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UTILIZATION OF THE YARD THROUGH VEGETABLE PLANTING PRACTICES INTEGRATED MATHEMATICS FOR STUDENTS AT ADIWIYATA SCHOOL

Ai Tusi Fatimah[1], Asep Amam[2], Adang Effendi[3]
[1,2,3]Universitas Galuh, Jl. R.E Martadinata No. 150 Ciamis, Indonesia
[1]aitusifatimah@unigal.ac.id, [1]asepamam85@gmail.com, [2]adangeffendi72@gmail.com

ABSTRACT

Utilization of yards at MI Hadapherang to improve the quality of Adiwiyata schools, support active student participation, management of environmentally friendly facilities, and the application of an environment-based curriculum in mathematics learning. The utilization of the yard by planting vegetables by students. The activity stages consist of preparation, implementation, and evaluation. The preparation stage is the provision of tools and materials, worksheets, and evaluation instruments. The implementation stage is the socialization of the practice of planting vegetables in the schoolyard and mathematics, followed by the planting vegetable practice from seedling to harvesting. The evaluation stage saw planting vegetable practice and students' mathematical understanding abilities. The implementation method is interactive question and answer and practice/experiment. The result of this activity is the increase in students' knowledge, understanding, and experience about the practice of growing vegetables and the integration of mathematics in the practice of planting vegetables. Active participation of students in vegetable planting activities in the high category. The students' mathematical instrumental understanding is high while the relational understanding is middle. The results of student activities become a means of supporting greenhouses in the schoolyard.

Keywords: mathematical understanding, planting vegetables, schoolyard

A. Introduction

MI Handapherang is an Adiwiyata school located in Ciamis, Indonesia. Adiwiyata is a school with environmental education programs. Adiwiyata school programs include the implementation of environmental-based insights in the curriculum, active participation of school residents, and management of environmental-based supporting facilities (Burhanuddin, 2021).

MI Handapherang has various programs to realize the Adiwiyata school. The active participation of school residents to realize environmental-based school facilities. Many of the plants on the school grounds are very well maintained. Plants are dominated by ornamental plants arranged in neat rows. These ornamental plants make the school look clean, healthy, and beautiful.

Figure 1. MI Handapherang Schoolyard (Front)

Some medicinal plants are also available in the schoolyard. We know that plants have many varieties with various functions. Medicinal plants as alternative medicine and to maintain health. Thus, students can have insight into medicinal plants.

In addition to ornamental and medicinal plants, students need to gain knowledge and experience about food plants. Preservation of food crops can support the food security agency's program to create a healthy, active, and productive generation (BKN, 2021). The Food Security Agency has a Sustainable Food Garden program. The goal is to increase the availability, accessibility, and utilization of food. The program is to achieve household food security and support government programs to handle priority locations for stunting reduction interventions. .

Improve the quality of the Adiwiyata MI Handapherang school by broadening students' knowledge about healthy and quality food crops. This issue needs to be raised so that students can have ideas for utilizing their yard (either at school or home) by planting food crops that can be consumed by students, school residents, and families.

Food health issues given to students can improve student health. It is common knowledge that the current generation of students is more interested in eating fast food. Facts show that fast food has a bad effect if it is continuously and excessively consumed. These effects include decreased academic achievement, obesity, decreased self-confidence, depression, weakness, and various chronic diseases (Anggraini, 2018).

Growing food plants independently by students is one of the efforts of the community service team to grow students' insight, experience, and self-confidence so that they create a sense of belonging to food plants and are willing to consume the crops of these plants. In addition, the practice of growing vegetables in this activity provides insight and experience on the implementation of mathematics learning in it. Students actively and productively carry out the practice of planting vegetable crops which are integrated with the mathematical understanding they have learned. The results show that mathematical problems in the agricultural context play a role in students' mathematical understanding (Fatimah et al., 2020).

The importance of preserving vegetable crops and the potential for the development of vegetable crops in schoolyards as well as the integration of mathematics in the practice of growing plants have encouraged the service team to carry out community service programs aimed at improving the quality of Adiwiyata schools by improving the function of the schoolyard. Specific objectives: 1) Provide students with insight into food crops to support Adiwiyata School policies and health, 2) Practice growing vegetable crops by students which are integrated with math worksheets to support the implementation of the environment-integrated Mathematics Subject curriculum, 3) Practice planting vegetable food crops by students to support active and productive participation of school residents, 4) Produce vegetable food crops to support the management of healthy environmentally friendly supporting facilities.

B. Method of Implementation

This activity was attended by 55 students of MI Handapherang, grade 4. The activity consisted of preparation, implementation, and evaluation stages. The implementation method is interactive question and answer and practice/experiment. The interactive questions and answers are aimed at providing an understanding of food crops, explaining tools/materials/how to plant, and explaining the role of mathematics in the practice of growing food crops. The practical/experimental method is carried out when students plant, care for and harvest vegetable food crops.

Activities at the preparation stage consist of 1) Making guide books, tools, materials, and activity schedules. 2) Making presentation slides about introduction to vegetable plants, tools, materials for practicing vegetables, and technical activities for students. 3) Making worksheets for students learning to grow vegetables and mathematics about a) Sowing vegetable seeds, b) Observing seed growth, c) Transferring seeds to polybags, d) Observing vegetable growth, e) Harvesting vegetables. 4) Prepare practical tools and materials such as seeds, cement trays, planting media. 5) Make activity observation sheets.

Activities at the implementation stage consist of 1) Giving understanding to students about a) Types of vegetable food crops, b) Tools, materials, and how to grow vegetables, c) The role of mathematics in the practice of growing food crops. 2) Fill out worksheets that involve mathematical skills. 3) Students practice: a) Sowing, b) Observing seed growth, c) Maintaining and observing seed growth, d) Preparing planting media, e) Transferring seeds to polybags (planting media) f) Maintaining and observing vegetable growth, g) Harvest vegetables.

Activities at the evaluation stage consist of 1) The achievement of students' active participation in planting vegetables. 2) Students' mathematical understanding in solving contextual problems of tools and materials for planting vegetables.

Observation of students to see the active participation of students in the activities of sowing seeds, caring for seeds, preparing planting media,

transferring seeds to planting media, and caring for growing vegetables. The achievement of the level of active student participation is categorized into three levels low (x<=60), medium (60<x<80), and high (x>=80).

Observing students while working on math problems and analyzing the answers to determine the level of students' mathematical understanding in the aspects of instrumental and relational understanding. The understanding aspect refers to Skemp (1976). The level of understanding is identified from the score of mathematical understanding which is categorized into three levels of low (x<=60), medium (60<x<80), and high (x>=80).

C. Result and Discussion

The results of the activities by the objectives consisted of increasing students' knowledge and experience about planting vegetables and integrating mathematics into the practice of planting vegetables and increasing the means of supporting the Green House in the MI Handapherang schoolyard.

There were 55 students from grades 4A and 4B who actively participated and were divided into 10 groups. Students are first given an understanding of vegetable plants and the role of mathematics in the practice of growing vegetables as shown in Figure 3 below.

Figure 3. Counseling on Vegetables and the Role of Mathematics

The next stage is the practice of sowing seeds, providing planting media, and caring for vegetables. Students were given the task of filling out the vegetable growth observation worksheet and filling out math problems.

Figure 4. Activities for Sowing Seeds and Making Planting Media

Figure 5. Activities of Caring for Vegetables and Filling in Worksheets

Figure 6. Student Activities Harvesting Vegetables

The results obtained by students from the implementation stage were knowledge and experience of growing vegetables from sowing, planting, and caring for vegetables. The results of the observations of the team and teachers on the active participation of students in carrying out these activities are in Table 2 below.

Table 1. Achievement of Students' Active Participation in Planting Vegetables

Activity	Active Participation of Students (%)
Sowing seeds	90
Preparing planting media	90
Caring for plants	80

Overall, the active participation of students in the high category. This is inseparable from the active and creative participation of teachers guiding students. Teacher creativity plays a role in students' active participation in community service activities at schools (Paramita et al., 2017).

Students' mathematical understanding was obtained from the activity of filling out worksheets on the use of measuring instruments, accuracy of measurement results, unit conversion, calculating area and circumference, as well as comparisons related to tools or materials used in vegetable growing activities. Problems related to measurement and unit conversion fall into the aspect of

instrumental understanding while area, perimeter, and comparison fall into the aspect of relational understanding.

The mathematical problems presented are correlated with the context of growing vegetables in agriculture. Based on the research results, mathematics plays an important role in solving various problems in the field of agribusiness such as calculating, measuring, and analyzing agricultural production factors (Fatimah, 2020), and plays an important role in processing agricultural production (Fatimah & Solihah, 2020). This practice of growing food crops can indirectly develop students' numeracy or mathematical literacy skills (Marlina & Fatimah, 2021) so that students are more sensitive to numbers in the context of everyday life (Fatimah & Wahyudin, 2020). Numeration in the agricultural context must be supported by the ability to understand and reason mathematically (Fatimah et al., 2019, 2019, 2020; Fatimah & Prabawanto, 2020) and mathematical connections (Fatimah, 2021).

The results of the analysis of students' answers show that the average score of students' answers to questions with indicators of mathematical instrumental understanding is 85, in the high category. The average score of the questions with relational understanding ability indicators is 70, which is in the medium category.

The student's instrumental understanding ability is better than the students' relational understanding ability. Instrumental understanding related to measurement and conversion of numbers is a routine activity that has been studied by students at the previous grade level. Students can use a ruler correctly and convert units using the ladder strategy. On the other hand, students' relational understanding must be improved again. This understanding requires good reasoning and understanding of context. In this case, students do not understand the context of the problem well so it affects mathematical understanding. Understanding context affects students' mathematical understanding (Fatimah et al., 2020).

This activity is also a reflection for the service team and teachers to design mathematics lessons that can

connect the environmental context with the mathematical concepts that students learn. Reflection is part of making and developing a didactic learning design based on the problems faced by the teacher from the students (Suciawati et al., 2021). Teachers are expected to be able to teach materials to increase the attractiveness of the environment for students (Sumiati et al., 2021).

The results of student activities support the fulfillment of Adiwiyata school infrastructure. Available tools and materials can be used repeatedly and are useful for subsequent planting activities. The vegetables planted by students are located on the side of the schoolyard and at the same time fill the greenhouse that has just been renovated.

D. Conclusion

The impact of this activity is as follows: 1) Increased knowledge and experience of students through the practice of growing vegetables from seeding to harvesting. 2) Increasing students' mathematical knowledge and experience in measuring, determining accurate calculations, converting units, determining dimensions, and determining the quantity of a comparison. 3) An increase in the number of plants in the schoolyard which previously was only oriented to ornamental plants. 4) More greenhouse facilities filled with equipment for growing vegetables and vegetable crops that have been successfully planted by students.

The partners' contributions in implementing the activities are as follows: 1) The involvement of grade 4A and 4B teachers in the preparation of activities is participating in the preparation of student worksheets. 2) Involvement of grade 4A and 4B teachers in the implementation, starting from providing understanding/counseling to students about vegetable food plants and the role of mathematics, mentoring vegetable care, to carrying out follow-up activities to continue to try to preserve plants in the greenhouse. 3) The involvement of the Head of Madrasah starts from preparation, opening, implementation, to the evaluation of activities. 4) Involvement of all madrasah residents

to care for and preserve vegetable crops at school.

The supporting factor for this activity is the enthusiasm of the school community and the school environment/support facilities. The enthusiasm of the school community made this activity run smoothly. In addition, sustainable green yards and various Adiwiyata school facilities are the carrying capacity that facilitates this activity. This supporting factor becomes the support for consistent follow-up activities to preserve vegetables in the schoolyard. In addition, the Adiwiyata school activities integrated with mathematics provide opportunities for further activities that will support the Adiwiyata program in the curriculum aspect.

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