours. Student textbooks are loaned to students and used during class time. There are no other teaching materials that students own and use in their learning. There are only science books from different publishers and curricula.

Characteristics of teaching materials on the topic of classifying living things: they present few relevant examples from everyday life. There are only a few examples of living things. There are no specific living things that are familiar to the students' location. For example, mushrooms in the oil palm plantation area, ferns on the oil palm trees, wildflowers around, various types of insects, etc., at the student's location. Examples of each kingdom are mentioned, but many are not accompanied by images or explanations. This is evident from the fact that the number of images of living things contextual to the students' environment presented in the student textbook reaches only 12.50%, and the number of examples of living things contextual to the students' environment is 33.33%. This indicates that there is still a need to add teaching materials that present contextual examples.

The instructional material design used by students is not very engaging, as evidenced by the lack of color in the books. The images are small, and the illustrations and pictures are not in-depth or colorful. For example, the types of protozoa are explained, some having pseudopods, others having flagella and cilia, but the detailed shapes of the locomotor organs that distinguish these protozoan groups are not shown. Another example is that there are no representative visuals to depict the characteristic structures of living organisms, such as rhizoids. Some of the terms used in the textbook are sometimes too scientific, such as saprophyte, substrate, chitin, etc. The activities in the teaching materials also do not adequately connect with environmental issues.

The evaluation of the teaching materials used has not yet accommodated the improvement of problem-solving and classification skills. The evaluation is limited to concept comprehension questions. None of them show the relationship between classifying living things and problem-solving in the context of the environment or conservation, for example. The questions provided are not graded, for example, they ask about the similarities and differences between one living thing and another. The questions tend to directly ask for the characteristics and the category they belong to. Additionally, the existing teaching materials are not interactive enough, as evidenced by the lack of self-evaluation features, limited technology integration, and the absence of interactive games or quizzes.

The digitalization of teaching materials is still not being used. No digital teaching materials are used in the teaching of living organism classification. Students do not have access to digital teaching materials. The absence of digital teaching materials is due to the teacher not preparing them and the limited availability of living organism classification materials on search engines. Based on student responses, the need for teaching materials that are easy to understand (98.82%), interesting (96.47%), contextual (89.41%), independent (81.18%), and technology-based (94.12%) was identified.

Student responses also indicated that students wanted and needed colorful living organism

classification teaching materials that included quizzes/games, were easy to understand, allowed for independent study at home, had videos, animations, digital content, were relevant to their surroundings, and contained many images. Therefore, it can be concluded that students need interactive teaching materials.

Teacher responses also indicated that 100% of teachers felt it was important to have interactive multimedia-based teaching materials on the classification of living things for 7th-grade middle school students. Teachers also supported the inclusion of the diversity of living things in the surrounding environment in digital teaching materials. Teachers also needed interactive teaching materials in terms of presentation and contextual and relevant content that could help teach the classification of living things. Thus, various challenges such as students' difficulty understanding the classification of living things with a large amount of material and limited time could be addressed with interactive multimedia-based digital teaching materials on the classification of living things.

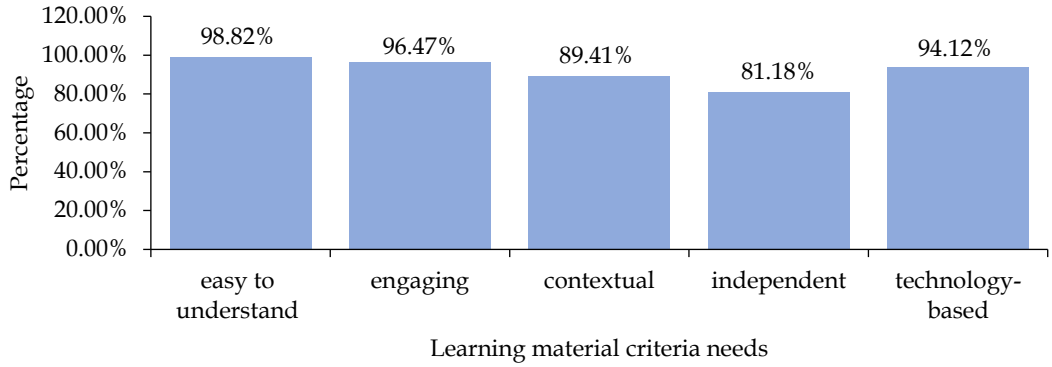

Figure 1. Diagram of students' learning material needs for the living things classification material

Student Characteristics

Student Characteristics: In terms of learning styles, students exhibit heterogeneous characteristics. Students have a diverse range of learning styles, including visual (54.10%), auditory (21.62%), and kinesthetic (8.11%), as well as a balanced combination of visual and auditory (16.22%). These data indicate that students' learning characteristics and styles are heterogeneous. This difference has not yet become a basis for learning design.

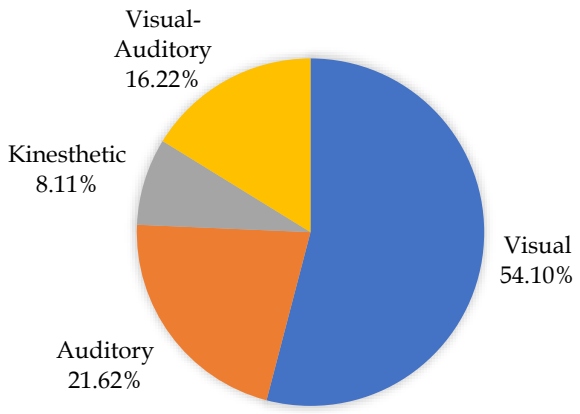

Figure 2. Diagram of students' learning style trend

Worksheets and evaluations have not yet facilitated students' needs based on learning styles. This difference is an important basis for determining teaching strategies and materials that meet students' needs in the classification of living things. Learning style is a term that refers to the most preferred method of learning.

Efforts to meet the differences in student characteristics (differentiation) based on learning style characteristics can be carried out by using interactive multimedia-based teaching materials. This is because it contains images for visual learners, videos for auditory learners, and interactive activities for kinesthetic learners.

Students with visual learning preferences need consideration in using visual elements in teaching by providing relevant images, graphs, diagrams, or illustrations. For students with auditory learning preferences, clear and structured oral explanations can be provided, class discussions can be facilitated, or audio recordings related to the lesson material can be used. Kinesthetic learners will gain a deeper understanding through learning processes that involve physical activities, moving their bodies, and using their sense of touch and movement to gain direct experience with the material being studied (Asnawi, 2023; Yuyun et al., 2024). Research shows that adapting learning materials to students' learning styles can improve their understanding and engagement in science learning (Permatasary, 2018; Nasution & Yerimadesi, 2025). Other research indicates that the direct use of visual media can improve students' science process skills. For

example, Maizaliani et al. (2024) assert that using visual-based teaching materials helps students develop observation, classification, and interpretation skills for scientific data more meaningfully. Mellyzar et al. (2024) also found that Virtual Reality (VR) based media provides a three-dimensional learning experience that supports visual and kinesthetic learners, especially in science topics requiring spatial representation. In line with this, Nurain et al. (2023) emphasized that discovery learning is capable of actively engaging students in the process of classifying living things, thus supporting diverse learning styles in the classroom. This adjustment will help students process information better.

Learning design includes the design of teaching materials, and classification can be adapted to learning styles as a reference factor, making videos, images, audio, and activity plans available to provide students with meaningful experiences and facilitate better information reception on classification material.

The characteristics of students of this age tend to be homogeneous. The students' ages range from 12 to 14 years old, and they are all from the same village. The fact that the students are in the 12-14 age range indicates that they are entering the formal operational stage, meaning they are capable of abstract, systematic, and analytical thinking. At this stage, their logical thinking abilities have already developed (Saifuddin, 2022).

The students' accommodation is located in an area of oil palm, gas, and coal distribution plantations. This condition limits students' exposure to biodiversity due to the low biodiversity in their surrounding environment. As a result, additional visualization from outside their environment is needed in living organism classification teaching materials. The research by Anggraini et al. (2024) proves that digital worksheets based on ecology and biodiversity are effective in expanding students' understanding of the concept of biodiversity. Similar findings were reported by Nugraha et al. (2021), who found that environmental education-based video learning media helped students understand living things outside of the local context.

The presence of students in an environment surrounded by oil palm plantations, gas pipelines, and coal distribution routes generally results in lower biodiversity compared to forest or conservation areas. This condition impacts students' limited direct experience with the diversity of living things. Therefore, additional visual aids are needed thru interactive teaching materials. The teaching materials, which include videos, diverse images, and augmented reality visualizations, serve as a bridge between the limited environment and the complex scope of classification.

The remote living areas, limited access to education outside of school, lack of learning support, and limited digital access outside of school hours pose unique challenges for teachers in facilitating students. This condition means that students' learning activities are not yet optimally directed, so a learning device is needed that can be accessed anytime and anywhere, both classically and independently at home. Teachers are required to innovate by integrating technology into learning, because although students are familiar with technological developments, its utilization has not been maximized for learning activities (Purnama & Sari, 2023; Wahyuni et al., 2021). Learning using digital devices in schools is rarely used and is limited to informatics lessons. The use of digital devices in other subjects is infrequent, except for recording learning documentation, not for the learning process itself.

Therefore, there is a need for learning innovation using technology, as every student follows technological developments, but they have not yet been directed toward its use in learning. This presents a significant potential for integrating technology into learning.

Considering students' access to digital devices. The amount of time students spend using digital devices per day ranges from 1-3 hours (83.78%) to more than 6 hours per day (2.70%). A total of 94.59% have used digital devices for learning at home.

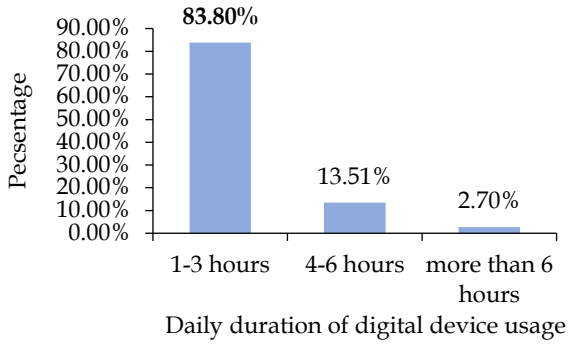

Figure 3. Diagram of students' access duration to digital devices

Jahan & Hasan (2025) research indicates that deep learning-based visual technology can accurately identify and classify plant species. This aligns with the use of interactive multimedia in teaching the classification of living things, which utilizes digital visualization to make it easier for students to understand the differences between organisms. Based on the daily duration of digital device usage and students' expectations regarding learning materials, interactive multimedia-based learning materials that are easy to understand, contextual, and technology-based are needed. It is hoped that students can experience a meaningful process and achieve maximum results in their learning.

The use of interactive multimedia can be a strategic tool in improving the quality of technical learning,

especially in practical aspects and work skills, and supporting the transformation of traditional teaching methods toward interactive digital (Rajendra & Sudana, 2018). The development of interactive digital media also facilitates meaningful and contextual learning (Pratiwi et al., 2025). The use of interactive e-modules has been proven to significantly improve the critical thinking skills of elementary school students. This module is highly valid and effective for implementation in 21st-century learning (Dermawan et al., 2025).

Besides integrating technology into learning, it's also necessary to adapt technology to problem-solving abilities. Teaching materials and media must be developed optimally and interactively. For interactive media to be optimal in developing students' problem-solving skills, its design must include embedded scaffolding. This feature, as demonstrated in Augmented Reality (AR) studies in Biology, allows students to process information and solve complex problems more independently (Shao & Huang, 2024).

Facilities and Infrastructure

Supporting facilities for learning include one projector at the school, 15 Chromebooks, and science learning kits. However, these have not been optimally utilized in teaching the classification of living things. Students only use picture cards, which are used solely for viewing images and are limited for further study.

The types of living things in the environment are not fully utilized to provide learning examples. In fact, there are many examples of living things in the surrounding environment that can be used as sample examples for learning. The results of interviews with science teachers indicate that limited infrastructure is the main obstacle in the learning process. The lack of existing school facilities is rarely utilized to the maximum because the quantity is disproportionate to the number of students in the class, making it difficult for teachers to organize their use. The teacher feels that using technology requires additional preparation time, while class hours are limited. This condition makes teachers tend to revert to lecture methods and textbooks.

In addition to technological constraints, teachers also highlight that utilizing the school's surrounding environment as a learning resource is still rarely done. This is not because the environment is not potential, but because of time constraints, the teachers' considerable administrative burden, and the lack of teaching materials that directly link the local context (oil palm plantations, ponds, TKKS mushrooms) to the classification material. This is due to limited learning time, an insufficient number of devices for the number of students in one class, only one projector per school that must be shared, making it difficult for teachers to organize its use.

The description of living things in the environment includes various wild and recognized plants, ranging from different types of plants from various plant groups. The school environment, located in the middle of a palm oil plantation, is home to unique types of living organisms such as certain types of fungi and ferns. Similarly, from members of the animal kingdom. There are many types of land animals, insects, and so on. In the school environment area, there is also a pond that can be used for collecting water animal samples, providing students with the opportunity to conduct direct observation and practical classification of living organisms. This phenomenon aligns with the research of Yahya (2025) and Syamsafitri (2023), which shows that the palm oil plantation environment, despite being a monoculture, still has biodiversity potential that can be utilized as a source of science learning.

Figure 4. Living things around the students

The potential of the school environment as a learning resource for classifying living things has not yet been utilized in the material on classifying living things. Teachers rely on textbooks as teaching materials without direct exploration. Some factors that cause this to happen include time constraints, the need for extensive preparation, and a lack of teacher training in designing creative learning.

The lack of environmental utilization and exploration of nearby life forms hinders the development of classification skills. In fact, an environmental-based approach provides greater opportunities for students to understand concepts thru direct experience. Its application has been proven to improve learning activity and learning outcomes. This aligns with the research findings of Cahyani & Djudin (2024), which state that the implementation of environmental-based science can improve the quality of learning and student learning outcomes, making learning meaningful and increasing students' care, curiosity, and motivation. Additionally, research by Zulfiqar et al. (2025) indicates that utilizing deep learning technology in plant species classification can support the development of interactive multimedia that

helps students visualize and understand the concept of living organism classification in a more contextual and engaging way.

This aligns with research in the life sciences that proves that an inquiry-based virtual reality environment is effective in improving students' critical thinking due to its interactive visual experience (Lee & Zhang, 2025). Therefore, it can be concluded that visualization and interactivity are very important in learning about the classification of living things.

Student Classification Ability Profile

The classification ability profile of junior high school students was examined to determine students' initial classification abilities. The results show that students' ability in the classification ability indicator is still considered low. Students' abilities are evident in several indicators, including recording each observation separately, finding similarities and differences, contrasting characteristics, comparing group characteristics, determining the basis for grouping, and connecting observation results (Hernawati et al., 2021).

Based on Figure 5, it can be seen that students' ability to record observation results separately only reached 34.30%. This indicates that students only recorded one or two criteria for the given picture object. On average, students only compared one or two objects whose similarities and differences they could write down. Students' ability to classify on the indicator of writing similarities and differences only reached 49.50%.

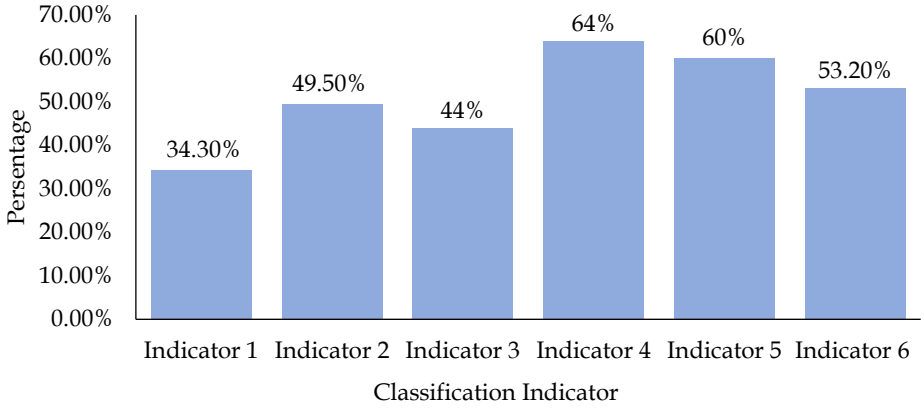

Figure 5. Diagram of students' classification abilities. Indicator 1: Record each observation separately; Indicator 2: Find similarities and differences; Indicator 3: Contrast characteristics; Indicator 4: Compare group characteristics; Indicator 5: Determine the basis for grouping; Indicator 6: Connect observation results

The achievement results for the indicators of contrasting characteristics (44.00%), comparing group characteristics (64.00%), determining the basis for grouping (60.00%), and connecting observation results (53.20%) show that students' classification abilities are still low. The answers provided by the students can describe physical characteristics to a limited extent, and only a few can analyze more about similarities and differences. Students briefly wrote conclusions regarding the classification questions they were given. However, based on the results of the initial student classification test, it was found that students have basic abilities in classifying by observing the physical characteristics of shapes and colours. However, students are not yet able to analyse further from each indicator provided. Therefore, this initial knowledge of the students can be used as a reference in training students' classification abilities.

This low score is not unrelated to the limitations of the facilities and teaching materials used in learning. The lack of interactive learning media and the underutilization of the surrounding environment mean that students only rely on textbooks and simple picture cards. This condition is further exacerbated by the limited hardware available at the school, with only one projector and 15 chromebooks, making it difficult for teachers to facilitate digital learning evenly. This low score is not unrelated to the limitations in infrastructure and teaching materials used in learning. The lack of interactive learning media and insufficient use of the surrounding environment mean that students rely solely on textbooks and simple picture cards.

This aligns with several studies indicating that inadequate laboratory and classroom space limitations affect the quality of the science learning process, particularly practical aspects and the use of engaging visual media (Lestari et al., 2024). In line with this, Alizadehsani et al. (2025) also showed that visual image-based technology is capable of automatically recognizing and classifying plant species. These results reinforce the importance of using interactive visual

media to help students understand the concept of classifying living things more clearly and concretely.

Thus, the need for interactive multimedia teaching materials that can integrate the potential of the surrounding environment with technological support has become very urgent to improve students' classification and problem-solving abilities.

Conclusion

The research results indicate that the teaching of living organism classification at SMP N 8 Bayung Lencir is still teacher-centered and only uses textbooks. This has resulted in low student ability in classification, with an average observation recording score of 34.30%. Only 49.50% of students were able to identify similarities and differences. The teacher reported limitations in learning media, which restricted interactive learning practices. Needs analysis confirms that students and teachers require contextual and user-friendly interactive multimedia-based teaching materials to improve students' classification abilities and problem-solving skills.

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Author Contributions

Conceptualization, methodology, software, formal analysis, investigation, resources, data curation, writing—original draft preparation, R.A.; writing—review and editing, validation, visualization, supervision, E. and M. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

All authors declare no conflict of interest.

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