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School Gardens as a learning approach and their effects on Students in Primary School

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ABSTRACT
Gardening play an important role to human's well-being. It not only provides the source of food but also teaches a lesson that related with other subjects such as math, science, environment and others. Some schools are garden-based learning or school garden, they bring the gardening into a classroom to be an educative and fun activity for students. It has been shown that school gardens have significant of positive impacts on direct and indirect academic outcomes (William & Dixon, 2013). There are many benefits of gardening in the school. This essay will examine the effect of school gardens on students' academic achievement. I will focus on direct and indirect effects on academic performance. I argue that school gardens can improve students' academic achievement directly and indirectly. School gardens have potential to promote the students' physical, mental and emotional health. The finding shows that Garden-based learning can improve students' academic achievement in different pathways such as math and language art. However, to meet the effectiveness, school gardens should be designed properly and collaboration from all of the stakeholders are needed.

Keywords: Students' performance, learning approach, outcomes, school garden, garden-based learning.

INTRODUCTION

Learning approach is important as an effective strategy in teaching and learning. School garden also can be used in school since gardening play an important role to human's well-being. It not only provides the source of food but also teaches a lesson that related with other subjects such as math, science, environment and others. Some schools are garden-based learnings or school gardens, they bring the gardening into a classroom to be an educative and fun activity for students. It has been shown that school gardens have significant of positive impacts on direct and indirect academic outcomes (William & Dixon, 2013). There are many benefits of gardening in the school. In this essay, I will examine the effect of school gardens on students' academic achievement. I will focus on direct and indirect effects on academic performance. I argue that school gardens can improve students' academic achievement directly and indirectly. School gardens have potential to promote the students' physical, mental and emotional health. Those benefits possibly stimulate their passion for learning. In other words, School gardens encourage the students to perform better and get higher academic achievement in their final examination. However, there is a research that claims gardening have no effects to help the students prepare standardized testing. To engage this debate, In the first section of this essay, I will discuss the school garden as a learning approach and its link to students' academic achievement, then the second section will be the explanations of direct and indirect outcomes. In the third section, I will present some challenges and problems in implementing the school gardens. Then, the last section will conclude by outlining the problem solving and conclusion.

What is school garden? It is school that has gardening program to learn the concept of agriculture and skills that integrate with other subjects such as math, science, art, health as well as educational goals such as personal and social responsibility (Green Heart Education, 2007). This brief explanation illustrates that the school garden can be the source of knowledge to learn the concepts of particular subject. In this case, school gardens potentially provide beneficial values to students in

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primary school through delightful experiential learning. In addition, the previous research also describes the impact of school gardens to students' grade. In the next session, I would like to describe the benefits of school gardens on students' academic achievement in two ways, Directly and Indirectly.

METHODS

According to Bryman (2016), A choice of research design reflects decision about the priority being given to a range of dimensions of the research process. In conducting the research, I would like to use qualitative method as it is the best way to analyze the benefits and effects of implementing school garden in primary school. Furthermore, this methodology will be used to answer the research questions. In addition, I will use documents as sources of data such as ERIC documents, books, Theses and peer reviewed academic journals. Then, I will present the effects into two areas, which are direct and indirect effect. Bowen (2009) states that by assessing information collected through different ways, the researcher can confirm and support the findings across the data sets and thus decrease the effect of potential biases that may appear in a single study. Hence, the data will be analyzed and discussed in the following section.

RESULT AND DISCUSSION

Direct Effects

Garden-based learning is related with some subjects, such as science, natural environment, art and math. Through the practical learning. These programs give concept and understanding of the theory that has been learned in the class. Classes and experiential learnings of school garden provide a wide range of information and concepts of science. For example, in learning about structure of plant the students can use the plant as sample to analyse each part of its structure and function. In this way, primary students can remember and understand about the topic easily. Instead of learning in conventional way, school gardens can help the students enlighten their knowledge and relate it with the nature around them. This experience can improve their quality of thinking and practice their rational thinking, which can be related to other subjects such as math, writing, and reading. William and Dixon (2013) found a significance impact on student' grades, especially in science, math, and language arts, giving credence to gardens serving as instructional and curricular means for covering academic content. They stated that in one study, using a sample of 647 students in Grades 3–5 in seven elementary schools in Temple, Texas, Klemmer, Waliczek, and Zajicek (2005b) found that science achievement of students who participated in a hands-on school gardening program was higher than that of students who did not participate.

In addition, it is argued that science and math curricula were recorded as most frequently connected to gardening. Activity such as plants parts, insects and wildlife are related with science. Thus, in mathematics, experiential learning covered themes in data analysis, probabilities and measurements. In this research, William and Dixon (2013) analysed 152 articles in 48 studies to find the impact of gardening programs on students' academic achievement in the schools. The data showed that students who experience gardening have the most significant improvement in their science's grade followed by math and language art.

Indirect Effects

There are three outcomes of indirect effect of school gardens on students' academic achievement. They are students' consumption, motivation and emotional intelligence. These elements contribute to students' performance in the learning process. For example, Health and motivation can help the students to study better. Compared with children who are not motivated to study, the

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motivated and healthy children are more excited to learn and participate. This factors will influence their attention and focus which will impact their quality of learning and understanding. In other words, activity in school gardens cause a beneficial impact to students to make the learning and teaching process more effective and efficient.

First, School garden promote health through improving students' fruit and vegetable consumption. In this programs the students produce and eat their own food from the garden. This is a big opportunity for them to interact with the nature and learn about food safety. This interaction will build the student's perception about their source of food, Experience in gardening gives connection to the nature which can be a reminder to realize that fruit and vegetable are important. Consequently, this program will improve their fruit and vegetable consumption. Parmer, Shannon and Struempler (2009) observe from the lunch observation, nutrition education and gardening (NE+G) treatment group change their behaviour significantly to eat vegetable in the school, while the nutrition education only (NE) treatment group had no significant change consumption. This result shows that school gardens have an important role in the school to promote eating fruit and vegetable. This is also a long term effect for students' health and behaviour because their decision to eat healthy food comes from their understanding, experience and interaction with nature.

Healthier children are also better learners. Regarding the relation between fruit and vegetable consumption with academic outcomes, it has been shown in a research. Nutritional intakes influence students' health and academic achievement. Consume healthy food are important. Regardless of various factors of diet quality, it is argued that fruit and vegetable and dietary fat intake were demonstrated as important to academic performance. (Florence, Asbridge & Veugellers, 2008). In addition, according to a report from USA government, national centre for chronic disease prevention and health promotion (2014), Healthy students are better on all levels of academic achievement: academic performance, education behaviour, and cognitive skills and attitudes. To conclude, School gardens improve students' academic achievement through their nutritional intake and health.

The second indirect effect to students is motivation. School garden programs contribute to children's physical, mental, and emotional health. They improve students' self-esteem, resilience, motivation and behaviour. After one-year implementation, it has been shown that school gardens improved students' confidence and positively influenced motivation and behaviour with increased enthusiasm for school and learning, better attendance and completion of homework. (Beery, Adatia, Orsola & Segantin, 2013)

Motivation is related with academic achievement. Motivated students are more likely to learn and participate in the class. School gardens involved a valuable teaching of how the concept and theory should be used and implemented, such as learn how to grow the plants to produce food. the long process of gardening teaches about motivation. Students are learned to follow the instruction with patient and treatments such as preparing the soil with organic fertiliser, composting, mulching, and watering. It will influence the quality of their food because without doing this process the plant possibly dying. In other words, the students will learn that to produce fresh food, the students need a long process and hard work to take care of the plants. This concept is the same as learning process. To get best grade or knowledge the students need to study hard and have full attention in their process of study. To compare with, as they harvest the fresh and tasty food after harvesting, they will find many advantages after study hard. This understanding and experience can be a motivation to students to study harder and perform better in their learning activity. To conclude, school garden programs improve students' academic achievement indirectly by improving their motivation to learn.

To support this, Skinner, Chi and The Learning-Gardens Educational Assessment Group (2012) demonstrated that students who were more engaged in the gardens were more likely to be engaged in science and in school in general. The correlations were positive and significant. About 310 seventh grade students ages 11 to 13 from a middle school in the Pacific Northwest and their six science

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teachers were participated. Correlations between garden engagement and engagement in science class and school are presented in this research. Assessments of engagement and self-perceptions in the garden worked well and showed the expected pattern of positive and significant correlations with potential academic outcomes such as learning and achievement, and with other important outcomes such as engagement in science and school, and academic self-perceptions.

Third, school gardens effect on students' emotional intelligent. School garden programs involved a physical activity and social collaboration. This programs help the students to balance their academic and social life in school. School gardens provide beneficial activity to their social-emotional skills which are important to the learning process. Generally speaking, success is not only measured by Intellectual quotient (IQ), but also emotional quotient (EQ). Elias, Arnold and Hussey (2003) elaborate in their book titled "EQ + IQ = Best Leadeship practices for caring and successful schools" that social-emotional competencies providing an inclusive learning environment that enhances academic achievement. EQ contributes to students' grades and performance. In one study, conducted by Swank and Swank (2013) Activities in the natural environment may also enhance children's social and emotional learning, personal development, and facilitate a conductive to Learning. School gardens possibly improve the students' academic achievement through balancing their academic and emotional development in gardening programs.

All of the indirect effects can be seen as the other pathway to improve students' progress and score. Students' grade is important but schools need to focus on the process and provide a beneficial activity to balance their academic, emotional and social life. From the discussion, it can be seen that the school gardens have significant impact to students' academic achievement, directly to science, math and language arts and indirectly through students' health, motivation and emotional intelligent development. All of these factors will accelerate the students' performance in the class. In addition, nutrition also influences the students' performance. National centre for chronic disease prevention and health promotion (2014) reports that lack of adequate consumption of specific food such as fruits, vegetables or dairy products is associated with lower grades among students.

Challenges

However, in primary school, students and teachers are facing the curriculum approach and examination test. On this account, gardening is not related with standardized testing preparation. In primary school, students are evaluated by multiple choices and written texts. Students and teachers have a lot of materials that should be learned to complete the curriculum approach. Lancey (2016) describes that strict public school standards and measures of success as a result of neoliberal education reform often prevent teachers and school administrators from utilizing these school gardens fully. He found teachers' problems in school gardens such as scheduling, standardized testing, knowledge of problem and students' behaviour are the factors of 'failing' gardens. In his interviews, one of the participants, school administrator said that even though teachers have block scheduling but it is not always fair to assume they will have time to make it out there. Especially before testing, which is probably when the students could use the time outside the most. In other words, gardening programs in the school can be not effective to academic achievement when the teachers and stakeholders are not able to apply this program properly.

The challenge is the examination test which makes the students busy with learning the materials and teachers struggling to schedule their time. It can be understood that teachers also need time to prepare themselves before teaching to relate their topic with gardening. Standardized testing is important to measure students' understanding. However, the teachers also need to focus on the process of the study. Schools nowadays, only focus on academic approach rather than on the implementation of study in students' life. Short-term and long-term impact of study should be thought by institutions to give the value of education which is not only in theory but also in practical. Students are encouraged to go to school not only to learn how to read and write or to remember the knowledge

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but also to implement their knowledge in real life. This should be considered by schools so that the students can receive the benefit of education.

Another challenge is integrating the gardens into the curriculum of the school. In spite of the examination test, the teachers also face the new challenges to relate their topic in outside activity or gardening. Consequently, the school should educate the teachers to apply the garden-based learning programs with some trainings and support them from various way. Previous research has described a successful school garden, called Manzo elementary school as a model to solve this problem. Moore, Apicella, Marston and Thompson (2012) stated that "the garden sites are well-integrated into the school's mission, and supported by other sustainable schoolyard projects, such as water harvesting" (p. 256). They also add that the community involvement is important to make sure that gardens are maintained.

To avoid these problems, school gardens should be designed and developed not only by school but also together with the stakeholders such as principal, teachers, learners, and caretakers. Beery et al. (2013) stated that to achieve the sustainability, practical and cultural challenges must be addressed. For example, adapting the culture of teaching and learning. In this case, developing participation and commitment among teachers for the garden and an understanding of its potential as a learning resources is a long-term process. Without the support from teachers, gardening programs cannot reach its benefit to students and just become a part of outside activity. The schools also need to consider the other organizations such as researcher, gardeners, and parents to be involved in this project. So, the school possibly maintained the garden successfully and the students can get the benefits of school gardens directly and indirectly.

CONCLUSION

From the discussion, it can be concluded that the garden-based learning can improve students' performance in the class. It has been discussed that there are many benefit of school garden to students' academic achievement directly and indirectly. In direct effect, school gardens dominantly increase the students' academic achievement in science, math and language art. In indirect effect, they impact on three elements. First, students' health which is changed because the students' preference in eating fruit and vegetables is increased. Second, students' motivation which is improved through the physical, fun and delightful activity in gardening. Third, students' emotional intelligent which is developed by the school garden's programs.

Moreover, the positive impact of school garden is not only in short term but also in long term such as students' fruits and vegetables eating habits. Nowadays, many children do not like to eat healthy food such as vegetables and fruits. In fact, many advertisements on Television or board encourage them to eat junk food such as burgers or drink soda. School gardens have an important role to promote the food safety to students. It also brings the message about their source of food so they are protected to eat unhealthy food in the school or home. Thus, it also has been shown that school gardens increase students' fruit and vegetable's consumption.

The challenges such as examination preparation test and teacher's obstacle in implementing the gardening programs can be solved with some treatments. For instance, involving the non-profit organization to maintain the school gardens, so the teachers can collaborate with the other participation to implement the school gardens properly. when the problems have been solved, the students can receive the direct and indirect outcomes to academic achievement. In addition, physical activity in school garden such as planting and collaborating with their friends to grow the food can be useful to encourage students to be active and collaborative. According to a report from USA Government, National Centre for Chronic Disease prevention and health promotion (2014), stated that providing access to healthy foods and physical activity plays an important role in the academic achievement of students.

After all of the discussion, it can be concluded that school gardens have positive effect on students' academic achievement. Academic performance is also influenced by some factors such as students' nutritional intake, behaviour and motivation. Garden-based learning can improve students' academic achievement in different pathway. However, to meet the effectiveness, school gardens should be designed properly and collaboration from all of the stakeholders. So, the students can receive the indirect and direct outcomes of gardening activity.

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