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The effect of activity sheet based on outdoor learning on student’s science process skills

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Abstract. Science is not only a series of facts, principles, and concepts but also the process of discovery. This statement gives a hint that not only the mastery of the concept should be good, but also the students have to know how the process of finding it. The aim of this study is find out the effect of activity sheet based on outdoor learning to the student’s science process skills. This study was applied to 29 grade 4 primary school student. This study is a pre-experimental conducted for 4 days. To find out the effectiveness of learning using activity sheet based on outdoor learning on student’s science process skills, science process skill tests consist of 6 items given as pretest and posttest for student. The result of the analysis explain that there is a significant influence between the activity sheet based on outdoor learning to the student’s science process skill and there is a significant improvement in the result of the student’s science process skill test after experiencing the learning by using the activity sheet based on outdoor learning.

1. Introduction
The development of science in the era of industry and information today makes the world situation becomes more difficult to predict so that students are required to have the character of thinkers, have the skills, productive, and up to date about the latest technology and information. One of the subjects that can develop skills, train students to think more critically and objectively is the sciences. According Kemendikbud science is a subject that aims to develop the competence of skills, attitudes, and knowledge of students as the basis of the ability possessed in living the life of society [1]. Effective science learning such as teaching students to fishing. Students begin to understand and use scientific though to learn more about the world around them, become lifelong fishermen with a hunger for knowledge and skills to seek and learn for themself [2].

The knowledge and skills that students have depended on their experience. The experience that has the greatest impact is direct experience because students in the learning process do touching, seeing, listening and experiencing activities [3]. In the learning of science, the process has great influence in constructing the cognitive and psychomotor aspects of students. Therefore, the objectives of science learning in primary schools should be prioritized on the mastery of process skills rather than the mastery of science materials, as the mastery of process skills is a prerequisite for studying other field of study [4].

During this time in science learning process at Primary School in Makassar City still use conventional a method which makes teacher as the main actor in the learning process. Students are also not interested in learning because it is not involved in the search for information directly so that students seek mote interesting activities such as playing and chatting with friends beside. In addition, science
Learning media is still less activate students and less use the school environment as a source of learning. This is because learning is only done in the classroom and more writing or answering the questions in the book. These activities make the student lack the opportunity to develop the science process skills that become his potential to understand the facts and concepts of science. If in science learning students are not given the opportunity to showcase their science process skills, then the facts gained are only memorized that are not fully understood by the students. In the end, learning goals will be difficult to achieve. The goal can be achieved when in the learning process students are always actively gain their own knowledge through the process of investigation of nature, therefore required a condition that makes students active [5].

One of the conditions that can develop the science process skills and make the student active is outdoor learning. Outdoor learning is an interaction that stems from the relationship between physical development and the surrounding environment that facilitates the development of an active, adventurous lifestyle, enhances self-esteem, develops good emotional relationships through group work, provides opportunities for imagination, creativity, and provide a unique experience for students [6]. One of the alternatives that can support the learning process of science is an activity sheet based on outdoor learning. The activity sheet utilizes the school environment as a source of learning and gives students the opportunity to actively touch, see, hear and experience so that information can be understood.

2. Method
In this study, the design of the implementation used is one group pretest and posttest design. In this design, the treatment results can be more accurate because it can be compared to the state before the skill is given. The classes of population and sample were given preliminary tests to look at the students science process skills at the first meeting containing classification skills, prediction skills, inference skills, and communication skills, then were given treatment by learning using activity sheet based an outdoor learning. The sampling technique used cluster random sampling. Cluster random sampling is used if the population is not based on an individual but a particular cluster individual group. The sample used in this study is 29 students of grade 4 of primary school. This study has independent variable and dependent variable. The independent variable in this study is the activity sheet based on outdoor learning and the dependent variable is the science process skill of the students. This study was conducted on the topic of plant parts and its function was done on January 15, 2018 at Primary School in Makassar. The learning process lasted for 4 meetings with a time allocation of 70 minutes in each meeting.

3. Result and Discussion
The main result of this study is quantitative data, that is the test result of science skill test before and after learning using activity sheet based on outdoor learning. Data presented in the form of data analysis results with Microsoft Office Excel 2007 and SPSS 16.0.

The data of student’s science process skill is obtained by giving the test of science process skill at the beginning of the pre-learning and at the end of the after learning consisting of 6 questions convering 4 components of science process skills. Science process skills instrument are used to sharpen the skills that students have in the form of a description problem. About the science process skills are also directed to strengthen the understanding of material concepts that have been described previously in learning.

In this study, two hypotheses that have been tested by using correlation and regression test and calculation of coefficient of determination, then taken decision of hypothesis test result as follows. The first hypothesis proposed in this study are:

\( H_0 \): There is no effect of activity sheet based on outdoor learning on student’s science process skill

\( H_1 \): There is an effect of activity sheet based on outdoor learning on student’s science process skill

The test criterion used is if the value of the test statistic is greater than \( \alpha \) (0.05) then \( H_0 \) is accepted and if the value of the test statistic is smaller than \( \alpha \) (0.05) then \( H_0 \) is rejected. Based on the results of determination coefficient analysis obtained \( r \)-count value for science process skill data is 0.552 with \( r \)-table 0.367, obtained value of \( r \)-count is bigger than \( r \)-table. In the table also obtained also value of sig. (2-tailed) of 0.000 which is smaller than 0.05.

Based on the result of the analysis is known that the significance value of paired sample t-test of science process skills data of students before and after the learning process is sig. (2-tailed) 0.000 with
\( t\)-count of 14.07. Since the significance value obtained is less than 0.05, it is concluded that there is a significant improvement in student’s science process skills. Improving the science process skills will lead to the second hypothesis, i.e. \( H_0 \) rejected and \( H_1 \) accepted. The percentage of student’s science process skills based on the results of the study that has been done can be seen in Figure 1.

![Figure 1. Percentage of Student’s Science Process Skills.](image)

Based on Figure 1, it shows that all components of the student’s science process skills have improved. In the classification component the students obtained a score of 54 on pretest and 87 on posttest, the inference component scored 39 on the pretest and 83 on the postest, the predictive component scored 50 on the pretest and 90 on the posttest, and on the communication component obtained a score of 37 on pretest and 80 at posttest.

In posttest result of science process skill, the average student got score with good category (> 75.6). It shows that all students have developed their science process skills. Based on the results of the first hypothesis test, obtained the conclusion that there is influence of activity sheet based on outdoor learning to the student’s science process skills. The effect of this activity sheet based on outdoor learning is only moderate because some students are not focused on learning and there are also some students who just follow their friends when doing science process skill action. This is also due to differences in student’s ability to understand learning so that it affects the student’s science process skills.

In the first learning process, it is found that most students rarely pay attention to the teacher when providing understanding of the material to be studied. This conditions cause students to understand less concepts that need to be achieved in learning.

Learning by using activity sheet based on outdoor learning is used to develop science process skills through activities based on the ability to observe, classify, inference, communicate. During the learning process by using activity sheet based on outdoor learning, students are required to actively follow the course of learning activities. Obstacles are only found in some students who do not enjoy the learning process at the beginning only because students feel unfamiliar with the applied learning method. The curiosity makes every student start to follow one by one science process skill in learning.

At the end of the learning the students communicate in the form of a presentation of the results of activities obtained by each group. In this session, it is known that each group begins to achieve the goal of learning, which is the mastery of the concept. To sharpen student’s science process skills, each student is given an instrument to test his science process skills containing 4 components with 6 questions.

The results of the student’s science process skill score confirm that the average of student’s science process skills are good. If the student’s science process skills are getting better, then the student’s conceptual knowledge about the learning is also good. It is in accordance with the statement of Nath and Thomas that the science process skills will increase because the stages in the learning directly become a means for the development of aspects of the science process skill and cognitive of students [7].

The conclusion is supported by the calculation of the coefficient of determination, so it can be seen that the value of the contribution of activity sheet based on outdoor learning influence to the student’s science process skill is 47%. This is supported by the average data on the percentage increase of
student’s science process skill test score of 39%. The student’s science process skill will increase or decrease based on the facilities and infrastructure such as in the school environment.

This equation can be assumed that outdoor learning has a positive and significant effect on student’s science process skill. The result of this study is supported by Glashan who revealed that the learning method of outdoor learning can develop the conceptualization of students and students are faced with real situations and conditions so that students are used to actively practice their science process skills by searching and processing data independently [8].

Based on the results of the second hypothesis test, it is concluded that there is a significant increase in the student’s science process skills. Through paired test sample t-test, it is known that there is a result change of science process skill test before and after learning. The result of significance test obtained less than 0,05, t-test value of sig. (2-tailed) of 0,014.

Nworgu and Otum say that the science process skill is the student’s capital in science learning to gain knowledge and even develop the knowledge it possesses [9]. One’s knowledge is an experience-based abstraction. No two people have the exact same experience, so the concepts formed on each person will be different.

Improvement of science process skill test in this study is still at moderate level with a percentage increase of 39%. Constraints that occur are insufficient time and the students are still not thoroughly working on the activity sheet. Nevertheless, the problem arises in some students and can be resolved after a briefing.

Activity sheet based on outdoor learning make student’s science process skills better because students are trained to sharpen their science process skills directly with the real environment. Activities that engage and provide experience to students directly in digging information, designing, conducting experiments, collecting data, and analyzing can increase interest, science process skills, and student knowledge resulting in high motivation and achievement of science [10].

4. Conclusion
The conclusions of this study are first; there is an effect of activity sheet based on outdoor learning to the student’s science process skill with a contribution value of 47%. Second: there was a significant increase in the results of student’s science process skill test scores with an average score change of 39% after learning using activity sheet based on outdoor learning.

Based on the findings, researchers gave the following suggestions. (1) For science teachers can make the environment around the school as an alternative to train the science process skill so that when the science process skills increase student learning outcomes can also increase. (2) During the learning process, teachers should be able to create interesting learning conditions so that students actively follow the course of learning. The atmosphere and conditions of good and interesting will be more motivate students in learning so easy to master the concept of the learning delivered.

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References
[1] Kemendikbud 2013 Kurikulum 2013 (Jakarta: Badan Penelitian dan Pengembangan)
[2] Straver J R 2007 Teaching Science
http://www.ibe.unesco.org/publications/EducationalPracticesSeriesPdf/Practice17.pdf
[3] Kellert S R 2002 Experiencing Nature: Affective, Cognitive, and Evaluative Development in Children Children and Nature: Psychological, Sociocultural, and Evolutionary Investigations 117-151
[4] Suderadjat H 2004 Implementasi Kurikulum Berbasis Kompetensi (Bandung: Cipta Cekas Grafika)
[5] Asy’ari Maslichah 2006 *Penerapan Pendekatan Sains Teknologi Masyarakat dalam Pembelajaran Sains di Sekolah Dasar* (Yogyakarta: Universitas Sanata Dharma)

[6] Rickinson M *et al* 2004 *A Review of Research on Outdoor Learning* (Preston Montford, Shropshire: Field Studies Council)

[7] Nath S and Thomas S 2012 *Enhancing Science Process Skills and Scientific Attitude and Analysing Their Interactions: An Intervention Through Inquiry Learning Approach* International Journal of Scientific Research Vol 1 (1): 37-42

[8] Glashan P 2007 *Outdoor Inquiries: Taking Science Investigations Outside The Classroom* (Heinemann Educational Books)

[9] Nworgu L N and Otum V 2003 *Effect of Guided Inquiry with Analogy Instructional Strategy on Students Acquisition of Science Process Skills* Journal of Education and Practice 27 (4): 35-40

[10] Hussain M and Akhtar M 2013 *Impact of Hands on Activities on Student’s Achievement in Science: An Experimental Evidence From Pakistan* Middle East Journal of Scientific Research 16 (5): 626-632