



Natural sciences and social sciences learning in school garden, Indonesian School of the Haque, Netherlands

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ARTICLE INFO	ABSTRACT
<p>Article history Received: 2023-07-09 Revised: 2023-09-09 Accepted: 2023-09-11 Published: 2023-09-19</p> <p>Keywords Indonesia School of the Haque Natural sciences School gardens Social sciences</p>	<p><i>School gardens can be used as a source of student learning for various subjects in an integrated manner to improve student' academic, personal, awareness, and social abilities. By implementing gardening activities students are trained to design, build and develop agricultural hustles at school through cultivating and harvesting the plants that may be consumed and added economic value. The service activity aims to utilize the school garden as a medium for learning natural science and social Science at the Indonesian school of the Hague. Methods of implementing activities consist of preparing materials tools, preparing seeds, clearing land, planting, caring for plants, observing the students' behavior toward school gardens, and evaluating students' understanding of school subject matter based on learning resources in the school garden. Based on students' responses in answering questions related to science material and social science impacts, it shows that both science and social science learning activities in school gardens may assist in an in-depth understanding of the concept of agriculture skills and behaviors of the students.</i></p>
<p>Kata Kunci IPA IPS Kebun sekolah SIDH</p>	<p>Pembelajaran ilmu pengetahuan alam dan ilmu sosial di kebun sekolah, Sekolah Indonesia Den Haag, Belanda. Kebun sekolah dapat dimanfaatkan sebagai sumber belajar siswa berbagai mata pelajaran secara terpadu untuk meningkatkan kemampuan akademik, pribadi, kesadaran dan sosial siswa. Dengan melaksanakan kegiatan berkebun siswa dilatih merancang, membangun dan mengembangkan usaha pertanian di sekolah melalui budidaya dan pemanenan tanaman yang dapat dikonsumsi dan bernilai ekonomi. Kegiatan pengabdian ini bertujuan untuk memanfaatkan taman sekolah sebagai media pembelajaran IPA dan IPS di Sekolah Indonesia Den Haag. Metode pelaksanaan kegiatan terdiri dari menyiapkan alat bahan, menyiapkan bibit, membuka lahan, menanam, merawat tanaman, mengamati perilaku siswa terhadap taman sekolah dan mengevaluasi pemahaman siswa terhadap materi pelajaran sekolah berdasarkan sumber belajar yang ada di taman sekolah. Berdasarkan respon siswa dalam menjawab pertanyaan terkait materi IPA dan dampak IPS menunjukkan bahwa kegiatan pembelajaran IPA dan IPS di taman sekolah dapat membantu pemahaman mendalam tentang konsep pertanian dan perilaku siswa.</p> <p style="text-align: right;">Copyright © 2023, Syamsia et al., This is an open access article under the CC-BY-SA</p> <div style="text-align: right;">  </div>
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INTRODUCTION

The learning method with school gardens was known in America in 1891 but experienced a decline in the 1950s and now school gardens are starting to be used again as a medium for educating school children (FAO, 2006); (Wiradnyani et al., 2018). According to (Chan et al., 2022), the effectiveness of using school gardens in increasing knowledge about nutrition, and cultivating students' attitudes and interest in vegetables depends on the type, extent, and duration of the activity.

The school garden is the right place for active learning for various subjects where teachers can use the school garden as a laboratory for conducting experiments and can also be used to study mathematics, English, and art so that the teaching and learning process becomes more interesting (CSGN, 2010; Wiradnyani et al., 2018). School gardens have the potential to improve student learning outcomes (Lohr et al., 2023)

Gardening activities at school can develop children's physical and motor skills, explore objects around them, and learn while playing so that children are active and don't feel bored (Sutrisno, 2005; Windarto et al., 2020). School gardens provide an active learning atmosphere that strengthens academic, personal, and social abilities (Kammar et al., 2017; Wiradnyani et al., 2018) Planting activities in school gardens in addition to increasing accessibility and availability of fruits and vegetables also encourage children to appreciate the products they produce. School garden-based learning can increase environmental awareness, health and welfare of the entire school community and its surroundings (Alexander et al., 2021).

School gardens integrate a hands-on experimental approach and active involvement of students in designing, building maintaining, and developing school gardens with edible plants (Chan et al., 2022). According to (FAO, 2004), school gardens have the main goals for education, economy, and food security. The aim of education is to active learning by linking plants with other subjects, such as mathematics, biology, reading, and writing, teaching environmental issues, including how to grow crops safely without using pesticides. The goal of economics and food security is to accustom students to applying sustainable food production methods that can be applied at home for household food security.

Based on observations, the Indonesian School of the Hague (SIDH) has quite a large area of land and can be used as a school garden to be used as a place of study for SIDH students for science subjects. This service activity aims to train students to understand school subject matter in an integrated manner by utilizing the SIDH school garden. The use of school gardens in science and social studies learning is in line with sustainable development goals (SDGs), especially the goal of ensuring inclusive and quality education throughout life (Gardner et al., 2023), ending hunger, achieving food security, improving nutrition as well as encouraging sustainable agriculture (Lapau, 2015; Kuntariningsih, 2018).

METHODS

This service activity was carried out from March to May 2023 in the backyard garden of Indonesia School of the Hague (SIDH). The stages of implementing the activities were carried out as follows:

Preparation of Materials and Tools

Materials needed for gardening activities include shovels, brooms, water hoses, plastic baskets, plastic, machetes. Materials used in the activity include plant seeds, soil, compost, plant seeds (fruits, vegetables and spices), bamboo sticks, neat ropes.

Land clearing

The location that had been determined for the construction of the school garden that cleaned and then a fence was installed using bamboo strips.

Seeding the seeds

Vegetable seeds that were planted in the school garden were already sown in containers filled with fertile soil.

Planting

Vegetable seeds that had grown in plastic tubs are transferred to the school garden. The seeds that had been planted are labelled and posted on school garden boards.

Maintenance

Plant maintenance was carried out every day by watering, removing grass or weeds that grow around the plants.

Interview

The interview approach was used as a qualitative method to observe the comprehensive information from Indonesian School of the Hague on the impact of the benefits of school garden in the social science aspects.

RESULT AND DISCUSSION

SIDH School Garden

Indonesian School of the Hague (SIDH) is an Indonesian National Education institution in the city of The Hague which is located at Rijksweg 679, 2245 CB, Wassenaar, The Netherlands. SIDH organizes Education Programs at 3 levels of Education namely Elementary School, Junior High School and Senior High School. The SIDH Education Process uses the National Education curriculum so that students who will continue their education in Indonesia can adapt to the conditions of education in Indonesia.

SIDH has a school garden in the backyard of the school building which is planted with various types of vegetable plants and a composting site for organic waste. The types of vegetables planted in the school garden consist of: fruit, vegetable and spice plants. Dried leaves from the school yard are composted using earthworms.



Figure 1. School Garden of SIDH

Natural Sciences Learning Media

Sciences learning materials that can be taught in school gardens such as: green plants, introduction to plant species, plant parts, forms and functions of plant body parts, changes in living things (growth) and plant maintenance. According to (Nurwidodo et al., 2022), school gardens can be used as natural science learning resources, related to material on classification, the structure of plant functions.

Material Types of plants

The types of plants in the SIDH garden are divided into 3 groups, namely: fruit vegetables, vegetables and spices. Fruit plants such as strawberries (Figure 2), vegetable plants such as tomatoes and peas (Figure 3), spice plants such as garlic, mint, raspberries, thyme (Figure 4). The selection of these plants is based on the consideration that plants are harvested faster and easy to maintain. This is almost the same as in school gardens in Bangladesh where vegetables such as tomatoes, onions, broccoli are planted and the selection of plant species is based on considerations of easy maintenance, nutritional content and plant availability (Wiradnyani et al., 2018).



Figure 2. Strawberry



Figure 3. Lettuce, Tomato and Peas



Figure 4. Garlic, Mint, Raspberry, and Thyme

Lessons in the School Garden do not only provide learning experiences about plant types. According to Pollin S and Retzlaff-Furst, (2021), learning in school gardens also provides basic experience about plant cultivation and accidental contact with animals such as soil organisms (earthworms, spiders and woodlice).

Material Parts of Plants

Students study the parts of plants by directly observing the parts of fruit, vegetable and spice plants that have grown in the school garden. The plant parts consist of: leaves, stems, roots, flowers, fruits and seeds. Each plant has a different leaf shape, some have broad leaves like lettuce, some have narrow leaves like rosemary. There are 2 kinds of plant stems, namely: soft stems such as mint and lettuce, hard stems such as raspberries (Figure 5).



Figure 5. Introduction to plant parts

Plant Breeding Materials

Plant reproduction was observed based on the parts of the plants planted in the SIDH school garden. Plants grown by seeds, such as lettuce, tomato, peas, rosmerry, mint, raspberries, thyme are included in generative propagation, while potatoes and garlic grown by tubers are included in vegetative propagation of plants.

Plant Growth and Maintenance Materials

Lessons about changes in living things, plant growth and care by watering are carried out from the beginning until just before harvest. Seeds and tubers planted in plastic containers filled with soil and compost germinate and grow into small plants.



Figure 6. Seed Growth

Small plants that already have several leaves are transferred to the garden and plant maintenance is carried out by watering and weed control, as well as installing stakes for vines such as peas is a lesson related to plant growth and care.



Figure 7. Watering Plant

Direct practical activities in plant maintenance such as watering, controlling weeds and harvesting vegetables in the school garden teach students to be disciplined and patient. According to (Story et al., 2008; Cristian et al., 2014; Chang et al., 2014), maintaining and harvesting plants in school gardens can encourage students to appreciate and value garden products.

Social Science Aspect

Anthropology

As the research observation in this study, school garden may create conducive environment for the students to gain social interaction of learning process and experience in nature and agriculture at school. The existence of school garden program provides the sense of understanding in life associated with gaining student's social development. For instance, the students gather with their peers in learning together in the field, interacting with other members, communicating in the discussion and helping each other to the agricultural activities as planting, cultivating and harvesting the crops. Moreover, the school may conduct any community events as joining field trip and promoting local food to the society surrounding the school.

Learning in school gardens that is designed according to needs can improve social learning because social interaction occurs which can increase emotional competence and social skills regarding communication and cooperation, the ability to relate to other people and teamwork (Pollin S and Retziuff-Furst C., 2021), increasing students' cognitive and emotional abilities (Dettweiler et al., 2017; Mason et al., 2022), a calmer environment and student involvement directly impacts academic success, attitudes towards the environment and being able to act ecologically (Rutter, 2000; Kuo et al., 2019).

Phycology

In term of benefits on phycology of school garden that the study observed, the students may develop good attitude, mental tension and anxiety among peers. The student's knowledge on food would be more in depth since the students will understand how the food is processed from the farm and the importance of food nutrition. Hence, their attitude toward food would be very concerned, as they will appreciate the food, and ignore to waste it. Indeed, the aggregation of managing positively the food waste that is started from the small communities, would contribute to the food security and sovereignty.

The results of research by Emily et al., (2021), the use of school gardens in learning has a positive impact on student teamwork and leadership abilities. Likewise, the results of research by Schultz (2022), the implementation of gardens in schools has an impact on the availability, access and consumption of fresh fruit and vegetables as well as students' social and emotional well-being. According to Rabiner et al., (2016), having learning activities in school gardens can provide opportunities and experiences for students to interact with nature which can support the attention process and become the basis for students' academic development.

Economics

Besides the social value and phycological behavior, the role of school garden may also contribute to the student's knowledge in economics. Although, the production of crops planted in the schoolyard is limited and only for student's consumption. However, the teacher also provides the knowledge how agricultural product may generate income or cash. It is very important to gain student's intention to value the food in agriculture. Specifically, students may start to assess the cost of agricultural inputs, determine selling price, market the product to consumer and attain profit. Hence, the students will be more eager to participate in the school garden activity.

Cultivating vegetables in school gardens is very useful for reducing expenses for buying nutritious food (Latifa E. et al., 2014). Outdoor learning specific to nature has measurable socio-emotional, academic and welfare benefits (Mann J, et al., 2022).

CONCLUSION

School gardens can be useful to provide an active and cheerful atmosphere for students in natural sciences and social science subjects. In the science benefits, the study obtained the practical approach on basic agricultural cultivation related to material; green plants, plant types (plant classification), plant parts, forms and functions of plant body parts, plant growth and plant maintenance which includes: watering, fertilizing and pest control. While, the enhancement of social interaction among the students, attitude toward food, and knowledge in marketing economics has received among the students as the contribution in the social science subject.

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