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From silence to curiosity: outdoor science learning and students' courage to ask questions in rural communities

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Abstract

Students residing in rural communities require conducive learning environments to cultivate the courage to ask questions in the learning process. The act of posing inquiries signifies the capacity to transcend a conventional and rigid learning environment. This research objective is to determine whether outdoor learning methodologies increase students' willingness to ask questions in science learning in rural communities. This quantitative descriptive study examined 51 elementary students residing in rural communities. Data on students' question-asking skills were collected through five distinct items. The data were collected using two techniques: observation and interviews. The results indicated that 61.3% of students demonstrated the ability to formulate questions spontaneously, 52.1% exhibited a capacity to respond to their peers' inquiries, 39.5% exhibited confidence when posing questions, 33.1% of questions were pertinent to the context of the material, and 32.5% of students employed standard Indonesian in their questioning. The utilisation of outdoor learning methodologies in scientific education can address students' tendency in rural communities to be reticent about seeking knowledge. However, developing an outdoor learning design that provides enhanced support for these students is imperative to foster their confidence in asking questions and to prevent bullying.

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1. Introduction

In the learning process, posing questions is an indispensable activity undertaken by students, often with a specific purpose. The impetus to pursue questions frequently stems from the pertinence of the information and prior experiences, thereby fulfilling a pivotal role in refining or reinforcing existing knowledge. Conversely, students may also pose inquiries when confronted with unfamiliar or unclear information (Salmon & Barrera, 2021). This condition indicates an absence of an inherent connection to the student's prior experiences. In this context, educators are expected to connect new information to students' real lives, facilitating its assimilation into their cognitive frameworks. Concurrently, other students inquire, intending to assess their cognitive abilities.

Recent studies have indicated that students residing in rural communities have distinct reasons for their reluctance to engage in questioning during the learning process. As demonstrated in the extant literature (Singh et al., 2019), the norms of social politeness that are upheld in everyday life result in passivity. As posited by Aditomo & Klieme (2020), other experts have suggested that students may hesitate to ask questions due to a mismatch between the dominant language used in the classroom and their native language. Concurrently, an absence of social support, manifesting, for instance, in derision of one's mother tongue, engenders reluctance to seek clarification due to apprehension of error, thereby diminishing self-assurance. The students' reluctance to pose questions is also influenced by the parents' educational attainment (Paneru & Bohara, 2025). The aforementioned conditions are further complicated by the predominantly lecture-based teaching methods employed by educators (Senisum & Edu, 2023).

The courage to pose inquiries is an integral component of self-assurance (Alkhaldi et al., 2021; Yehuda et al., 2025), which is manifested through relaxed facial expressions (Qu et al., 2017), intonation, and precise articulation of words. In addition, other indications of students' courage in the learning process are evident when they pose questions spontaneously (Pozuelo-muñoz et al., 2023), utilise straightforward sentences (Senisum et al., 2022), and the questions correspond to the learning material. In our previous observations (Senisum & Edu, 2023), it was revealed that students who responded to questions from other students in the study group were students who dared to express their opinions. The students' courage to ask questions can be observed from eye contact when asking questions (Qu et al., 2017), which is characterised by students directing their eyes to friends or the teacher when asking questions.

It is imperative to overcome students' reluctance to ask questions. This is because asking questions can facilitate positive learning outcomes (Watson, 2018) and enhance self-confidence within academic contexts (Rüschenpöhler & Markic, 2019). Moreover, posing questions has been shown to enhance adaptability in the learning process, maintain logical and systematic thinking (Senisum et al., 2022), and refine communication skills (Hrastinski et al., 2019).

Several studies have previously examined the relationship between self-confidence and students' propensity to ask questions during classroom learning. These studies, as reported in the works of Alkhaldi et al. (2021), Psycharis & Kotzampasaki (2019), and Yehuda et al. (2025), have revealed a positive correlation between the two variables. However, research on outdoor learning that supports students' inquiry skills, particularly in rural areas where they are accustomed to playing and exploring their environment, remains limited. Consequently, learning activities that are congruent with their daily environment are required. One approach that is considered to support this is outdoor learning. Outdoor learning can be defined as an educational activity that takes place in the outdoors and makes use of natural elements and ecosystems as the medium for learning (Kelly et al., 2022; Priest, 1986). This approach provides students with the opportunity to

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explore the natural environment in rural areas while engaging in both learning and play. The extensive, unspoilt rural environment affords students greater freedom to engage in physical activity and explore new experiences. Moreover, this approach is congruent with the subject matter of science learning, exhibits a high degree of flexibility with regard to location (Fan et al., 2024), time, and learning method, and utilises natural objects and phenomena found in the natural environment as learning media.

A substantial corpus of research has demonstrated that outdoor learning can facilitate students' socio-emotional and cognitive development (Parker, 2022), physical-mental development, and increase learning engagement (Kelly et al., 2022). A comprehensive review of the extant literature (Senisum & Edu, 2023) revealed that, in fact, elementary school students residing in rural communities exhibit different behaviours outside the classroom. In non-curricular settings, they typically demonstrate an independent disposition when engaging in recreational activities and investigating their surroundings in groups. The present study aims to implement an outdoor learning approach in science education that is appropriate for the original character of students living in rural areas, so that they have the courage to ask questions.

2. Method

The present study was conducted at an elementary school located in a rural community. The research design employed a simple quantitative descriptive approach. The study involved 51 fifth-grade students from an elementary school. The students in question hailed from three different schools within the same cluster.

The implementation of learning using an outdoor learning approach consists of three phases: planning, exploration, and reflection (Kelly et al., 2022; Priest, 1986). The teacher is responsible for the planning stage, which is conducted before the exploration of the natural environment. This stage involves a number of activities, including preparing a lesson plan in accordance with the fifth-grade elementary school curriculum, establishing safety rules for nature exploration, and organising supporting facilities. During the exploration stage, students, in conjunction with the research team, visit several locations based on the observation topics listed in Table 1 below.

Table 1. Observation objects

No.	Learning Observation Objects
1	A rice field containing flowering *Oryza sativa*
2	A garden filled with cabbage plants
3	A group of free-range chickens is searching for food.
4	The soil is being loosened
5	A pile of dry wood eaten by termites
6	A tree trunk covered in mushrooms
7	Types of pet food (chicken, dog, pig, beef, cat, fish)

Exploration of the natural world offers students a valuable opportunity to engage with scientific concepts relevant to the subject. During the exploratory phase, students are organised into study groups, with each group being accompanied by two facilitators who also act as observers. The teacher elucidates the material directly to the subjects being observed. The exploration concludes with a reflection on the learning. Within the context of exploration, the most emphasized thing is observing students' courage to ask questions. Students are given the

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opportunity to request clarification on the subject matter during both the teacher's exposition and the group observations.

Two distinct data collection techniques are employed through observation during exploratory fieldwork in natural environments and interviews. The observed item is the courage to ask questions, which can be categorised into five items. Spontaneous asking (Pozuelo-muñoz et al., 2023) is item 1. Confidence when asking questions is demonstrated through relaxed facial expressions and eye contact with the source (Qu et al., 2017) is item 2. Utilisation of the standard Indonesian (Senisum et al., 2022) is item 3. The content of the questions, according to the material's context, is item 4. And responding to friends' questions is item 5. The validity of these five aspects of courage to ask questions has been previously validated in our research (Senisum & Edu, 2023). The initial four aspects of observation are linked. Consequently, if a student poses a question spontaneously, subsequent observation is conducted to ascertain their level of confidence, the use of standard Indonesian in their inquiry, and the relevance of their question to the observer's context. Meanwhile, the fifth item is an observation aspect that is not necessarily related to items 1-4. Students receive a score of 1 if they perform the activity as observed; otherwise, they receive a score of 0. The inter-rater reliability value of the observer is determined by utilising the Cohen's Kappa formula (Tang et al., 2015).

In addition to employing observation techniques to collect data, this study incorporated interviews as a supplementary methodological component. Four students (two females and two males) were randomly selected from each of the three schools to be interviewed. The interview sampling technique used simple random sampling. The interviews were conducted after all learning activities were completed. To reveal students' courage in asking questions about the topic of learning observations, we prepared two questions as follows.

1. Do you feel hesitant when you want to ask a teacher a question spontaneously? Why?
2. Would you rather ask a teacher or a friend? Why?

The observation data were analysed by calculating the percentage of observation items for each learning session, while the interview data were analysed using the principle of triangulation, which involves matching the observation and interview data with the teacher's documentation.

The present study was conducted in accordance with research ethics, ensuring the well-being and integrity of all participating elementary school students. Before participation, written informed consent was obtained from the students' parents or guardians. Furthermore, the students were provided with an explanation of the research's purpose and procedures. Participants in this study voluntarily consented to take part and had the right to withdraw at any time during the learning process without facing any negative consequences.

3. Results

3.1 Observation data

The findings of the analysis of five observation items during outdoor learning science for seven meetings (M1-M7) are outlined in Table 2.

Table 2. The observation data

Meeting	Item1 (%)	Item2 (%)	Item3 (%)	Item4 (%)	Item5 (%)
M-1	27.5	13.7	3.9	9.8	35.3
M-2	41.2	15.7	9.8	11.8	45.1

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Meeting	Item1 (%)	Item2 (%)	Item3 (%)	Item4 (%)	Item5 (%)
M-3	60.8	35.3	11.8	19.6	49.0
M-4	68.6	39.2	37.3	35.3	51.0
M-5	74.5	47.1	49.0	43.1	52.9
M-6	78.4	54.9	51.0	49.0	56.9
M-7	78.4	70.6	64.7	62.7	74.5
Total	**61.3**	**39.5**	**32.5**	**33.1**	**52.1**

Meanwhile, the data visualization of Table 2 is presented as Figure 1.

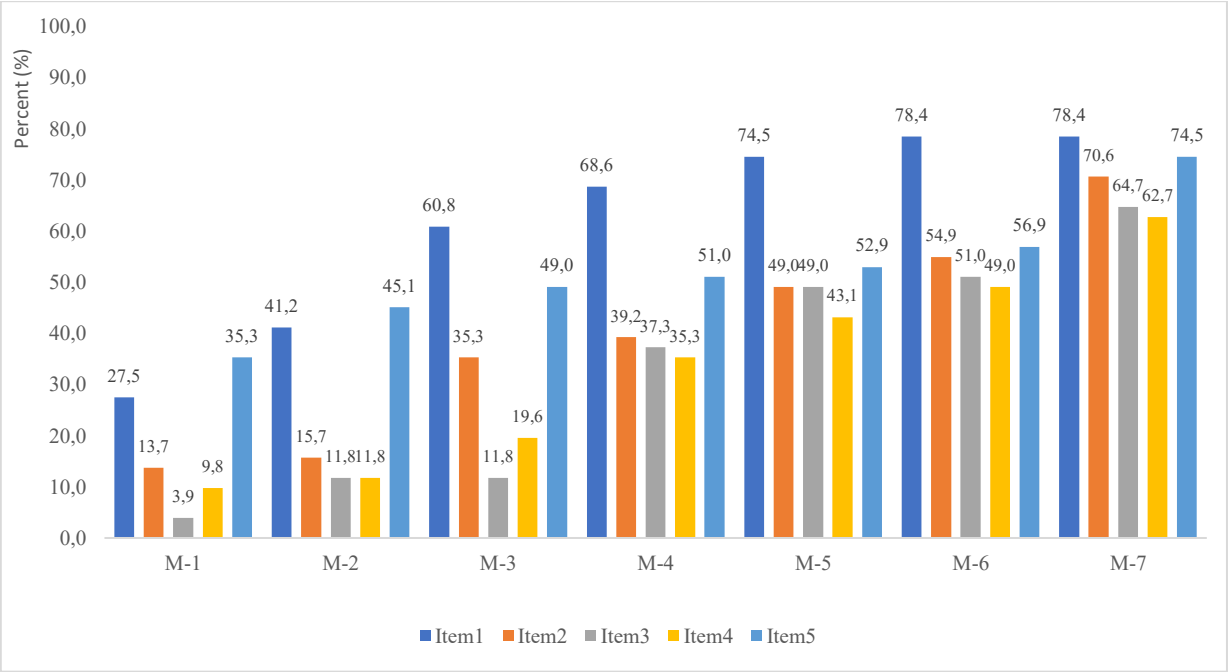

Figure 1. Percentage of student responses

As illustrated in Figure 1, there is a consistent increase in the percentage of observations from the initial meeting to the seventh meeting. In the initial meeting (M-1), it is observed that only 27.5% of students (out of 51 individuals) inquire spontaneously (item 1); 13.7% exhibit confidence when posing questions (item 2); 3.9% employ standard Indonesian (item 3); 9.8% of the inquiries posed are pertinent to the context (item 4); and 35.3% of students respond to their peer's questions (item 5). From the second meeting (M-2) to the seventh meeting (M-7), all observation items reveal an increase in percentage, except item 3, which remains constant between the second and third meetings. The mean percentage value for each observation item increases from the first to the seventh meeting, though the values varied. This phenomenon is clearly illustrated in Figure 2 below.

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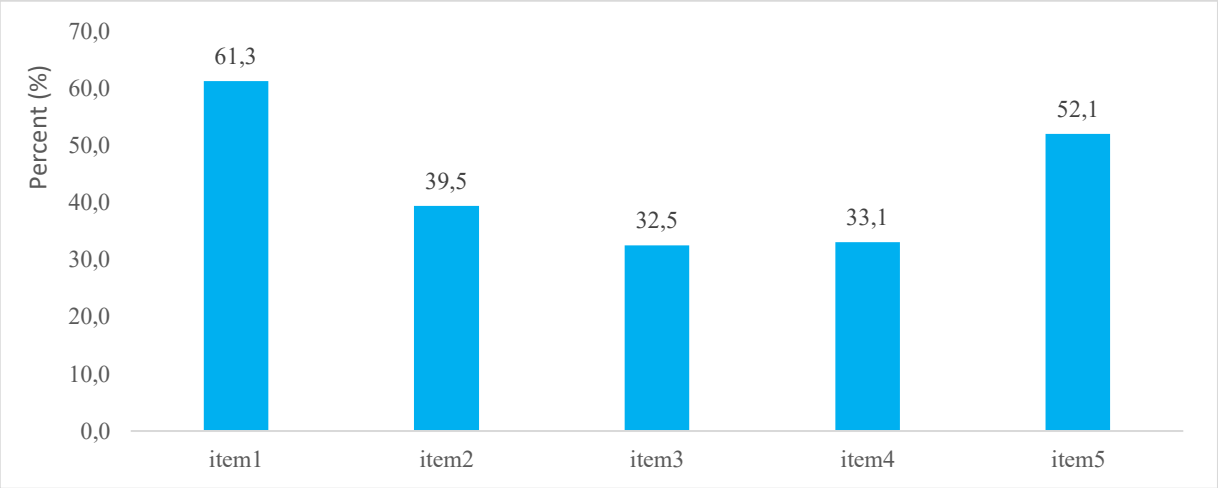

Figure 2. A comparison of the mean increase for each item

As shown in Figure 2, spontaneous questioning (item 1) has been identified as the observation aspect with the highest average score among the remaining four. The mean score of 61.3% is achieved at the first meeting and remains consistent through the subsequent meetings until the seventh. This data is based on 51 students. The same calculation is also applicable to items 2 through 5. Therefore, in the event of the scores being ranked from highest to lowest, the following order is to be observed through the act of posing questions spontaneously, responding to the questions posed by friends, demonstrating confidence when asking questions, the content of the questions being in accordance with the context of the learning material, and the utilisation of standard Indonesian when asking questions.

3.2 Interview data

The results of interviews with twelve students for two interview questions are described as follows. In the initial question regarding students' propensity to approach teachers spontaneously and the underlying factors, the following findings emerged. Two respondents indicated that they never hesitate to ask the teacher because they believe the teacher treats all students fairly and with kindness. Conversely, eight respondents stated that they were reluctant to ask questions for three primary reasons. First, they lacked fluency in standard Indonesian. Second, students felt embarrassed if their inquiries were not accepted by the instructor. Third, students considered it impolite to ask questions on their own if the instructor had not provided an opportunity to do so. Finally, two respondents noted that their reluctance to ask the teacher is influenced by the fear of being ridiculed by their peers.

In the second interview, respondents were asked to provide a rationale for their decision to ask a question spontaneously to the teacher or their classmates. It was reported by two individuals that asking the instructor spontaneously was more expedient due to the instructor's superior knowledge and experience. In addition, ten respondents disclosed that they initially consulted their peers within their respective groups to assess the suitability of the language used and the relevance of the questions to the subject of observation. The rationale for including these ten individuals was that, in the context of extracurricular activities, they engaged in social interactions with peers beyond the classroom. In the absence of a formal Indonesian language requirement,

these individuals were permitted to use Manggarai or a combination of Manggarai and formal Indonesian during these interactions. This linguistic flexibility was granted to them, enabling them to engage in verbal exchanges with their peers during playing activities.

4. Discussion

The data presented in Table 2, when viewed through the lens of Figure 1, suggest that students' question-asking courage, as gauged by five distinct observation items, can develop alongside an increasing number of their interactions with observation objects outside the classroom. In the context of outdoor learning for students in rural areas, direct interaction with natural objects gradually fosters asking questions. The use of observation objects that resonate with students' everyday experiences and are associated with the prevailing learning topic has been shown to influence students' awareness and understanding of the material (Fan et al., 2024). This, in turn, fosters a tendency to ask questions. In the observational study, students were assigned to monitor the flowering of *Oryza sativa* in the field. This assignment entailed more than merely observing the subject; it also involved collecting insects that had taken up temporary residence on the rice stalks. The students proceeded with their assigned task while concurrently engaging in physical activity and expressing a positive emotional state. It is hypothesized that this environment engenders a psychological state of "joy" in the subjects. The theory proposed by Tony Buzan (Buzan & Buzan, 1993; Fredrickson, 2001) posits that psychological well-being in students is directly correlated with optimal cognitive function. In this context, the capacity to think is evidenced by posing questions and engaging in interactive learning.

The observation item that received the highest score (61,3%) compared to the other aspects was the act of posing spontaneous questions. Despite its elevated score, this item showed a strong correlation with the second, third, and fourth items. A subsequent investigation revealed that students who posed inquiries spontaneously tended to lack confidence, use non-standard Indonesian, and formulate questions that did not align with the material's context. The evidence indicates that a mere 39.5% of students exhibit confidence when posing inquiries. Indications of students who are reluctant to ask questions due to a lack of confidence can be observed in various ways. These include nervous facial expressions when posing questions, avoiding eye contact with the instructor (despite the question being intended for the instructor), and a decline in vocal intonation, making the question difficult to hear. Interviews revealed that students were more confident asking questions to their peers in a group than to the teacher. In the context of academic study groups, soliciting assistance from peers is often perceived as a more enjoyable and less stressful alternative, and this practice aligns with previous studies (Singh et al., 2019; Watson, 2018). Furthermore, the interviews indicate that students are reluctant to ask spontaneous questions during the teacher's instruction, for fear of being perceived as impolite. As is evident in everyday culture, this is seen as an interruption of an older person. In this context, spontaneous questioning can be considered a behavioural habit, inextricably linked to the cultural environment. This finding aligns with the conclusions drawn in previous research (Paneru & Bohara, 2025). Additionally, the students' low self-confidence may stem from fear of being bullied by their peers. This condition is consistent with previous research (Nunung Purwanti & Fitri Indriani, 2024; Senisum et al., 2025), which indicates that bullying can modify the behaviour of the victim.

Research data also underscores that only 32.5% of students use formal Indonesian when posing questions. While teachers and classmates can comprehend the intent behind students' spontaneous inquiries, the use of formal Indonesian can hinder students' confidence in asking

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questions. This assertion is corroborated by interview data, which revealed that eight of the twelve students interviewed were hesitant to ask questions due to their lack of fluency in formal Indonesian. Further observations of student communication indicate that the majority of the 51 students in this study utilised their mother tongue, Manggarai. It is evident that despite their inclination to pose inquiries, they employ a blend of standard Indonesian and Manggarai, a linguistic combination that, on occasion, elicits derision from their peers. This condition causes other students who have not yet posed questions to change their minds out of fear of being bullied. The disparity between the formal language employed in educational settings and the students' mother tongue has been suspected as a factor that hinders their propensity to articulate queries (Salmon & Barrera, 2021).

33.1% of students inquired about matters pertinent to the learning material. This substandard performance can be attributed to two primary factors. First, students were reluctant to pose spontaneous inquiries; second, their spontaneous questions lacked contextual relevance. The data observation revealed that a number of the questions addressed subjects from previous meetings, even though they were entirely unrelated to the current lesson. It is hypothesised that students pose questions out of context due to a lack of concentration on the current learning. This finding is consistent with those reported by Singh et al. (2019) and Soysal & Soysal (2023).

The fifth observation item, concerning responses to questions posed by other students in class, engenders the second-highest mean percentage increase, at 52.1%. Although it is not associated with the initial four observation items, this item is a behaviour that demonstrates courage in asking questions. This item is indicated by students' behaviour, which allows them to answer or comment on their peers' questions. In responding, there is no imposition of formal Indonesian language use or proficiency. They engage in reciprocal interactions with their peers, whilst simultaneously deriving enjoyment from the act of observation or participation in play. They are also free to use the Manggarai language in communication. The observation data for this fifth item align with research findings presented by Psycharis & Kotzampasaki (2019) and Salmon & Barrera (2021), who found that asking questions without specific rules in learning is more effective in fostering critical thinking skills.

5. Conclusion and implications

The implementation of outdoor learning as a pedagogical strategy in science education for elementary school students residing in rural communities has been shown to effectively reduce their reluctance to ask questions during learning. Of the five observation items about the courage to ask questions, asking questions spontaneously was the item that received the highest score (61.3%), followed by the items responding to friends' questions (52.1%), being confident when asking questions (39.5%), asking questions according to context (33.1%), and the lowest was the item using standard Indonesian (32.5%).

The practical implications of this study's findings underscore that outdoor science learning, utilising the natural environment as a learning resource, can address students' hesitations in asking questions in rural communities. The research findings are subject to certain limitations and require refinement in subsequent research. For instance, establishing additional class groups is required to facilitate meaningful comparisons and support the implementation of effective strategies across specific school categories. In addition, there is a need to develop outdoor learning designs that provide enhanced support for students in rural areas. These designs should

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aim to foster greater confidence in students when posing questions, mitigate the risk of bullying, and familiarise students with the use of formal Indonesian when asking questions.

Credit authorship contribution statement

First Author: Conceptualization, Methodology, Formal analysis, Data curation, writing- original draft preparation. **Second Authors**: Resources, Methodology, Project Administration, and Formal analysis. **Third Author**: writing-review, and editing. **Fourth Author**: Formal analysis.

Declaration of competing interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request. Because the data include human participant information, they are not publicly available to protect participant privacy.

Ethical Declaration

All processes involving participants in this study complied with local laws and regulations. Students voluntarily indicated their willingness to participate, and no individual data was disclosed. Therefore, ethical approval was waived.

Declaration of AI statement

This manuscript is an original work that we compiled independently. However, to improve the grammar, specifically the abstract section, we used ChatGPT-4.

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