

## Enhancing the Conceptual Comprehension on Photosynthesis by Implementing Outdoor Study for Grade 4 Students of SDN Bratan I In Academic Year 2014/2015

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**Abstract:** The objective of this research is to improve the conceptual comprehension on photosynthesis by implementing Outdoor Study. This research is a Classroom Action Research (CAR) conducted in two cycles. Every cycle consisted of four steps namely planning, action, observation, and reflection. Teachers and fourth grade students were the subject and sources of data in this research. The techniques of collecting data in this research were documentation, interview, observation, and test. The methods of data validity used were triangulation of source and triangulation of technique. The techniques of data analysis used in this research were comparative descriptive and interactive technique analysis. Conclusion of this research is implementing Outdoor Study can enhance the conceptual comprehension on photosynthesis.

**Keywords:** conceptual, comprehension, photosynthesis, outdoor study

### 1 INTRODUCTION

Natural Science is defined as a science which studies surrounding natural environment and it is said to be a set of knowledge concerned with systematically-constructed natural phenomena. According to Srinivasa M. Iskandar (2001: 2), Natural Science is considered literally as a science of nature or that which studies events happening in the nature. Meanwhile Sukardjo (2005: 1) states that it is a science which studies nature and its contents, or is simply a set of systematically-constructed knowledge about natural phenomena.

School Based Curriculum (KTSP) denotes that Natural Science seeks to understand how to find out nature systematically. Science is not only about mastery on a set of knowledge comprising facts, concepts or principles, but also invention process. Natural Science applies learning which emphasizes on the provision of direct experience with nature as well as motivates students to be active and have curiosity. In short, the Natural Science learning refers to activities to find out surrounding natural problems. It is commonly called scientific approach. This learning approach includes observing, asking, trying, analyzing and presenting.

The Natural Science learning provided by primary schools is the basic one. In syllabus of KTSP 2006 for 4<sup>th</sup> grade in 2<sup>nd</sup> Semester, Natural Science includes one of competency standards: plants material. In the subject, the process of photosynthesis explained in the school involves parts of the plants. Students are expected to make use of the resource for their daily needs as appropriate. Knowledge on the process of photosynthesis, thus, needs to be transferred to primary school students.

In order to enhance the conceptual comprehension in the Natural Science learning, students' curiosity becomes the starting point in conducting activities of experiment. The activities aim to discover and to establish conceptual comprehension as well as to apply it to solve the problems encountered by the primary school students in their everyday life.

In reference to the previous observation done to grade 4 students of SDN Bratan I, several problems in the learning process were found. The problems were: 1) students being less enthusiastic, 2) the existence of passive students, 3) saturation and boredom, 4) less student involvement since one way traditional learning with lecture is still applied. Moreover, the students were bored with

the learning in classroom which is bordered by four walls and is monotonous. It caused the determined learning objectives to be less optimally achieved. It could be seen from the results of preliminary evaluation score on the material about photosynthesis being under the determined Minimum Mastery Criteria (KKM) that is 70. The number of students achieving score above 70 is 11 with average score of 64.14. Therefore 60.71% (17 students) has not achieved the KKM.

Based on the aforementioned fact, appropriate solution is required to solve the existing problems. The solution includes the implementation of innovative learning in order to achieve the learning objectives more optimally. One of the learning to cope with students' boredom since their classroom is bordered by four walls during learning activities is outdoor study.

Priest (1986: 13) states "Outdoor education is an experimental method of learning by doing, which takes place primarily through exposure to the out-of-doors. In outdoor education, the emphasis for the subject of learning is placed on relationship between human and natural resources. The outdoor study requires the students to adapt with surrounding environment and nature and to comprehend the significance of life skills and experiences in surrounding environment and nature as well as to have appreciation for them.

This is in line with Adelia Vera's opinion (2012) that teaching outdoor is an activity of transferring lessons outdoor. This outdoor study takes place outside class or in natural environment. It is basically an activity of learning which has been designed and developed by teachers. It is a combination of both indoor and outdoor studies to set students to study outdoor by making use of surrounding environment or nature.

Based on the aforementioned statement, it concludes that teaching outdoor study refers to an activity of learning outdoor by making use of environment as a source of learning and then discussing in the class something obtained from the environment. This activity helps develop the relationship between teacher and students and

therefore there exists no distance between them. Apart from that, the students can be active in the learning and the teacher will not dominate the teaching and learning process. Outdoor activity is not merely an informal additional activity. It is held during the school's learning hours.

## 2 RESEARCH METHOD

This research was conducted in grade 2 of SDN Bratan I in Colomadu Karanganyar in 2015 in two cycles in which each cycle consisted of four steps: 1) planning; 2) action; 3) observation; and 4) reflection. The subject of this research included teachers and grade 2 students of SDN Bratan I, with total number of 28 students comprising 13 female students and 15 male ones. Data sources were obtained from both qualitative and quantitative data sourced from students and teachers of grade 4, documents, conceptual comprehension score, and documents of teachers' performance score, students' activities, images and videos. Technique of collecting data included documentation, observation, interview and test.

## 3 RESULTS AND DISCUSSION

### a. Results

Several activities such as observation, interview and preliminary evaluation test were conducted prior to action. Based on preliminary test on the comprehension on photosynthesis, data showing that most of 2<sup>nd</sup> grade students of SDN Bratan I have not achieved the determined KKM. They can be seen in Table 1 below.

Table 1. Frequency Distribution of Score of Preliminary Conceptual Comprehension

No	Interval	Frequency (f <sub>i</sub> )	Percentage (%)
1	40-49	7	25 %
2	50-59	3	10.71 %
3	60-69	7	25 %
4	70-79	7	25 %
5	80-89	3	10.71 %
6	90-99	1	3.57 %
Total		28	100 %
Average Score = $1796:28 = 64,14$			
Class Average Percentage (%) Mastery = $(11:28) \times 100\% = 39.29\%$			

The table shows that the comprehension on photosynthesis shown by 2<sup>nd</sup> grade students' preliminary result is still low. The number of students achieving score under the KKM is 17 (60.71%) while 11 students succeed to achieve score of the KKM, with the lowest score of 40 and the highest score of 96 as well as average score of 64.14. Concerning this finding, the researcher suggests an implementation of outdoor study to enhance the conceptual comprehension on photosynthesis for 4<sup>th</sup> grade students of SDN Bratan I.

Meanwhile, the data of 4<sup>th</sup> grade students' score of conceptual comprehension on photosynthesis by implementing outdoor study in cycle 1 indicate an improvement. They are figured out in Table 2 below:

Table 2. Frequency Distribution of Conceptual Comprehension in Cycle 1

No	Interval	Frequency (fi)	Percentage (%)
1	43-51	1	3.57 %
2	52-60	4	14.29 %
3	61-69	2	7.14 %
4	70-78	2	7.14 %
5	79-87	12	42.86 %
6	88-96	7	25 %
Total		28	100%

Average Score = 2189 : 28 = 78.18

Class Average Percentage (%) Mastery =

(21:28) X 100% = 75%

In cycle 1, there are 21 students (75%) achieving the KKM, whereas 7 students (25%) do not reach it. The result indicates that the target determined at the indicator has not been achieved, and accordingly it will lead to cycle 2. Cycle 2 shows that there is significant improvement on the conceptual comprehension on photosynthesis by using outdoor study. The complete result is exhibited by Table 3.

Table 3. The Frequency Distribution of Conceptual Comprehension in Cycle 2

No	Interval	Frequency (fi)	Percentage (%)
1	70-74	0	0 %
2	75-79	4	14.29 %
3	80-84	11	17.85 %

4	85-89	4	14.29 %
5	90-94	5	17.85 %
6	95-99	4	14.29 %
Total			100%

Average Score = 2406 : 28 = 85.93

Class Average Percentage (%) Mastery =

(28:28) X 100% = 100%

The treatment conducted in cycle 2 reveals that there are 28 students (100%) who have achieved the KKM, with 96 as the highest and 76 as the lowest score. The result obtained in cycle 2 increases and accomplishes the determined performance indicator of 85% with the average score of 85.93.

## b. Discussion

The aforementioned explanation demonstrates that the implementation of outdoor study can gain the conceptual comprehension on the photosynthesis. It is proven by the score improvement in the preliminary research, cycle 1 and 2. The conceptual comprehension of grade 4 students of SDN Bratan I on photosynthesis is still low in the preliminary research. The result of the study shows that 17 (60.71%) of the total number of students do not achieve the KKM, whereas 11 students achieve it.

In cycle 1, the comprehension increases for about 75%. The number of students achieving the KKM is 21, while 7 students (25%) have not achieved it. A more significant improvement occurs in cycle 2. The data obtained from the cycle 2 exhibit that 28 students (100%) achieve the KKM. The comparison of the scores obtained from the preliminary research, cycle 1 and 2 is displayed in table 4.

Table 4. The Comparison of Conceptual Comprehension

Description	Class Average Percentage (%) Mastery	
	The Number of Students	Percentage (%)
Preliminary	11	39.29
Cycle I	21	75
Cycle II	28	100

The improvement occurring after the implementation of outdoor study for the material about photosynthesis reveals that it can engage students' interest in the learning process,

encourage them to learn from real learning source, and reduce boredom caused by the learning in a classroom bordered by 4 walls.

The outdoor study is appropriate to be implemented in scientific classes (IPA). It is due to the fact that IPA tends to apply a learning which emphasizes on direct experience with natural environment surrounding the students and motivates them to be active and curious.

The aforementioned explanation is in accordance with the theory postulated by Suyadi in Husamah (2013: 25) that outdoor study has some strengths comprising that it (a) builds a clearer mind, (b) creates a more pleasant learning, (c) offers more varied learning, (d) creates a more recreational learning, (e) makes learning more real, (f) stimulates students to know the real and extended world, (g) puts in an image of the world as a class, (h) has more extended means of learning, and (i) makes the brain work in a more relaxed way.

The other advantages are also proposed by some experts, including the one conveyed by Adelia Vera (2013: 28) who states some strengths of it, comprising that outdoor study can encourage students' learning motivation; furthermore, it can give a more pleasant atmosphere compared to the learning in a classroom bordered by 4 walls; also, it can make the students more active and creative. Outdoor study indirectly employs real media in the surrounding environment, and the mastery of basic skills, attitude, appreciation, and social skills. It can develop learning skill, work culture, and work group with friends. Moreover, it leads the students to be more independent since the learning is conducted through direct observation. Other benefits are that (1) the learning outcomes gained will be easily memorized, (2) it does not

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need much equipment, (3) it can create an emotional bond between the teacher and students, (4) it directs the students to a better environment and meaningful learning, and (5) it becomes easier to deal with study problems.

## 4 CONCLUSION

In reference to the discussion on the findings on the conceptual comprehension on photosynthesis conducted in two cycles, it proves that the outdoor study implementation can enhance the comprehension of grade 4 students of SDN Bratan I year 2014/2015 on the material. The fact is supported by the improvement the comprehension achieved by the students in cycle 1 and 2.

The pretest result shows that of 28 students, 11 students achieve the score above 70 (the KKM) with class average percentage (%) mastery of 39.29% while 17 students obtain the scores under the KKM or less than 70 (60.71%). The highest score is 96 and the lowest one is 40.

The evaluation scores obtained in cycle 1 indicate that 21 out of 28 students achieve the score above 70 with the average of 78.18. Meanwhile, 7 out of 28 students (25%) obtain the comprehension score under 70.

The evaluation result in cycle 2 based on the obtained data reveals that 28 students (100%) achieve the score above 70 (KKM) with the average score of 85.93. The highest achieved score is 96 and the lowest one is 76.

In reference to the analysis and reflection result in cycle 2, it is concluded that the treatment is successfully implemented with the students' mastery indicator reaching 100%. In other words, having reached the determined indicator (85%), this research was ended in cycle 2.

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