JPPIPA 9(2) (2023)

Jurnal Penelitian Pendidikan IPA

Journal of Research in Science Education

http://jppipa.unram.ac.id/index.php/jppipa/index

The Effect of Outdoor Study Method Based on Democratic Learning in Improving Junior High Students' Learning Outcomes in Science Subject

Zusje Wiesje Merry Warouw[1*], Firnalia Arruan Boyong[1], Ni Wayan Suriani[1], Ester Caroline Wowor[1], Widya Anjelia Tumewu[1]

[1] Department of Science Education, Universitas Negeri Manado, Minahasa, Indonesia.

Received: December 14, 2022
Revised: February 6, 2023
Accepted: February 25, 2023
Published: February 28, 2023

Corresponding Author:
Zusje Wiesje Merry Warouw
zusyewarouw@unima.ac.id

DOI: 10.29303/jppipa.v9i2.2630

Abstract: This research aims to determine the effect of the outdoor study method based on democratic learning in improving junior high students' learning outcomes in science subjects. The research method we used is a quasi-experimental research with a nonequivalent control group design. The population in this study were all seventh-grade students at SMP Negeri 6 Tondano, while the research sample consisted of students in classes VII A and VII B. We obtained the research sample via a random sampling technique. Data were obtained from the pre-test before being given treatment and the post-test after being given treatment. The results showed that the average post-test result for the experimental class was 74.53, while the control class was 58.00. The t-test on the difference in the experimental and control groups' post-test scores shows the results of $t_{count} = 37.91 > t_{table} = 2.011$ so that H_0 is rejected and H_1 is accepted. Thus, the outdoor study methods based on democratic learning improve students' science learning outcomes on the interaction between living things and their environment topic at SMP Negeri 6 Tondano.

Keywords: Outdoor study; Democratic learning; Learning outcomes; Interaction between living things and their environment

Introduction

Natural science is related to how to systematically find out about nature so that science is not only mastering a collection of knowledge in the form of facts, concepts, or principles but also a process of discovery (Chusni et al., 2017). Science is an endeavor that focuses on investigations, especially those related to understanding nature and how nature works, where observable physical evidence is the basis of scientific knowledge and explanation (Vieira & Tenreiro-Vieira, 2016). On the one hand, science education is expected to be a vehicle for students to learn about themselves, their natural surroundings, and their application in everyday life. It is because studying science can be a path for humans to comprehend natural phenomena that happen around them (Suriani et al., 2022). Learning science in schools is intended, so students have organized knowledge, ideas, and concepts about the natural surroundings obtained from experience through a series of scientific processes (Istiani & Retnoningsih, 2015).

Science teachers must be able to choose and use learning methods appropriate to the subject matter and student learning interests (Prihatini, 2017). Using appropriate learning methods is expected to motivate students to seek their knowledge actively. Gani et al. (2022) revealed that motivation in learning is significant because a student who is motivated to learn is usually more severe and gets good learning outcomes. Empirical studies show a relationship between expectations of success (as a motivation trigger) and learning outcomes, including the topics studied and the level of involvement in learning and achievement (Cook & Artino, 2016).

Based on the results of observations made by researchers at SMP Negeri 6 Tondano, we got

How to Cite:
Warouw, Z.W.M., Boyong, F.A., Suriani, N.W., Wowor, E.C., & Tumewu, W.A. (2023). The Effect of Outdoor Study Method Based on Democratic Learning in Improving Junior High Students' Learning Outcomes in Science Subject. *Jurnal Penelitian Pendidikan IPA*, *9*(2), 527–533. https://doi.org/10.29303/jppipa.v9i2.2630

information that the learning outcomes of class VII students on the topic of the interaction between living things and their environment have not yet reached the minimum completeness criteria (known with KKM), which is 70. It can be seen from the average score. -the average daily repetition of students is only 65, with a classical learning completeness percentage of only 30%. The results of interviews with students and science teachers at SMP Negeri 6 Tondano revealed that the learning method used in science learning is teacher-centered, causing students to be less active in learning activities. The incompatibility of the learning method used by the teacher with the topic being taught is a factor causing students' laziness to find out and causing students to feel bored in learning activities (Nursa'adah, 2015).

Science learning will be more meaningful if students can relate the concepts or knowledge they acquire in class to real situations outside the classroom. It is because students who study science are expected to be skilled in applying the concepts they have learned in everyday life (Wola et al., 2020). Learning that utilizes the environment as a medium and learning resource expects students to be able to develop creative ideas and work together in groups to solve problems. Therefore, teachers are required to be able to use learning methods that can motivate and guide students in discovering the science concepts being studied. The learning method that teachers can apply is the outdoor study method based on democratic learning.

Glackin (2016) states that outdoor teaching is an important teaching strategy, even though science classes are rarely held outside the classroom. Remmen & Iversen (2022) state that locations that we can use outdoors can be in the form of various settings outside the school, for example, school grounds, school gardens, city parks, museums, botanical gardens, farms, and natural scenery. Wahyuni et al. (2017) stated that outdoor study is a learning method that utilizes nature as a learning resource. Uzel (2020) says that an outdoor learning environment provides more learning opportunities for students because it does not limit learning to the classroom environment. Teachers who believe in the importance of outdoor learning activities know that these activities are effective and provide benefits for the learning process (Karamustafaoğlu et al., 2018). In addition, Liefländer et al. (2013) stated that teachers could embrace outdoor learning opportunities to increase science content knowledge and develop students' attitudes that care about the environment.

The natural environment or physical environment is everything natural, such as natural resources (water, forests, soil, rocks), plants and animals (flora and fauna), rivers, climate, temperature, and others (Pantiwati, 2015). The environment as a source of learning is essential as evidence of interaction between humans and the natural surroundings. Understanding these relationships can be used as learning so that the learning process is not only through books but can directly learn from the surrounding environment (Tumewu et al., 2020). The environment and atmosphere around the school can be used as teaching materials that are factual in nature because students can be directly involved in learning a particular topic.

The concept of learning by using the environment is a learning concept that is synonymous with the environment as a source of learning. Nugroho & Hanik (2016) say that the environment is a source of inspiration and motivator in increasing student understanding. Soga & Gaston (2016) stated that people recently had less direct contact with nature (natural environments and their associated wildlife) in their daily lives. Rios & Brewer (2014) stated that if students are not allowed to learn outside the room, they will be separated from the world around them. Keniger et al. (2013) stated that there is much empirical evidence from research results that show the benefits of humans interacting with nature, namely the positive effects on physical health, psychological well-being, cognitive ability, and social cohesion. Thus, the natural environment becomes an important learning resource because it not only acts as a driving factor determining students' understanding of a lesson but also delivers many other benefits.

Democratic learning is an effective learning activity because students can directly know the application of a topic in everyday life (Setiawan, 2014). In addition, Warouw et al. (2019) state that democratic learning encourages independence and initiative. It will positively impact students by strengthening the attitudes and behavior of democratic interactions. The strengthening of democratic attitudes and behavior occurs through individual interactions. Democratic interactions are shown, among others, by (1) individual unique ideas in the context that are being discussed together, (2) debating the ideas and ideas of others, (3) criticizing and being criticized, (4) respecting differences, (5) tolerance, (6) make a try.

The researcher chose the topic of the interaction between living things and their environment because it is suitable to be taught when using the environment as a learning resource. Students not only fantasize about the lesson's topic but can participate in observing directly and trying to solve problems in groups with diverse student members. Therefore, we conducted this research to know the effect of the outdoor study method based on democratic learning in improving student science learning outcomes at SMP Negeri 6 Tondano.

Method

This research is a type of quantitative research. The research method used was a quasi-experimental study with a nonequivalent control group design (Sugiyono, 2015) as shown in Table 1. There are two groups which we call the experimental class and the control class.

We conducted this research at SMP Negeri 6 Tondano in the even semester of the 2021/2022 academic year. The population in this study were students of class VII at SMP Negeri 6 Tondano, while the sample used was class VII A as the experimental class and class VII B as the control class. Sampling using a simple random sampling technique.

Table 1. Nonequivalent Control Group Design

Group	Pre-test	Treatment	Post-test
Experiment	O_1	X	O_2
Control	O_3	-	O_4

Description:
O_1 : pre-test in the experimental class
O_2 : post-test in the experimental class
O_3 : pre-test in the control class
O_4 : post-test in the control class
X : outdoor study method based on democratic learning

Based on Table 1, the research design shows that both classes were given a pre-test and post-test. We gave the experimental class treatment by applying the outdoor study method based on democratic learning, while the control class was not given treatment. In this case, learning in the control class uses conventional learning methods.

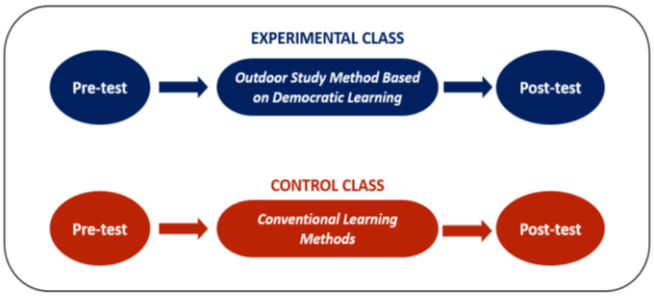

Figure 1. Research Stages

The instrument used in this study was a multiple-choice test of learning outcomes tested on the pre-test and post-test. The pre-test is the initial test to measure students' initial understanding before treatment, while the post-test is the final test to determine students' final knowledge after treatment. Testing the research instruments was carried out through validity and reliability tests.

The data analysis technique in this study was a normality test using the Liliefors test to determine whether the sample used in this study came from a normally distributed population. Then test the homogeneity to assess the uniformity of the data used in the study (Sugiyono, 2015). Furthermore, hypothesis testing is done by t-test. The hypothesis in this study is that there is an effect of outdoor study based on democratic learning in improving students' science learning outcomes at SMP Negeri 6 Tondano.

Result and Discussion

This research was conducted at SMP Negeri 6 Tondano. Before conducting research in the experimental class and control class, the researcher tested the instrument in the form of an objective test (multiple choice), namely, validity and reliability tests in class VII A of SMP Negeri 6 Tondano, who had previously studied the topic of the interaction between living things and their environment.

After the research instruments were tested for validity and reliability, the researcher gave pre-tests to the experimental and control classes. Pre-test results in the control class and experimental class have the same value. Furthermore, a teaching and learning process was carried out in which the experimental class used an outdoor study method based on democratic learning, and the control class used conventional methods. After the given topic has been taught, the next step is to complete the final test as a post-test which aims to find out whether there is an effect of the outdoor study method based on democratic learning in improving student science learning outcomes.

The results of data analysis in this study are data from the pre-test and post-test results from the experimental and control classes. Data testing begins with validity testing using the Pearson product-moment correlation formula with the help of the Microsoft Excel 2010 software application, where out of 40 questions tested with the criterion $r_{count} > r_{table}$, 30 items are valid, and 10 items are invalid.

Reliability testing is determined using the Cronbach Alpha coefficient formula. An instrument is reliable if it has a Cronbach Alpha coefficient above 0.60. Based on the reliability test of 30 items declared valid, the reliability coefficient value obtained was $r_i = 0.94$, so we concluded that the test items were reliable and feasible. This study's experimental class data collection results can be seen in Table 2, while the control class results can be seen in Table 3.

Table 2. Summary of Pre-Test and Post-Test Data for the Experimental Class

Statistics	Pre-test	Posttest	Difference
Min Value	26.67	60	33.33
Max Value	53.33	90	36.67
Amount	966.67	1863.33	896.66
Average	38.67	74.53	35.86

Statistics	Pre-test	Posttest	Difference
St. deviation	6.88	7.12	0.24
Variance	47.22	50.81	3.59

Table 2 shows us that the experimental class's average pre-test and post-test scores increased by a difference of 35.86.

Table 3. Summary of Pre-test and Post-test Data for Control Class

Statistics	Pre-test	Post-test	Difference
Min Value	30	46.67	16.67
Max Value	50	76.67	26.67
Amount	980	1450	470
Average	39.2	58	18.8
St. deviation	6.69	6.8	0.11
Variance	44.7	46.29	1.59

Based on Table 3, we can see that the average pre-test and post-test scores in the control class increased by a difference of 18.8. Testing for normality in this study used the Liliefors test with the help of the Microsoft Excel 2010 software application on experimental class and control class data with the criterion of normally distributed data if $L_{count} < L_{table.}$ The data obtained in the experimental class L_{count} (0.1283) < L_{table} l (0.173) and in the control class L_{count} (0.1306) < L_{table} (0.173), so that we can conclude that both data are normally distributed.

Testing the homogeneity of student data from both classes in this study was analyzed using the F-test and the Microsoft Excel 2010 software application on the pre-test data with the variance criteria of the two homogeneous classes if $F_{count} < F_{table.}$ The results of the pre-test data homogeneity test obtained F_{count} (1.057) < F_{table} (4.05), so we can conclude that both data are homogeneous. After the prerequisite test is fulfilled, where the experimental class and control class data are normally distributed and homogeneous, hypothesis testing can be continued using the t-test.

Hypothesis testing is done by calculating the difference in the students' pre-test and post-test results. The t-test in this study was used to determine whether there were differences in student learning outcomes using outdoor study methods based on democratic learning and student learning outcomes using conventional methods with the criteria $t_{count} > t_{table.}$ A summary of hypothesis testing can be seen in Table 4.

Table 4. Summary of hypothesis testing data

t_{count}	t_{table}	Criteria	Conclusion
37,91	2,011	$t_{count} > t_{table}$	H_0 is rejected, and H_1 is accepted

Based on Table 4, after being analyzed using the t-test on data in the experimental class and control class, it is obtained that $t_{count} = 37.91 > t_{table} = 2.011$, indicating a significant difference in the learning outcomes of the two classes.

The topic of interaction between living things and their environment will be challenging to understand and seem abstract if you only learn it by reading textbooks and looking at pictures. Learning activities outside the classroom, which are carried out through observing the surrounding environment, make it easier for students to reveal facts and obtain data so that learning becomes more meaningful. Suryani et al. (2015) stated that outdoor learning brings students to independent learning situations, is responsible individually or in groups, and learns to communicate, conveying ideas related to the tasks they are doing. This opinion is in line with that expressed by Harris (2018) that outdoor learning is used in various formats to support children's personal, social and emotional development through group work, team building, and the development of social and communication skills.

Learning in the experimental class begins with an initial introduction to the interaction between living things and their environment topic. Furthermore, students are grouped heterogeneously to carry out outdoor learning activities in the SMP Negeri 6 Tondano school environment. Students are invited to observe the environment around the school and work on student worksheets (LKS) that the teacher has distributed. After that, the students returned to the class and discussed the results of their observations. Through this learning activity, students actively work with group members when making observations.

Students in this experimental group also asked many questions to teachers and friends about concepts they had not understood, collaborated with group members, and were able to conclude topics that they had studied. Students also have a great responsibility for the teacher's assignments and participate in group discussions with other students. Students' direct involvement and activeness in learning outside the classroom make them more comfortable, active, and concerned about the natural environment in the learning process. It is in line with Fägerstam's (2014) research which revealed teachers' perceptions that outdoor teaching and learning showed increased motivation, communication, and student participation.

Learning in the control group occurs using conventional methods by the teacher. Learning activities take place as usual, which is characterized by the use of teacher-centered methods, assignments, and group discussions. During learning, the teacher actively lectures, explaining the lesson's topic, while students who are learning become less active. It is because they sit, listen, and write the points explained by the teacher. Students in the control class also did not work together in groups because there was no direct observation of the

lesson topic they were receiving. Even so, a small number of students actively asked and responded to teacher and friend questions. Only some students have a sense of responsibility for the assignments given, so the knowledge possessed by students in the control class could be better. Less creative and uninteresting learning makes students have less initiative to express opinions or ask questions; hence they are more dependent on the teacher.

Based on research data, we obtained the average value of student learning outcomes in the experimental class from 38.67 (pre-test), which increased to 74.53 (post-test), higher than the average value of student learning outcomes in the control class, namely from 39.20 (pre-test) increased to 58.00 (post-test). In addition, the statistical test (t-test) results for the difference between the experimental and control classes' post-test values obtained $t_{count} = 37.91 > t_{table} = 2.011$ so that H_0 is rejected and H_1 is accepted. It proves that students in the experimental class who were taught using outdoor study methods based on democratic learning were better than those in the control class who did not, especially on the interaction between living things and their environment topic. It is evident that outdoor study makes it easier for students to understand and apply concepts in real life. Warow et al. (2019) stated that democratic learning encourages independence and learning initiatives through individual interactions such as debating personal ideas, criticizing and being criticized, and respecting opinions or diversity between individuals.

The results of this study align with research conducted by Wara et al. (2015), which also proves that the application of the outdoor study method affects student learning outcomes. It can be seen from the post-test scores of students who were taught using the outdoor study method based on democratic learning, which increased compared to the post-test scores taught by conventional methods. Marfuah et al. (2014) that outdoor learning makes students able to implement science concepts in real life and makes it easier for them to solve problems in the learning process. Dillon et al. (2016) stated that outdoor study experiences are more effective for improving students' cognitive abilities when compared to classroom-based learning. It is because outdoor learning provides opportunities for students to construct their knowledge from the natural environment (Hastutiningsih et al., 2016).

Conclusion

Based on the research that we have done, we conclude that the outdoor study method based on democratic learning affects improving students' science learning outcomes on the topic of the interaction between living things and their environment at SMP Negeri 6 Tondano.

Acknowledgments

We thank the principal, science teacher, and students at SMP Negeri 6 Tondano for the permission and opportunity to conduct research that has been given. Thank you to all those who have helped prepare this article so that it is finished and published.

References

Chusni, M. M., Mahardika, A., Sayekti, I. C., & Setya, W. (2017). The profile of student activities in learning basic natural science concepts through the contextual teaching and learning (CTL) approach with group investigation (GI) model. *Jurnal Penelitian dan Pembelajaran IPA*, *3*(1), 1-10. http://dx.doi.org/10.30870/jppi.v3i1.734

Cook, D. A., & Artino Jr, A. R. (2016). Motivation to learn: an overview of contemporary theories. *Medical education*, *50*(10), 997-1014. https://doi.org/10.1111/medu.13074

Dillon, J., Rickinson, M., & Teamey, K. (2016). The value of outdoor learning: evidence from research in the UK and elsewhere. In *Towards a Convergence Between Science and Environmental Education* (pp. 193-200). UK: Routledge.

Fägerstam, E. (2014). High school teachers' experience of the educational potential of outdoor teaching and learning. *Journal of Adventure Education & Outdoor Learning*, *14*(1), 56-81. https://doi.org/10.1080/14729679.2013.769887

Gani, M. A., Tumewu, W. A., & Wola, B. R. (2022). Motivasi belajar siswa Kelas VII SMP Anugerah Tondano pada pembelajaran IPA di era pandemi covid-19. *SCIENING: Science Learning Journal*, *3*(1), 8-13. https://doi.org/10.53682/slj.v3i1.1845

Glackin, M. (2016). 'Risky fun'or 'Authentic science'? How teachers' beliefs influence their practice during a professional development programme on outdoor learning. *International Journal of Science Education*, *38*(3), 409-433. https://doi.org/10.1080/09500693.2016.1145368

Harris, F. (2018). Outdoor learning spaces: The case of forest school. *Area*, *50*(2), 222-231. https://doi.org/10.1111/area.12360

Hastutiningsih, T., Prasetyo, A. P. B., & Widiyaningrum, P. (2016). Pengembangan panduan pembelajaran outdoor bermuatan karakter peduli lingkungan pada materi ekologi. *Journal of Innovative Science Education*, *5*(1), 28-35. Retrieved from:

https://journal.unnes.ac.id/sju/index.php/jise/article/view/13215

Istiani, R. M., & Retnoningsih, A. (2015). Pemanfaatan lingkungan sekolah sebagai sumber belajar menggunakan metode post to post pada materi klasifikasi makhluk hidup. *Journal Of Biology Education, 4*(1), 70-80. https://doi.org/10.15294/jbe.v4i1.5237

Karamustafaoğlu, S., Ayvalı, L., & Ocak, Y. (2018). Teachers' opinions on informal environments in pre-school education. *Journal of Research in Informal Environments, 3*(2), 38-65. Retrieved from: https://dergipark.org.tr/en/pub/jrinen/issue/42184/462970

Keniger, L. E., Gaston, K. J., Irvine, K. N., & Fuller, R. A. (2013). What are the benefits of interacting with nature?. *International Journal of Environmental Research and Public Health*, *10*(3), 913-935. https://doi.org/10.3390/ijerph10030913

Liefländer, A. K., Fröhlich, G., Bogner, F. X., & Schultz, P. W. (2013). Promoting connectedness with nature through environmental education. *Environmental Education Research*, *19*(3), 370-384. https://doi.org/10.1080/13504622.2012.697545

Marfuah, I., Mardiyana, M., & Kusmayadi, T. A. (2014). Pengembangan model pembelajaran NHT (numbered heads together) berbasis outdoor study untuk meningkatkan prestasi belajar siswa SMA kelas X pada materi pokok sistem persamaan dan pertidaksamaan. *Jurnal Pembelajaran Matematika*, *2*(6), 655-666. Retrieved from: https://jurnal.fkip.uns.ac.id/index.php/s2math/article/view/4536

Nugroho, A. A., & Hanik, N. R. (2016). Implementasi outdoor learning untuk meningkatkan hasil belajar kognitif mahasiswa pada mata kuliah sistematika tumbuhan tinggi. *Bioedukasi: Jurnal Pendidikan Biologi*, *9*(1), 41-44. https://doi.org/10.20961/bioedukasi-uns.v9i1.3884

Nursa'adah, F. P. (2015). Pengaruh Metode Pembelajaran dan Sikap Siswa Pada Pelajaran IPA Terhadap Hasil Belajar IPA. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, *4*(2). http://dx.doi.org/10.30998/formatif.v4i2.145

Pantiwati, Y. (2015). Pemanfaatan lingkungan sekolah sebagai sumber belajar dalam lesson study untuk meningkatkan metakognitif. *Jurnal Bioedukatika*, *3*(1), 27-32. http://dx.doi.org/10.26555/bioedukatika.v3i1.4144

Prihatini, E. (2017). Pengaruh metode pembelajaran dan minat belajar terhadap hasil belajar IPA. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, *7*(2), 171-179. http://dx.doi.org/10.30998/formatif.v7i2.1831

Remmen, K. B., & Iversen, E. (2022). A scoping review of research on school-based outdoor education in the Nordic countries. *Journal of Adventure Education and Outdoor Learning*, 1-19. https://doi.org/10.1080/14729679.2022.2027796

Rios, J. M., & Brewer, J. (2014). Outdoor education and science achievement. *Applied Environmental Education & Communication, 13*(4), 234–240. https://doi.org/10.1080/1533015X.2015.975084

Setiawan, D. (2014). Pendidikan kewarganegaraan berbasis karakter melalui penerapan pendekatan pembelajaran aktif, kreatif, efektif dan menyenangkan. *JUPIIS: Jurnal Pendidikan Ilmu-Ilmu Sosial*, *6*(2), 61-72. https://doi.org/10.24114/jupiis.v6i2.2285

Soga, M., & Gaston, K. J. (2016). Extinction of experience: the loss of human–nature interactions. *Frontiers in Ecology and the Environment*, *14*(2), 94-101. https://doi.org/10.1002/fee.1225

Sugiyono. (2015). Metode penelitian pendidikan pendekatan kuantitatif, kualitatif dan R&D. Bandung: Penerbit Alfabeta.

Suriani, N. W., Wola, B. R., & Komansilan, A. (2022). Development of biological macromolecules three-tier test (BM-3T) to identify misconceptions of prospective science teachers. *Jurnal Penelitian Pendidikan IPA*, *8*(4), 2093-2100. https://doi.org/10.29303/jppipa.v8i4.1297

Suryani, E., Jekti, D. S. D., & Ramdani, A. (2015). Pengembangan Perangkat Pembelajaran Model Belajar di Lingkungan (Outdoor Learning) untuk Mata Kuliah Morfologi Tumbuhan. *Jurnal Penelitian Pendidikan IPA*, *1*(2). https://doi.org/10.29303/jppipa.v1i2.18

Tumewu, W. A., Wowor, E. C., & Rogahang, M. K. (2020). Efektivitas Environmental Learning Bagi Mahasiswa. *JISIP (Jurnal Ilmu Sosial dan Pendidikan)*, *4*(4), 325-329. http://dx.doi.org/10.58258/jisip.v4i4.1517

Uzel, N. (2020). Opinions of prospective biology teachers about "outdoor learning environments": The case of museum visit and scientific field trip. *Participatory Educational Research*, *7*(2), 115-134. https://doi.org/10.17275/per.20.23.7.2

Vieira, R. M., & Tenreiro-Vieira, C. (2016). Fostering scientific literacy and critical thinking in elementary science education. *International Journal of science and mathematics education*, *14*(4), 659-680. https://doi.org/10.1007/s10763-014-9605-2

Wahyuni, S., Indrawati, I., Sudarti, S., & Suana, W. (2017). Developing science process skills and problemsolving abilities based on outdoor learning in junior high school. *Jurnal Pendidikan IPA Indonesia*, *6*(1), 158-162. https://doi.org/10.15294/jpii.v6i1.6849

Wara, H., Pargito, P., & Sudarmi, S. (2015). Penerapan metode pembelajaran outdoor study terhadap hasil belajar Geografi. *JPG (Jurnal Penelitian Geografi)*, *3*(6), 1-9. Retrieved from: http://jurnal.fkip.unila.ac.id/index.php/JPG/article/view/10240

Warouw, Z. W. M., Medellu, C., Makahinda, T., & Runtu, V. P. (2019, October). Facilitation of democratic learning activities through mentoring. In *Journal of Physics: Conference Series* (Vol. 1317, No. 1, p. 012209). IOP Publishing. doi: 10.1088/1742-6596/1317/1/012209

Wola, B. R., Ibrahim, M., & Purnomo, T. (2020). Development of a four-tier multiple-choice test on the concept of transport across membranes. *SEJ (Science Education Journal)*, *4*(2), 77-97. https://doi.org/10.21070/sej.v4i2.878