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# Students' Needs for Bangka Island Ethnopedagogy-Based Liveworksheet Development

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***Abstract***
*Limited integration of local plant knowledge into science learning highlighted the need to identify students' requirements for contextual digital learning resources. This study aimed to analyze students' needs to inform the development of a Bangka Island ethnopedagogy-based Liveworksheet incorporating Discovery Learning. A descriptive survey involved 38 Grade VII students at Junior High School 3 SATAP Lubuk Besar, Indonesia. Questionnaire responses were analyzed using descriptive statistics and thematic grouping. Although 94.7% of students expressed interest in learning about plants, 57.9% reported difficulties understanding plant-related material. Interest in Liveworksheet reached 92.1%, and 94.7% had access to smartphones or laptops. Furthermore, 94.7% were interested in local plants, but only 50% had previously learned about their cultural uses. All students preferred active learning involving observation, experimentation, and discovery. These findings indicated a need for interactive learning resources that connect local plants and community knowledge with scientific concepts through discovery-oriented activities. The development priorities identified were accessible digital activities, contextual plant content, and opportunities for direct exploration. These findings inform the subsequent design and evaluation of an ethnopedagogy-based Liveworksheet.*

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## INTRODUCTION

Plant awareness disparity describes the tendency to pay less attention to plants than to animals. Published international research has identified this disparity among students (Walias et al., 2023). Another published study reported that students identified plants at a rate of 22.60%, compared with 75.78% for animals (Sakinah et al., 2026). These findings establish the relevance of plant awareness as an educational concern, but they do not describe the learning needs of Grade VII students at Junior High School 3 SATAP Lubuk Besar. Their interest in plants, difficulties with plant-related material, familiarity with local species, and preferred forms of learning support require investigation in the local context. A needs analysis can provide the evidence needed to guide the development of plant learning resources suited to these students.

Contextual science learning can draw on local wisdom, understood here as the knowledge, practices, and cultural values developed within a community. Ethnoscience has a different role: it examines local knowledge and practices in relation to scientific concepts. Ethnopedagogy concerns their educational use, guiding how culturally grounded knowledge and values are incorporated into learning activities (Alwasilah, 2024). A review by Hikmah et al. (2025) found that studies of ethnoscience in science education have used approaches including

project-based learning, inquiry, and STEAM to connect scientific content with cultural contexts. Rosyidah et al. (2025) likewise identified the integration of local wisdom with STEM as a developing approach to contextual science education that may contribute to Sustainable Development Goal 4. For plant learning in Bangka Island, local knowledge about plants would provide the cultural content, ethnoscience would help examine its relationship with scientific explanations, and ethnopedagogy would guide its use in learning activities. Whether this approach meets the needs of the students in the present study remains to be established through the local needs analysis.

Bangka Island possesses considerable plant diversity, much of which is closely connected to the daily lives of local communities. The people of Bangka Island utilize plants for various purposes, including economic activities, traditional medicine, cultural practices, and ecological functions. However, the presence of diverse local plants does not necessarily ensure that students possess adequate awareness, knowledge, and concern for plants. This finding is consistent with (Linderwall et al., 2024) who reported that plant knowledge is influenced by various experiential factors and learning contexts. Therefore, local plant knowledge from Bangka Island needs to be integrated into formal education, particularly at the junior secondary school level. Communities on Bangka Island frequently use locally available resources, for example, by cultivating pepper as a source of income, using simpur leaves to wrap food, and using jeruk kunci to enhance the flavor of dishes. Formal education can incorporate technology to create interactive learning experiences for students (Dariah et al., 2024). Such interactive learning can be facilitated through electronic student worksheets that integrate contextual knowledge with students' surrounding environments(Fitri et al., 2025). This approach is consistent with the findings of (Rachma et al., 2023), who reported that electronic worksheets can make students' learning experiences more engaging.

Existing research on ethnopedagogy has predominantly focused on outcomes such as scientific literacy, learning outcomes, motivation, and learning independence. One of these studies is (Ariana, 2025), which states that one of the main focuses of research is scientific literacy and learning independence, along with various science process skills and innovative learning approaches. Another study by (Jannah et al., 2022) reported that frequently developed research topics include scientific literacy, critical thinking, creative thinking, problem-solving, and learning outcomes. The findings indicate that the use of ethnoscience-based learning resources has the potential to improve learning motivation and scientific literacy (Januarti et al., 2024). The gap in this study concerns the evidence needed to design a learning resource for a specific group of students. Research on plant awareness explains why students' attention to plants matters, while ethnopedagogy offers a way to bring local knowledge and cultural practices into science learning. Liveworksheet provides a possible format for interactive activities. However, these strands alone do not show what difficulties Grade VII students in Bangka Island encounter when learning about plants, which local plant knowledge is meaningful to them, or what digital activities they can access and would find useful. A needs analysis is therefore required before these elements are brought together in a Liveworksheet. Its contribution is to identify locally grounded design requirements; the effectiveness of the resulting resource would require subsequent evaluation. A needs analysis of Discovery Learning-based electronic student worksheets (E-LKPD) can serve as an important preliminary stage for identifying students' characteristics and instructional material requirements before proceeding to the development stage (Khotami et al., 2023).

Previous studies have demonstrated the potential of ethnoscience, local wisdom, Liveworksheets, and Discovery Learning in science education. However, these approaches have generally been examined separately or have been associated with different learning outcomes. The use of Liveworksheet can support more interactive learning and actively engage students in the learning process (Firnanda et al., 2026). Therefore, the present study seeks to extend previous

research by integrating Bangka Island ethnopedagogy into a Liveworksheet designed around the Discovery Learning model and specifically oriented toward enhancing students' plant awareness. This study contributes a contextual profile of students' learning needs to guide the development of a Liveworksheet based on Bangka Island ethnopedagogy. Accordingly, this study analyzes students' learning needs as a foundation for developing the Liveworksheet. Discovery Learning and plant awareness provide directions for its subsequent design and evaluation; this needs analysis does not establish an intervention effect.

## METHODS

This study employed a descriptive survey design to identify students' needs as an initial stage in the development of science learning based on ethnopedagogy using the context of local plants from Bangka Island. The needs analysis was conducted to obtain information regarding students' interest in plant-related topics, difficulties in understanding the material, learning experiences and preferences, needs for digital learning media, knowledge of local plants from Bangka Island, learning experiences related to the use of plants in local culture, and students' concern for plants and the environment. A descriptive survey was selected because it could document students' existing experiences, learning difficulties, and preferences before the Liveworksheet was designed. This information provides a basis for choosing relevant local plant content and learning activities without implying that the resource has already been tested. Data were collected through a questionnaire administered on May 18, 2026, to 38 Grade VII students at Junior High School 3 SATAP Lubuk Besar, Central Bangka Regency, Indonesia. The questionnaire consisted of closed-ended questions with response options and open-ended questions that allowed students to explain the reasons for their responses. The 38 respondents comprised all Grade VII students at Junior High School 3 SATAP Lubuk Besar, who had completed all Grade VII coursework at the time of data collection.

The needs analysis instrument was developed by the researcher with reference to the plant awareness indicators described by Parsley (2020): attention, attitude, knowledge, and relative interest. The needs analysis instrument covered several aspects, namely (1) students' interest and learning experiences related to plant materials, (2) students' difficulties in understanding and recognizing plants, (3) experiences and needs regarding the use of learning media, (4) students' knowledge and experiences concerning local plants from Bangka Island and their utilization in local culture, and (5) students' awareness, experiences, and preferences in plant learning. The learning media aspect included students' experiences using website-based media, the use of Student Worksheets , access to learning devices, and interest in interactive media such as Liveworksheet. Meanwhile, the local-context aspect included students' knowledge of characteristic plants of Bangka Island, their experiences learning about the benefits of plants in local culture, and their interest in learning about plants found in their local environment.

Data collection was conducted by asking students to complete the questionnaire based on their experiences and perceptions of plant learning. The needs analysis data were collected in person during a science lesson. Each student answered the questions under the teacher's guidance, after the teacher had explained how to respond and clarified the meaning of each question. Quantitative data from the closed-ended questions were analyzed descriptively using frequencies and percentages. The percentage of each response category was calculated using the formula

$$P = \left(\frac{f}{N}\right) \times 100\%$$

where (P) represents the percentage, (f) represents the response frequency, and (N) represents the total number of respondents (N = 38).

This analysis was used to describe the trends in students' needs regarding plant learning, learning media, local contexts, and learning activities. Each student's answer to an open-ended question served as a unit of analysis. The researcher read all responses and assigned initial codes

to statements about interest in plants, learning difficulties, media needs, local plants, and expectations for science learning. Codes with similar meanings were grouped into broader categories, while responses expressing different or opposing views were retained and described within the relevant category rather than forced into a dominant pattern. The researcher checked the interpretation by rereading the original responses and comparing them with the assigned codes and category descriptions.

## RESULTS AND DISCUSSION

The needs analysis was conducted with Grade VII students of Junior High School 3 SATAP Lubuk Besar to describe their experiences of plant learning, learning media needs, interest in local plants, and preferred learning activities. Before data collection, permission was obtained from the school, consent was obtained from parents or guardians, and students were asked for their assent. Participation was voluntary, and students could decline or stop without academic consequences. Responses were recorded without names, reported in aggregate or through unidentified excerpts, and kept confidential.Data were collected through a questionnaire consisting of closed-ended and open-ended questions. This is consistent with the statement by (Karsous et al., 2025), which explicitly explains that educational surveys use questionnaires containing both closed-ended and open-ended questions to obtain student feedback. The authors also explain that closed-ended questions are useful for obtaining data that can be quickly analyzed quantitatively, whereas open-ended questions provide more in-depth information about students' experiences. The results of the analysis showed a high level of interest in plant-related materials, but difficulties were still found in recognizing and understanding plants. On the other hand, students demonstrated a need for interactive learning media, local plant contexts, and learning activities that allow them to observe, try, and discover directly.

The findings can be organized into four areas: interest in plants, learning media needs, the local plant context, and preferences for active learning. Regarding interest, 94.7% of students found plant-related material interesting, often referring to plants' varied shapes and colors and their importance to human life. Yet 57.9% reported difficulty understanding the material. Interest may motivate students to learn, but it does not by itself provide the observation and comparison needed to recognize plants and understand their characteristics. Limited opportunities to examine plants directly may help explain this difference, although the survey did not measure the frequency of such opportunities. Amprazis and Papadopoulou (2026) emphasized the value of learning experiences designed to develop attention to plants, while Gonzales et al. (2026) reported limitations in students' attention to and knowledge of local plant species in a different setting. Together, these findings support exploring activities in which students observe and identify local plants; they do not establish that the students in this study have low plant awareness. The open-ended responses showed that these difficulties were mainly related to limited knowledge of plant names and types, difficulties in distinguishing plant forms, and insufficient understanding of certain topics. Some students even stated that animals were more interesting than plants. This is consistent with the statement by (Tibell et al., 2010) that plant identification is a difficult task due to variations in plant appearance, the characteristics that need to be observed, and students' limited experience with plants.

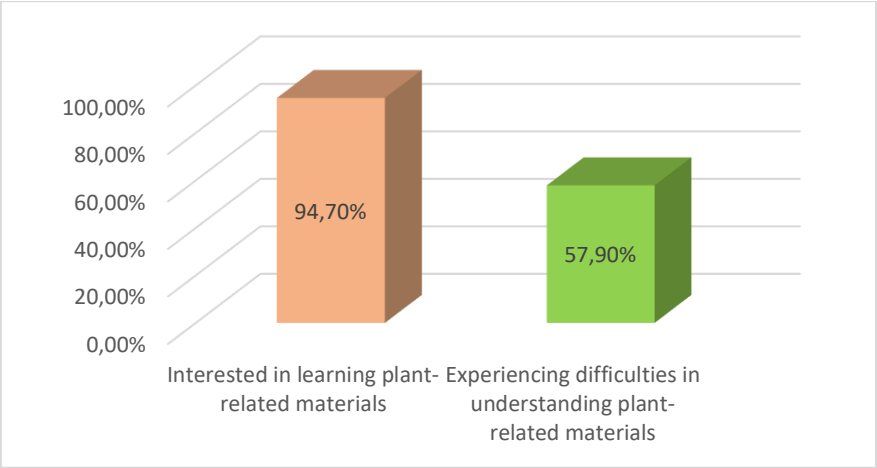


Figure 1. Students' Interest and Difficulties in Plant Learning

These findings indicate an interesting condition, namely that students' interest in learning about plants is relatively high, but their ability to recognize and understand plants remains a challenge. This condition indicates that plant learning should not merely provide conceptual information but should also provide experiences that allow students to interact directly with plant objects. Thus, students can connect the concepts they learn with the characteristics of plants they encounter in their daily lives.

These findings are also relevant to the results of (Balas et al., 2014), which indicate a tendency for students to recognize animals more easily than plants. This condition shows that the presence of plant-related content in learning does not necessarily result in adequate attention to and recognition of plants. Therefore, learning should present plants in a more concrete manner and make them more closely connected to students' experiences.The needs analysis also indicates a strong opportunity to utilize digital media in learning. The results are presented in the following figure.

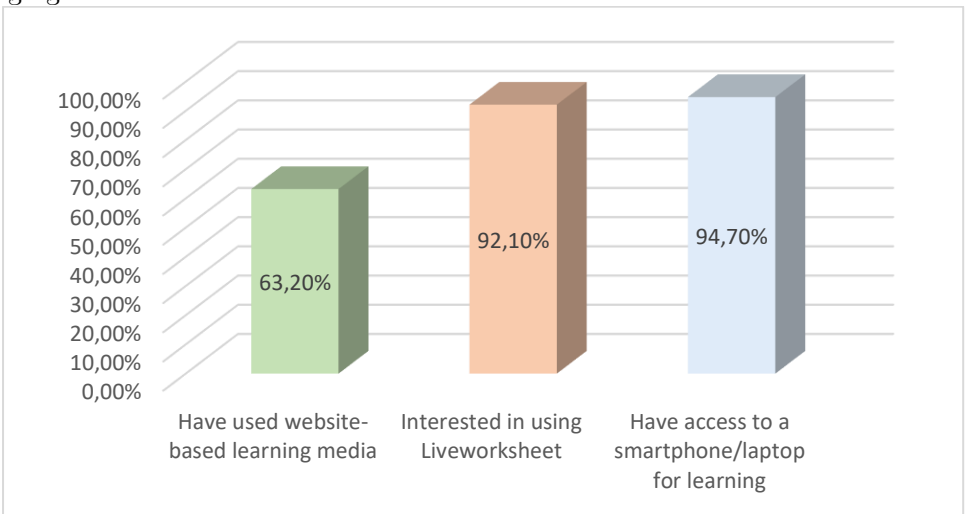


Figure 2. Students' Learning Media Needs

Students' reported preference for interactive media and their access to digital devices provide a basis for considering Liveworksheet as one option for developing plant learning activities. Device access alone does not establish that students have stable internet connections or the digital skills needed to use the platform. The usability of the proposed Liveworksheet and its effects on learning and plant awareness therefore require evaluation in subsequent research. The open-ended responses showed that students considered new media more interesting,

enjoyable, easier to understand, and capable of providing a different learning experience from previous learning activities. Some students also stated that interactive media could help them understand and remember the material more easily.

This condition further supports the relevance of using Liveworksheet as a learning medium. However, the need for digital media in this study does not stand alone. The media needs to be integrated with materials and activities that are appropriate to the characteristics of the students. This means that the use of technology should not merely aim to transform printed worksheets into digital formats but should be utilized to provide activities that allow students to observe, seek information, identify, and discover knowledge.Thus, the results of the needs analysis provide a basis for using interactive digital media as a supporting medium for plant learning, particularly because most students already have access to digital devices and demonstrate a high level of interest in using interactive media.

One important finding from the needs analysis was the high level of student interest in plants found in their local environment. A total of 78.9% of students stated that they knew characteristic plants of Bangka Island, while 94.7% stated that they were interested in learning about plants found in their own region. The needs analysis revealed that students were familiar with the use of resam fern, a plant found on Bangka Island, to make traditional caps known as kopiah. The open-ended responses showed that students wanted to learn about more plants in their region, discover plants they had never seen before, understand their benefits, and learn more about their own region. Some students stated that local plants were interesting because they were distinctive features of their region and made them feel proud of their place of origin.

Although 94.7% of students expressed interest in learning about local plants, their reported experience of learning about the cultural uses of plants was evenly split: 50% had encountered the topic, while 50% had not. This contrast reveals a pedagogical gap between students' interest in the local context and their opportunities to connect plants with community knowledge. It provides a rationale for designing an ethnopedagogy-based Liveworksheet that invites students to investigate local plant uses and compare community knowledge with relevant science concepts. The questionnaire does not establish where their previous learning occurred.This finding indicates a gap between students' interest in local plants and their learning experiences that connect plants with community culture. This is consistent with the study conducted by (Sofiyana et al., 2025), which found that ethnobotanical knowledge plays an important role in connecting biological concepts with local wisdom and contextual learning, but its integration into formal biology education remains limited. This is also consistent with the study by (Hidayah et al., 2025), which found that low levels of students' *species literacy* and *plant awareness* regarding local plant diversity constitute a problem in biology learning. The researchers subsequently developed learning media based on local plants and local wisdom.

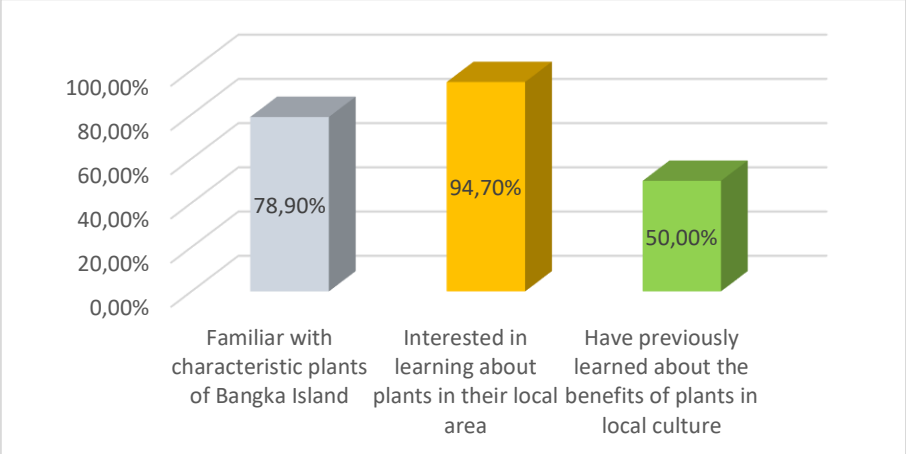


Figure 3. Students' Interest in Local Plant Contexts

The high level of interest in local plants provides a strong basis for integrating the local context of Bangka Island into science learning. Plants found in students' environment can be used as learning objects to connect scientific knowledge with students' experiences, environment, and local community knowledge. This is in line with the statement by Aprilia et al. 2026), which shows that the integration of local wisdom into learning helps improve students' understanding of plant diversity concepts. Another study by (Rofi'i et al., 2022) showed that the use of ethnobotany-based e-modules was effective in improving students' motivation and learning outcomes, while research conducted by (Amelia et al., 2024) showed that contextual science learning can be implemented by integrating local wisdom from students' environment into the learning process.

This is consistent with studies on ethnoscience and *local wisdom*, which indicate that local knowledge can serve as a learning resource that connects scientific concepts with students' real-life experiences. The integration of local contexts can also make learning more contextual and meaningful because students learn about phenomena that are closely related to their environment and daily lives (Suciyati et al., 2021). In the context of this study, these findings provide a basis for the use of ethnopedagogy, namely positioning local knowledge and experiences as part of the learning process rather than merely as additional examples. By utilizing local plants from Bangka Island, learning can connect science content with the environment and culture that students are already familiar with (Jayadi et al., 2026). The analysis results also showed that students tended to prefer learning activities that involved searching and discovering. A total of 89.5% of students stated that they had previously learned by finding answers on their own, while 81.6% stated that they enjoyed learning activities involving independently searching for and discovering information.

The strongest finding was shown in the responses regarding active learning. All students (100%) reported a preference for more active learning through trying, observing, and discovering. This preference can inform the planned use of Discovery Learning: students could observe local plants directly, classify them by visible characteristics, explore their uses in the community, and investigate questions about their structure and role in the environment with teacher guidance. These activities would give students opportunities to construct explanations from observations and evidence. Their effectiveness would need to be evaluated after implementation. Students explained that these activities made learning more enjoyable, helped them understand the material, made information easier to remember, and allowed them to gain new knowledge.

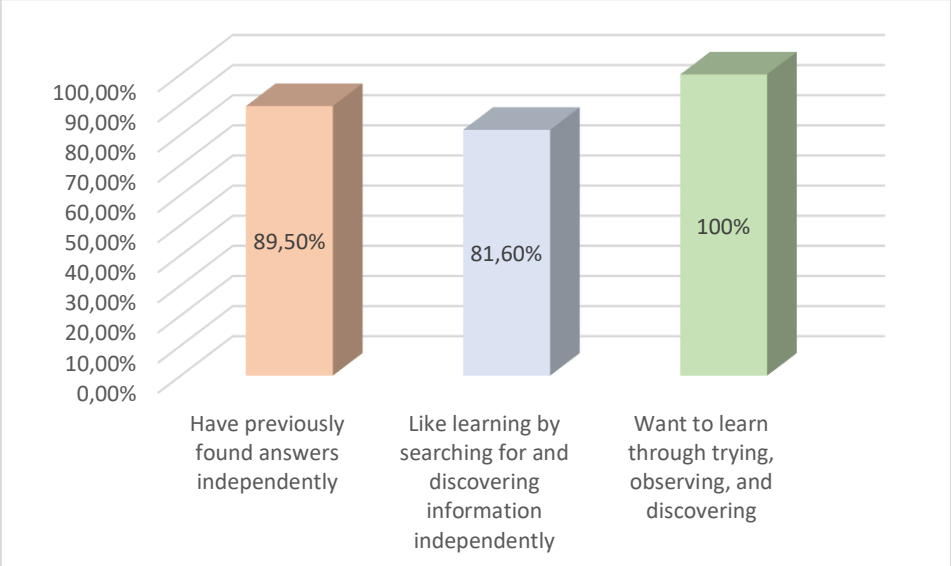


Figure 4. Students' Preferences for Active Learning

These findings indicate that students need more active, exploratory, and student-centered learning experiences. These characteristics are relevant to Discovery Learning because students are given opportunities to observe objects, collect information, identify problems, and construct understanding based on their observations.This need is also reflected in students' expectations for science learning. Students expected learning activities to be enjoyable and interesting, the use of electronic worksheets, the utilization of smartphones or digital media, the use of images, activities involving plant observation, opportunities to try new things, and opportunities to learn outside the classroom.Thus, Discovery Learning and interactive digital media are aligned with the characteristics of the students' needs identified in this analysis. Integrating both with an ethnopedagogical context can provide learning experiences that are not only oriented toward conceptual mastery but also encourage students to interact with local plants and construct knowledge through experience.

Overall, the needs analysis identified four conditions that can guide the next stage of Liveworksheet design. First, although 94.7% of students were interested in plant-related material, 57.9% reported difficulty understanding it; the content should therefore use recognizable local plants to support observation, identification, and explanation of scientific concepts. Second, 92.1% expressed interest in Liveworksheet and 94.7% reported access to smartphones or laptops; interactive images, response fields, and feedback could be considered, with their usability and technical requirements tested before implementation. Third, 94.7% were interested in plants from their region, while only half had previously learned about their cultural uses; ethnopedagogical activities could invite students to document community knowledge and compare it with relevant science concepts. Fourth, all students preferred activities involving trying, observing, and discovering; guided observation, classification, and investigation of local plants could structure the learning sequence. These are design implications drawn from reported needs, while the usability and learning effects of the resulting Liveworksheet remain to be evaluated.

These findings indicate that students' needs are not only related to learning media but also to the learning context and approach. Therefore, the development of science learning based on ethnopedagogy with the context of local plants from Bangka Island, supported by interactive media such as Liveworksheet and activities oriented toward Discovery Learning, is aligned with the characteristics of the students' needs identified in this study.These results also reinforce the view that integrating local knowledge into learning can serve as a means of making science learning more contextual. A systematic review of ethnoscience indicates that integrating cultural and local knowledge into learning can support the development of scientific, environmental, and cultural literacy because students can connect scientific concepts with real conditions in their surroundings. Meanwhile, research on *plant awareness* indicates that more contextual learning that integrates local plants can be one approach to increasing students' attention to and understanding of plants. Thus, the needs analysis provides preliminary, context-specific input for designing a proposed learning resource that integrates local plants from Bangka Island, ethnopedagogy, discovery-based activities, and interactive digital media. Its effect on students' plant awareness still requires evaluation.

## CONCLUSION

The needs analysis found that students' interest in plants was accompanied by reported difficulties in understanding the material. Students also expressed interest in local plants, interactive media, and active learning, while their reported experiences of learning about plants' cultural uses varied. These findings provide a context-specific basis for developing a Bangka Island ethnopedagogy-based Liveworksheet with guided discovery activities. The resource's usability and effects on learning and plant awareness require subsequent evaluation.

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