The role of agroedu-tourism program in enhancing young generation’s knowledge on urban farming: Hydroponics technique

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Abstract. The low regeneration of farmers in Indonesia encourages agricultural education to the young generation. Cendekia Baznas School (SCB) develops the Agroedu-tourism program as a place to learn agriculture for the young generation. This study aims to determine the increase in knowledge of agroedu-tourism program participants on urban farming, especially hydroponics. This type of research is an evaluation research based on the knowledge gained by program participants. This research was conducted in Bogor, West Java. The sample in this study participants of the agroedu-tourism program were 46 students from SMP Nurul Ihsan, Bogor, Java. The data obtained were inputted at Ms. Excel 2010, then it was performed the normality test and paired T-test difference test using SPSS 20. The results of this study were that there was an increase in the average score of participants' knowledge from before and after participating in agroedu-tourism activities. In addition, there are significant differences in hydroponic knowledge.

Keywords: Agro-tourism, hydroponics, young generation, urban farming

1. Introduction

Indonesia is known as agrarian country in which most of Indonesian work in agriculture. Farming is related to rural environment, wide land and rich. However, time by time, the agricultural land becomes the habitation. Centre Agriculture Data and Information System of Ministry of Agriculture shows that the growth of paddy fields is -0.31 percent [1]. Moreover, it is around 61 percent of farmers are over 45 years old [2]. It means that farmer regeneration is still low in Indonesia. The low portion of young farmers is in line with the low interest of the younger generation in agricultural business [3]. The phenomenon of low interest in agriculture by students, such as farming, occurs because students' perceptions of farming are identical to dirty, heating in the hot sun, and exhausting [4, 5] 26]. In addition, limited land in urban areas is one of reasons of urban youth do not know much about the world of agriculture [6]. This agricultural sector which is prone to be abandoned by the younger generation should be a serious concern. Education has an important role in this issue because it is known that good education will create a quality generation of the nation that is able to advance the nation's agriculture. Becoming a developed nation really
depends on the quality factor of the human resources (HR) of the Indonesian [7]. This is a demand that the young generation should be given a lot of knowledge that can open up insights and can provide a better life provision in the future. According to Page's assessment, experience with complex problems, demands from formal teachers, and the exchange of ideas against youth groups, are necessary for operational thinking development [8]. Young generation is The young generation is a future asset that needs environmental education, thus, it can educate individuals to be responsive toward environmental problems [9]. The environment is very important for human life because if the environment is problematic, then, human life will not be disturbed [10]. The young generation needs to get direction to be able to be involved in the process of national and state life [11].

The program of Agroedu-tourism from Cendekia BAZNAS School (SCB) was created as a form of contribution to concern for the low regeneration of farmers in Indonesia, especially in Bogor. The agroedu-tourism program or agricultural tourism is defined as a series of tourism travel activities that utilize the location or agricultural sector from the starting of production until obtaining the agricultural products in various systems and scales with the aim of expanding knowledge, understanding, experience and recreation in agriculture [12]. Then, this program consists of several activities such as classical learning, practicum class, and field trips.

The study about agroedu-tourism had been studied by many researchers. Previous research has focused on the study of agroedu-tourism on the building model of agroedu-tourism for elementary school students [13]. They found that the model from PLS can improve the students’ cognitive knowledge, understanding, enjoyment, and also pleasure in learning about agriculture. Another study was conducted which the aim of their study is to evaluate of two tour programs in agroedu-tourism [14]. The result of their study is most of students had high interest toward the tour programs. The next study about agroedu-tourism had been conducted, they used wheat farming as the object of agroedu-tourism and tried to find the potential of it [15]. From the previous studies that have been mentioned before, it seems like there is no study about agroedu-tourism related to hydroponics technique. Thus, the authors have interest in determining the increase of students’ interest and knowledge about agroedu-tourism program, especially hydroponics.

2. Methodology
This study used a cross-sectional study design. This type of research is an evaluation research based on the knowledge gained by program participants. This research was conducted at Cendekia BAZNAS School, Bogor, West Java. Data were collected using the self-administered method using a questionnaire that was filled in directly before (pre-test) and after the event (post-test). Sampling of this research was conducted by nonprobability sampling with purposive sampling technique. The sample of this study is the participants of agroedu-tourism program who completed the pre-test and post-test programs were obtained as many as 46 people. Program participants are the students from SMP Nurul Ihsan, Bogor, West Java. Furthermore, the data obtained was inputted at Ms. Excel 2010. Then performed the normality test and paired T-test difference test using SPSS 20.

The normality test is a data test used to determine whether the experimental group before and after participating in the agroedu-tourism program is normally distributed because the requirements for data analysis in this measurement, one of which must be normally distributed [16]. The normality test used in this study is the Shapiro-Wilk test, which is a normality test with a sample of less than 50 samples. If the test results are obtained <0.05, it means that the data is not normally distributed [16]. Then, after the normality test is carried out, it is followed by a different test, provided that if the data is normally distributed, the paired T-test is carried out and if the data is not normally distributed, the Wilcoxon test is carried out. The following are the steps of this research process.
Figure 1. Step of Research Method.

3. Result and Discussion
Hydroponics is a plant cultivation technology using groundless water [17]. Learning about hydroponics conveyed in the agroedu-tourism program in general is the definition, benefits, drawbacks, and types of hydroponic systems. Giving knowledge about agricultural innovations such as hydroponics is very suitable to be conveyed to the young generation, especially adolescents who are currently developing to try new things [18]. The right hydroponic learning method is needed in order that the material presented is able to foster interest and increase knowledge. Learning method has a strong relationship to the students’ achievement [19]. In this study, learning about hydroponics was carried out using the classical learning method, practicum class, and field trips.

The first teaching in the agroedu-tourism program is classical learning. Before starting, all participants were given a pre-test on basic knowledge about hydroponics. In this Classical Learning session, it was used to convey urban farming material in general and hydroponic material in particular using the lecture and discussion method. The participants looked enthusiastic and excited during their classical learning. The chart below shows the program participants' interests in hydroponic farming systems.

Based on the diagram, it can be seen that most of the participants (80%) are interested in hydroponic farming, as much as 13 percent are very interested in hydroponics, and 7 percent show no interest or dislike.
They are interested in hydroponics because it is a new thing in agriculture for them, such as it only needs a narrow/limited land or land intensification [20, 21]; requires little water [22]; and without soil medium [23].

The next lesson is practicum class. This practice was done outdoors. This method is included in the experimental method. In this activity, participants were taught to practice directly in creating hydroponic kits from used goods. In this study, participants were introduced to the types of hydroponic systems, namely drip systems, ebb and flow systems, Nutrient Film Technique (NFT) systems, Deep Flow Technique (DFT) systems, deep water culture systems, axis systems [24]. However, in this practicum class, a wick system was created. This practicum is expected to be able to increase the participants' understanding [25], namely understanding of the manufacture and hydroponic work system.

Then, the last lesson that was carried out in the agro-tourism program was field trips. This activity was carried out by looking the urban farming field directly which the field had been carried out at SCB. In doing this activity, a two-way discussion is also done by the following teacher's directions. This method is considered to be able to help the improving of learning abilities, participants' understanding, and providing a strong and practical learning experience [26]. After that, participants were given a post-test to determine the increase in participants' knowledge about hydroponics. The questions made are five basic questions related to hydroponics. The following is a graph of the results of the participants' answers based on each question:

![Graph showing percentage of participants answered correctly per question item.]

**Figure 3.** Number of participants based on correct answers per question item.

Based on the total number of participants who filled out the pre-test and post-test, it was found that all (100%) of the participants were correct in answering the question point 1 after completing the activity. In addition, there was an increase in the number of participants who correctly answered item 5 from before the activity there were 4 people (8.70%) who answered correctly, increased to 32 people (69.57%) who answered correctly after receiving exposure to hydroponics. In addition, an average pre-test score was obtained of 57.83 percent who answered correctly and an average post-test score of 79.57 percent answered correctly. This is in line with the previous research that the training program with the lecturing and discussion method can increase adolescent knowledge about agribusiness and consuming hydroponic vegetables [18]. In addition, the results of other studies reveal that experimental learning methods are
proven to improve student learning outcomes [25]. If there is an increase in students’ learning outcomes, there is the use of appropriate learning methods, while the use of appropriate learning methods provides clear evidence that the teacher / guide has the ability to manage the learning process as needed [19]. SCB's Agroedu-tourism program is designed with two concepts, namely agro-tourism and education, which means that the program is designed to become a center for the development of knowledge, understanding and experience through agricultural tourism [26] thus learning feels fun, because students' subjective well-being has a significant relationship and influence on students’ achievement [27]. Subjective well-being is based on the self-affective dimension in which there are pleasant and unpleasant moods and emotions [28]. When agroedu-tourism participants feel happy in carrying out their learning activities, they can improve their ability to absorb the material provided for satisfactory learning achievements or outcomes.

In addition, different tests were carried out before and after the activity. Before the difference test was carried out, a data normality test was carried out in order to determine the distribution of the data, thus, it can perform a different test of the pre-test and post-test results of these activities with the appropriate method. The following is a table of results from the data normality test:

| Table 1. Normality Test. |
|--------------------------|
| Kolmogorov-Smirnov*      | Shapiro-Wilk |
|                          |              |
| Statistik                | Sig.         | Statistic   | df  | Sig. |
| pre-test                 | 0.199        | 0.000       | 0.873| 46  | 0.000 |
| post-test                | 0.224        | 0.000       | 0.864| 46  | 0.000 |

Based on the table, it shows that the Shapiro-Wilk significance score for the pre-test and post-test variables is less than 0.05, thus it can be concluded that the data is not normally distributed. This makes the difference test process carried out using the Wilcoxon test. The results of the Wilcoxon test are obtained as follows.

| Table 2. Wilcoxon Test: Ranks. |
|--------------------------------|
| Total of Participant | Mean Rank | Sum of Ranks |
| IDX2-IDX1            |            |
| Negative Ranks       | 5a         | 18          | 90  |
| Positive Ranks       | 30b        | 1           | 540 |
| Ties                 | 11c        |             |     |
| Total                | 46         |             |     |

Based on the calculation method done by using the Wilcoxon Signed rank Test formula, the scores obtained are the mean rank and sum of ranks of the negative ranks, positive ranks and ties group. Negative ranks are samples with the score of the second group (posttest) lower than the score of the first group (pretest), which in the table above there are 5 participants who have lower scores after being given material in these activities. Positive ranks are samples with the score of the second group (posttest) higher than the score of the first group (pretest), which in the table above there are 30 participants who have higher scores after being given material in these activities. While ties are the score of the second group (posttest) equal to the value of the first group (pretest), which in the table above there are 11 participants who have the same score after being given the material in the activity. The Mean Rank is the average rating and the sum of ranks is the sum of the ratings. After the test results table above, there is a table of Statistics Test which shows whether there is a difference or not before and after participating in agroedu-tourism activities.
Table 3. Wilcoxon Test: Statistics Testa.

| IDX2-IDX1 |  |
| --- | --- |
| Z      | -3.762b |
| Asymp. Sig. (2-tailed) | 0.000 |


a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

Based on the table above, it can be seen that the Z score obtained is -3.762 with a p-score (Asymp. Sig. 2-tailed) of 0.000 which is less than the critical research limit of 0.05, thus, it means that there is a significant difference between hydroponic knowledge before participating and after participating in agroedu-tourism.

The similar studies have been carried out with the results that there are very significant differences in students' knowledge from before and after being given agribusiness and hydroponic training [18]. It can be due to the fact that participants are interested in hydroponics, thus they have enthusiasm and spirit in participating the activities. These positive emotions can make it easier for participants to understand the learning material.

4. Conclusion

In short, the Agroedu-tourism program from Cendekia BAZNAS School can be concluded that there is an increase in the average score of participants' knowledge from before to after participating in agro-tourism activities. In addition, there is a significant difference in hydroponic knowledge from before and after the participants took part in participating in agroedu-tourism activities. Interesting agricultural education for adolescents is able to foster adolescent interest in agriculture and it can increase the knowledge about agriculture. Based on these results, for the better benefit of the next program, it is best to complete practicum material; the material is explained more in a more diverse range of media, and there are periodic visits from the participants concerned.

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