



Environmental-Based Science Learning Process in Elementary Schools

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Abstract. There are three research objectives in this article: (1) to describe the activity of developing the science concept in environment-based learning; (2) to describe the science group exercise activities in environment-based learning; (3) to analyze independent science exercise activities in environment-based learning. The type of research in this article was ethnographic qualitative. The research was conducted at SD Unggulan Azkiyaa, Sukoharjo, for six months. The research subjects included school principals, students, and teachers at SD Unggulan Azkiyaa. Data collection techniques were carried out through interviews and documentation to obtain data for reference in this study. Data validity used source and technique triangulation. Data analysis used an inductive technique. The data analysis process was data collection, reduction, display, verification, and concluding. The research results show that (1) Science concept development activities include question and answer, exchange of ideas, observation, and reflection; (2) Group exercise activities related to problem-solving still need to get used; (3) Independent exercise activities include problem-solving, discovery, and application of theory independently.

Keywords: Concept Development · Group Exercise · Independent Exercise

1 Introduction

In the science learning process, especially at the elementary level, science is a tool for understanding oneself and the natural world and exploring future possibilities for use in everyday life. The learning process emphasizes providing direct experience to create competence so students can naturally explore and understand their environment. Science learning at the elementary level also teaches about nature in the form of facts, reality, and events [1] so that students can quickly access information to support scientific theories, concepts, and attitudes that can improve the quality and methods of education [2].

Human life is inseparable from the environment, both the natural environment and the school environment. The environment is an area and all the parts contained in it that are around humans and affect the development of human life [3]. The value of environmental factors will depend on attitudes and behavior. On the other hand, the quality of human life is influenced by how humans handle the environment [4].

Based on the findings of the PISA [5] and TIMSS [6] survey, it can be concluded that when compared with the scientific rankings of students in other countries, Indonesian students are consistently in the bottom ten. Even in 2012, when 65 countries participated in the PISA study, and 42 countries participated in the TIMSS study, Indonesian students' science test scores were ranked second last and third last, respectively. Based on the PISA and TIMSS ranking data, improving science learning in elementary schools is necessary.

Students' ability in science in elementary schools is still low due to the inability of students to understand the content being taught. Based on several schools that have been observed, this lack of understanding is because students are not interested in the material presented by the teacher [7]. After all, the material presented is only by the lecture method, and students can only imagine the learning process. Besides that, student learning outcomes in science subjects are low and can be influenced by factors of the utilization of learning media and learning styles [8].

Science learning is related to the natural surroundings and environment-based learning. Being directly involved in the surrounding environment will make students more masterful of the science learning concept because it makes students more challenged [9]. Students learn in the classroom and can directly imagine the material being taught. Students will feel more challenged in environment-based learning because they interact directly with actual objects [10]. Students can also witness events directly caused by nature, such as material development and plant growth. Through direct observation, students will understand the stages of plant growth. In this learning, students can observe real things that help them understand the learning material.

Based on a preliminary study conducted by researchers, teachers at SD Unggulan Azkiyaa have used various learning models, including environment-based science learning, because this elementary school has a particular nature-based program with a vision and mission of implementing nature-based learning. Another advantage of this school is that it is located in a village surrounded by rice fields and a large and beautiful school area. Geographically, this school supports the learning process outside the classroom or environment-based.

Based on this description, there are three research objectives in this article: (1) to describe the activity of developing the science concept in environment-based learning in the third grade of SD Unggulan Stiba Azkiyaa; (2) to describe the science group exercise activities in environmental-based learning in the third grade of SD Unggulan Stiba Azkiyaa; (3) to analyze independent science exercise activities in environmental-based learning in the third grade of SD Unggulan Stiba Azkiyaa.

2 Method

The type of research used was ethnographic qualitative. Qualitative research is a process for understanding and analyzing natural phenomena, events, and social activities presented in words [11]. Ethnography studies how participants participate in everyday social practices [12]. So, qualitative research describes facts in the form of words to analyze data that does not use statistical procedures.

The research site was at SD Unggulan Azkiyaa. This location was chosen because SD Unggulan Azkiyaa is an elementary school that is always open and works to change

and improve the educational process to improve the quality of students and make it easier for researchers to collect the information needed to carry out research. The time of this research runs from June to November 2022.

Concerning the title and purpose of the research, the subjects included school principals, third-grade students, and teachers at SD Unggulan Azkiyaa. The school principal was asked about school facilities and infrastructure and the vision and mission at SD Unggulan Siba Azkiyaa, while the third-grade students were explored in depth about the learning carried out and the third-grade teacher as the person in charge of learning activities.

Data collection techniques used interviews and documentation in the form of presentation of words. Documentation techniques are used to analyze documents related to the research focus, such as teacher administration [13]. Documentation complements the use of the interview method in qualitative research. Documentation in this study was used to record interview data. Apart from that, a documentation study was also conducted to obtain profile data of SD Unggulan Siba Azkiyaa, Sukoharjo.

The data were validated using source and technique triangulation. Triangulation is validating data by comparing it with something other than data to assess its accuracy. In qualitative research, triangulation is a trendy and common way to check data validity [14]. Triangulation offers the best chance of getting accurate data [15].

Data analysis used an inductive technique. The process of data analysis was data collection, data reduction, data display, verification, and concluding.

3 Results and Discussion

Developing science in an environment-based learning process positively contributes to students introduced in the third grade, especially in plant growth and development. Based on the results of research conducted at SD Unggulan Azkiyaa, the environmental-based science learning process has been carried out well, but there are still many shortcomings. In this study, the interviews focused on science concept development activities in environment-based learning, science group exercise activities in environment-based learning, and independent science exercise activities in environment-based learning.

3.1 Science Concept Development Activity

The interviews with the third-grade teachers include the exploratory stage, which aims to explore students' science knowledge. Exploration uses the question-and-answer method by teachers and students. The teacher acts as a facilitator in understanding the material. Then elaboration is done by exchanging ideas between students. Elaboration is carried out by utilizing the school environment as a learning resource so that students can better understand the goals the teacher plans. The following is an example of student work.

Figure 1 shows the ability to develop the science concept of growth and development. Students develop concepts by observing the environment and explaining the results of their previous observations. In the answers, students can explain the stages in the growth of watermelon plants. This is supported by research [16] which states that this will affect learning if students can understand the growth and development of the subject matter.

<input type="checkbox"/>	Tuliskan tahap daur hidup tanaman
<input type="checkbox"/>	semangka
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<input type="checkbox"/>	Jawaban:
	perkembangan tanaman semangka diawali
	dengan biji semangka. biji di semai
	ke dalam pot. selanjutnya biji tersebut
	akan muncul kecambah lalu tanaman
	semangka akan tumbuh sedikit-sedikit,
	kemudian tanaman semangka tumbuh bunga.
	Setelah penyerbukan terbentuklah buah semangka.

↓

Students are able to interpret the stages of the life cycle of observations on watermelon plants.

Direct translations:

1. Write the stages of the watermelon plant life cycle using your own language.

Answer:

The development of watermelon plants begins with seeds being sown in pots. Then the seeds will sprout, then the watermelon plants will grow little by little then the watermelon plants grow flowers, after pollination a watermelon is formed.

Fig. 1. Interpreting Observation Results

The next third-grade student activity, confirmation, is carried out as a reflection of activities that have been carried out, such as questions and answers about learning and strengthening by the third-grade teachers. This activity is carried out with students concluding what they have learned orally and in writing. The teacher gives appreciation verbally, which aims to motivate students in the following material.

The teacher said that students tend to experience difficulties in making conclusions. Some students understand the material being taught and can answer questions, but students have difficulty in making concluding sentences.

The last activity in concept development is that the teacher gives homework to repeat what has been learned. In this way, students can remember the material well. However, some third-grade students cannot read and still need their parents' help doing homework.

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3.2 Science Group Exercise Activity

Based on the results of interviews with the third-grade teachers, the first step in group exercise activities is dividing students into groups, each consisting of 5–6 students. Each group has been distributed the materials used. Learning is structured so that students can independently discover the concepts to be learned while still receiving instructions from the teacher.

Each group observes different plants in that group; then, students write down the observations of the plants observed on paper. Based on each group's observations, the plant's observed parts include roots, leaves, flowers, and seeds. Based on the results of interviews with the teacher, a student has difficulty writing, so the teacher asks some friends to help, not to write down but to dictate the sentence arrangement in question. This method is considered effective in helping these students learn to write.

Figure 2 presents the results of the analysis of Subject A, the work on the questions by group A students (high ability). Group A can apply theory to solve problem-solving given through pictorial questions. From the results of group A's work, they could write down the results of observations on mango trees in full and their characteristics. Students can explain the parts of a mango tree, from the stem, flower, fruit, root, and leaf shapes. The following is the result of work from group A.

Figure 3 presents the results of the analysis of Subject B, the work on questions by group B students (medium ability). Group B can carry out activities to complete the observation task given through pictorial questions with the correct procedures and answers. From the results of group B work, students can analyze the parts of the tomato plant through good observation and identify the parts of the plant, such as flowers, stems, leaves, fruits, seeds, and roots. However, it is incomplete, they only be able to mention the parts of the plant and not accompanied by a description or characteristics.

Based on the results of interviews with class teachers, group activities can increase understanding of natural science concepts, generate curiosity about natural environmental conditions, and provide insight into natural concepts useful in everyday life. This is supported by a study by [17], which states that the teacher conveys material orally less effectively than through discovery activities in instilling a concept.

Based on the results of interviews with the teacher, each group presents the results of group work in the next activity. This allows students to interact with other groups and exchange observations and discussions. The students looked very enthusiastic about finding the parts of the plant they were asking about. Students collaborate when learning about plant structure by writing down the names of plant parts, such as roots, seeds, leaves, and flowers.

In the environment-based learning process, students become more active in learning activities, as evidenced by students who like to travel or like to talk to themselves. It turns out that they can also actively participate in the observation process. Students experience themselves in the process of finding answers to make students more familiar with plant components. Students can enjoy learning because they can experience and identify solutions for themselves. This is supported by research by [18], which states that increasing students' knowledge of science concepts has been a success of an environment-based learning approach.



Students are able to name parts and their characteristics based on observations on mango trees.

Direct Translation:
 Plant name: Mango Tree
 Stem shape: erect, large, hard, strong.
 Flower shape: small, white, yellow center
 Fruit shape: oval/circle, red, yellow, green.
 Root form: long and strong form, taproot to absorb water.
 Leaf shape: green, wide, long, pointed.

Fig. 2. Subject A's Answer

The teacher's effectiveness in science group work practice activities has several drawbacks, including the teacher not explaining the rules of group work. The teacher only guides two or three groups while letting other groups solve their problems. The teacher does not set a time limit for group discussion and does not provide opportunities for groups others to provide feedback.

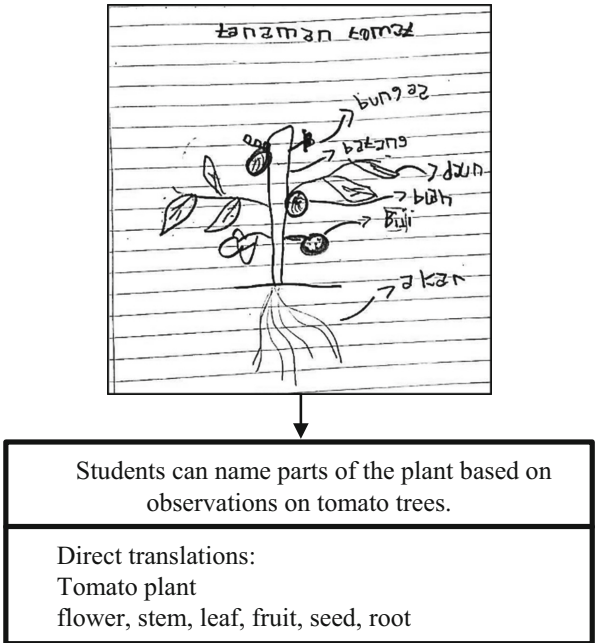


Fig. 3. Subject B's Answer

3.3 Science Independent Exercise Activity

Based on interviews with the third grade teachers, the students of SD Unggulan Stiba Azkiyaa show their independence in independent science activities by completing individual assignments from the teacher.

Based on interviews with teachers on independent exercise activities, students can be seen during planting activities. This learning is carried out based on the environment in which students independently prepare tools and materials. Then, students start planting activities from the selected seeds; then, students are given the freedom to choose ornamental plants to accommodate differences. The indicator of success is that the plants can grow well.

The essence of learning to grow plants is to teach children how to apply what they have learned about science in everyday life. Planting ornamental plants looks simple. However, from these simple things, students learn science in a complex, comprehensive, and meaningful way. In this case, students design what to plant and care for and the possibility of plants failing to grow. All processes experienced by students explicitly teach students to be independent, persistent, tough, and never give up.

Behind this problem-solving activity, students can learn many positive things. This aligns with the opinion [19] that applying problem-based learning can increase one's capacity to solve science-related problems.

Students learn to love the plants they care for so that the plants thrive and can beautify the schoolyard. This is supported by research results which state that students gain new

knowledge about planting media that can be used in growing plants; students play a role in planting and placing plants in and around the school [20].

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