Effect of Kalibanger River Utilization as a Learning Source of Environmental Pollution in Junior High School 5 Pekalongan

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Info Article	Abstract
	Natural Science is the study of the phenomenon that occurs in the student environment. Directly oriented learning in the student environment makes learning meaningful because students can see the real object being studied. Based on the observations in SMP Negeri 5 Pekalongan, learning activity has not utilized the environment as a learning source. Whereas the location of the school near the appropriate learning sources to study environmental pollution material. Student learning outcomes are less than optimal and students tend to be passive. Therefore, variations are made in the learning by utilizing the Kalibanger River as a source of learning environmental about environment pollution. The method used in this research is quasi experimental design type nonequivalent control group design. Determination of the sample is done by purposive sampling technique and used as experimental class is class VII F and control class is class VII D. Student retrieval data using test instrument, while student activity is taken from observation sheet and questionnaire. Learning result data obtained by posttest value is higher than pretest. Increased learning results occur due to learning activities undertaken by students. Recapitulation of experimental class student activity is 87,9% which belong to very active criteria. Based on the results of t-test calculation obtained t-count = 3.323> 2.040 so H1 accepted, it can be concluded learning Kalibanger river utilization as a source of learning about environmental pollution can increase the activity and learning outcomes of students of SMP Negeri 5 Pekalongan.

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INTRODUCTION

The environment is the closest to the student world. The use of the environment as a learning resource will make the student feeling enjoy to learning (Moha, 2015). The reason of utilization the environment as a source of learning such as through direct environmental observation of students is expected to get a something concrete of the concept of environmental pollution, so as to improve student comprehension and can provide optimal results. The use of the environment as a learning resource is expected to increase students interest, attract more students attention, and get a memorable learning experience, so that in the learning process students become more active and creative. The use of the environment as a source of learning has advantages such as students get information based on direct experience, lessons are concrete, meaningful, and more communicative so they can make students actively know and love the environment (Safiutra, 2015). In addition, if teachers apply learning by utilizing the environment as a source of learning will be more meaningful because the students are faced with real facts and events (Moha, 2015).

Environmental pollution is one of the chapters on science subjects that students of junior high school grade 7 in the school year of the even semester. In Educational and cultural ministrial regulations No. 24 of 2016 attachment 6 on principal competence and basic competence of Science Junior High School class 7, environmental pollution material is listed on principal competence 3.8 and basic competence 4.8. Competence 3.8 is a competence of knowledge in which students are expected to be able to analyze the occurrence of environmental pollution and its impact to the ecosystem, while the basic competence 4.8 is a skill competence where students are expected to be able to write about the idea of solving the problem of pollution in their environment based on observations. Based on principal competence 3.8 and basic competence 4.8, expected learning is learning where students can analyze environmental pollution and its impact and can make idea of problem solving through writing.

Contextual learning according to Davi et al is a concept of learning by teacher presents the real situation in learning. Students are trained to link their knowledge to real situations in society, so that knowledge is more internalized within students and more meaningful. This is in accordance with the content of environmental pollution materials so that students become more sensitive to the environment.

To teach a concept to students, learning resources and media are needed. Learning media is the introduction or intermediary of information from the source to the recipient, while the source of learning is everything that can be utilized by students to gain knowledge and learning experience in accordance with the objectives to be achieved (Sanjaya, 2006).

In the city of Pekalongan there are several rivers whose condition is almost the same that is contaminated so less utilized by local people. One of the efforts to re-utilize the river in the education is used as a learning resource. Learning resources alone is everything that can be utilized by students to gain knowledge and learning experience in accordance with the objectives to be achieved (Sanjaya, 2006). According to Navy (2013), there are two types of learning resources: learning resources such as textbooks and learning resources available and utilized such as the utilization of the Kalibanger river as a learning resource.

Junior High School 5 Pekalongan addressed on the road Kalisari district East Pekalongan. Junior High School 5 Pekalongan has adequate supporting facilities and infrastructure of science education because there are laboratory of IPA which has area 144 m2 with table chair and laboratory equipments which complete. SMP Negeri 5 Pekalongan is also adjacent to the grass field, rice fields and river Kalibanger river that can be used as a learning resource. However, the results of interviews with teachers subjects in science IPA class VII SMP Negeri 5 Pekalongan, during the semester odd and early semester even the teacher has never done learning by utilizing the environment around the

students. Lessons are done more often in the classroom with the source of the book learning guide. Teachers also rarely invite students to explore the environment in the learning process. From the observation, even the middle of the semester exam is not optimal of less than 50% of students who can achieve the minimum complete criteria that is ≥72. Based on the results of interviews with students, learning in the classroom makes learning done only by rote and become less meaningful. In addition, teacher-centered learning with book learning resources makes students not actively involved in learning so that students become more passive in the implementation of learning. Therefore, variations need to be done in the implementation of learning so as not monotonous.

Based on the description above hypothesis proposed in this study is learning by utilizing Kalibanger river as a source of learning environmental pollution affect the results of learning and student activities in Junior High School 5 Pekalongan.

RESEARCH METHOD

The study was conducted in May 2016/2017. The method used is quasi experimental design with type nonequivalent control group design. Population The population in this study were all students of class VII of SMP Negeri 5 Pekalongan consisting of six classes namely VII A, VII B, VII C, VII D, VII E, and VII F. Determination of sample is done by purposive sampling technique that is sample determination technique with certain considerations. The sample used as the experimental class is class VII F and used as the control class is class VII D. The procedure or step in this research consists of 3 stages: preparation stage, implementation stage and analysis phase. The preparation stage includes (1) preliminary observation with science subject teachers of SMP Negeri 5 Pekalongan; (2) determine the problem solving solution; (3) determine the subject of research; (4) develop learning tools covering syllabus, planning of learning implementation and student worksheet; (5) develop the research instrument; (6) conducting trial questions; (7) determines the questions to be used as pretest and postest. Implementation stage includes (1) implementation of pretest of control and experiment class; (2) conducting lessons according to planning of learning implementation; (3) implementing the postest; (4) provide student questionnaire; (5) conducting interviews with subject teachers. The analysis phase includes (1) conducting homogeneity test on student pretest and normality test at posttest of student; (2) conducting t-test; (3) calculating classical completeness; (4) calculate the increase in learning outcomes; (5) recapitulate activity observation sheets, questionnaires and interviews with subject teachers.

Data of cognitive aspect learning outcomes is taken from pretest and posttest data. The pretest value data was tested for homogeneity to determine whether the two classes (control and experiment) came from the same population. Comparison of pretest values of control and experiment classes derived from the same population to indicate that the difference in postest grade of control and experimental values after the implementation of the learning is really a result of the applied learning, whereas the posttest value data is tested for normality to find out whether the data obtained is normal or not . If normal distributed data with this can be continued for t test. T test is done to know whether there is difference of cognitive learning result between before and after learning done. From the data of student learning result is calculated the final value which by weighting the postest value with the value of the task with the ratio of 7: 4. The final value is used to calculate students' classical mastery. The indicator of success of this study is if the students' classical completeness ≥ 85% with the criterion of minimum mastery ≥72.

In addition to data on cognitive learning outcomes, this study is also to determine the learning activities of students in learning. The result of observation of student activity obtained through observation at the time of study using rubric appraisal by observer then analyzed by qualitative deksriptif based on predetermined criterion. The result of activity observation is

calculated by the accumulated score obtained by the students. Learning can be done to improve student learning activities if the classical completeness of student learning activities ≥75%. Data of student and teacher responses are also done to know the advantages and disadvantages in learning as the next learning evaluation.

RESULTS AND DISCUSSION

The data taken in this study are student learning outcomes, student activities, student and teacher responses. The cognitive learning outcomes are taken from pretest and posttest values, student activity and affective learning outcomes using observation sheets, psychomotor learning outcomes using assessment sheets, student responses using questionnaires, and teacher responses with interviews.

Description of student learning outcomes of cognitive aspect was done to know the level of cognitive learning outcomes of students before and after learning with the utilization of river Kalibanger as a source of learning environmental pollution material in the experimental group and student learning outcomes before and after being given textual learning of environmental pollution material in the control group. Recapitulation of student learning outcomes cognitive aspects can be seen in table 1.

Tabel 1 Descriptive of students value

Variation	Pretest		Postest	
	Experiment Class	Control Class	Experiment Class	Control Class
Number of students	32	32	32	32
Average value	43,75	41,93	77,21	68,36
Highest value	70,83	62,50	91,67	87,50
Lowest value	25,00	25,00	58,33	45,83
Number of student completeness	0	0	24	14
Number of student uncompleteness	32	32	8	18

Source: Primary data processed, 2017

Based on the above table obtained information on average learning outcomes in the experimental group before the treatment was 43.75 with the lowest value of 25.00 and the highest score of 70.83. The average learning outcomes in the experimental group after treatment were 77.21 with the lowest score of 58.33 and the highest score of 91.67. The average learning outcomes in the control group before the learning was 41.93 with the lowest score of 25.00 and the highest score of 62.50. The average learning outcomes in the control group after conventional learning were 68.36 with the lowest score of 45.83 and the highest score of 87.50.

The pretest learning outcomes were tested for homogeneity to determine whether the pretest values of the control group as well as the homogeneous experiments or not. The result data analysis shows Fcount (1,41) <Ftabel (1,97) so that it can be concluded experiment and control group come from homogenous population. So that after given the treatment of learning by utilizing river Kalibanger as source of learning material of environmental pollution in experiment class and study with textbook on kelasas control of posttest result of second class can be compared to know influence of Kalibanger river utilization application as learning resource to learning result and student learning activity.

The posttest learning outcomes were tested for normality to determine whether the posttest data of both control and experimental groups were normal distribution or not. The result of the analysis shows that $x^2{}_{count} < x^2{}_{table}$ so that it can be concluded that the postest data is normally

distributed so that the next test is t test. The result of t test shows t_{hitung} (3,323) $< t_{tabel}$ (2.040) so that it can be concluded that learning by utilizing Kalibanger river as a learning source has a positive effect in improving learning outcomes and student learning activities.

Based on the result of the n-gain test that the number of students of medium and high category in the experimental class is more than the experimental class, so it can be concluded that the improvement of understanding with Kalibanger river utilization learning as learning resource is better than the learning with textbook. The difference in the increase in learning outcomes is made possible by the different designs of applied learning. Based on the data show that learning utilization of river Kalibnger as a learning resource is proven to optimize student learning outcomes.

In SMP Negeri 5 Pekalongan minimum completeness criteria for science that is ≥ 72. Based on Table 4.1, the pretest results of the control and experiment classes indicate there is no complete student. This is because each class has not received environmental pollution material. After the posttest there was an increase that is in the experiment class there are 24 complete students and the control class 14 students. The increasing number of students who completed this is because each class has received environmental pollution material. This shows the learning process of the students. According to Gagne (in Suprijono, 2010) the learning process in question is a change that occurs in students as a result of experience or activity. Student's experience or activity in river Kalibanger is looking for information about river Kalibanger by observing and listening explanation of teacher and local people about the pollution happened in river. Students also smelled water samples in Kalibanger river to find out whether river water of Kalibanger enter the characteristic of polluted water that is smelly.

The data obtained in the Kalibanger River is then recorded on the LKS given by the teacher. The data obtained later in the analysis then taken the conclusion that the Kalibanger river experiencing contamination. The conclusion obtained by the students about the condition of river Kalibanger is used to create a paper on the idea of solving the problem of pollution that occurred in river Kalibanger and presented it in front of the class. At the end of the lesson, reinforcement of learning materials accompanied by teachers. The last activity is evaluation with posttest implementation. Student activities are included in eleven activities of learning activities, including (1) listening; (2) view; (3) tasting, smelling and tasting / tasting; (4) write or record; (5) reading; (6) make an overview or summary and underline; (7) observe tables, diagrams and charts; (8) preparing a paper or work assignment; (9) recall; (10) think; (11) practice or practice (Djamrah, 2008).

Although all students do learning activities, there are still some students who have not achieved the completeness of the learning outcomes that are determined. Students are included in the criteria is not complete because it has a value under the minimum completeness criteria defined by the school that is ≥ 72. Analysis of student activity data known that the student is in very active category. This is because students' learning outcomes are not only influenced by student activity, but there are several factors. Factors that affect student learning outcomes are internal factors and external factors. According to Dalyono (in Syarifudin, 2011) suggests that factors affecting learning outcomes consist of internal factors (which come from within), including health, intelligence and talent, interests and motivation, learning methods, and external factors self), including family, school, community, the environment.

One of the supporting activities of learning is the availability of learning resources. In this study the learning source used is Kalibanger River. According to Nayy (2013) river is a learning resource that has been available and lived utilized (learning resources by utilization). The location of the Kalibanger river near the school is only ± 1 minute on foot so that Kalibanger River can be said to be an effective and efficient learning resource and does not cost big (Uno & Muhammad, 2013). Besides being close to Junior High School 5 Pekalongan, Kalibanger river is also a real learning resource. According to Hamzah (in Saada, 2014) students are easier to learn something concrete

where students can see directly and feel themselves all the events that occur in the environment. Students will also be more sensitive to the events around them. This can be seen from the increase in student learning outcomes that show significant numbers. This is in line with research conducted Kombuayo et al (2014) that the utilization of the surrounding environment as a source of learning can improve student learning outcomes in the class IPS class III SDN Bone-Bone Bangkalung District Bangkai Laut.

The use of the environment as a source of learning has several benefits including: 1) saving costs, because in addition to the existing resources and live utilized, Kalibanger River is located close to SMP Negeri 5 Pekalongan so it does not require travel costs; 2) practical and easy to do, because it does not require special equipment, only stationery to record various information in the river; 3) provide a real experience for students, because students see first hand how the river is polluted; 4) can help students connect knowledge with the life of students in society, this is also in accordance with the concept of contextual learning; 5) more applicative learning, because it can be directly applied by students if students find the event of pollution occurring in their environment; 6) provide direct experience to students, so students are more sensitive to the surrounding environment; 7) more communicative, because the events that exist in the student environment are usually easily understand by the students than the media packed (Aunurrohman, 2011).

In contextual learning, students are actively involved in the learning process in linking materials with everyday life, finding knowledge, and being able to make conclusions about the concepts being studied. Teachers do not transfer knowledge, but help students find their own knowledge. The teacher as a facilitator should be able to combine all the elements of learning so that students are interested in learning so that it can improve students' understanding. Learning in the experimental class emphasizes the provision of direct experience that is by observing the condition of the river, so that students are able to understand the nature around scientifically. This is in accordance with the nature of science education where learning is directed to find out and do (Rusman, 2013). Learning by doing, trying, and experiencing the objects themselves learned so that it can strengthen the knowledge that students have so that knowledge will go into the long-term memory of students. Students see firsthand how pollution occurs in the environment so that it becomes sensitive to problems in the environment. Through ideas or proposals on solving the problem of pollution in the environment students are trained to be able to link the material obtained with the life of students in the community, thus facilitating students in life in the community later.

This is in accordance with the nature of contextual learning according to Johnson (2009) that contextual learning is a teaching system that connects academic content to the context of daily life of students. While in the control class, the main source of learning is a textbook where students see the pollution only through the book, so students are less sensitive to the condition of the surrounding environment. Students are aware of the essence of pollution but do not know directly where pollution is common. Learning takes place by rote so that the meaning of the material being studied can not be applied by students in the life of society. This result is seen in the psychomotor value where the experimental class is higher than the control class. In the experimental class students are more able to interpret the pollution in the environment so as to provide a more logical and relevant ideas.

Student learning completeness is classically calculated based on the final grade obtained by the students. The final score can illustrate how many students complete the study with a value of ≥72. The calculation results show percentage of classical completeness experiment class that has been given treatmen that is 93,75%. These results indicate that ≥85% of students in the experimental class are complete so that it can be said that learning by utilizing Kalibanger River as a source of learning environmental pollution material is suitable for use in subsequent learning.

In addition to learning outcomes, student activity during the learning process observed by the observer with student activity observation sheet. The number of groups in the experimental class and control class are 6 groups with 4 observers. The activity of the student is to pay attention to teacher explanation, discussion in group, communicate result of discussion, convey opinion, ask friend or teacher, answer questions and draw conclusions from the learning done.

Analysis of observation result of student activity (table 4.8) showed in control class average of activity of student that is 74,11% which belong to active criterion, meanwhile in experiment class mean of activity of student is 86,38% which belongs very active criteria. Based on the results obtained can know the average activity of students of experiment class higher. This is thanks to contextual learning of students involved to actively participate in learning where students learn to teach by (learning by doing) (Putra, 2013).

A lesson should be able to support the student to do the activity, because the activity can affect the learning outcomes as proposed by Winkel (in Ayuwanti, 2016) which states that learning is a mental activity / psychic that takes place in an active interaction with the environment that produces a change in knowledge, and attitude values. Based on the analysis of product moment correlation between learning outcomes with student activity showed sig 0.00 <0,05 so it is concluded that the activity influences student learning outcomes. The higher the activity with this the higher the student learning outcomes. This is in line with the results of research conducted Widodo and Lusi (2013) that the increase in student activity is also accompanied by improvements in student learning outcomes both cognitive, affective and psychomotor aspects.

Analysis of student activity is not always directly proportional to student learning outcomes. In general, high learning activities tend to have high learning results as well. As the results of research Anggraito et al (2006) that student activities affect the learning achievement achieved. However, some students who are active and very active have learning outcomes under the KKM. This is due to several factors such as different levels of students' understanding and comprehension. As the research conducted by Mu'iz (2013) which shows that some students active and highly active criteria have not reached the minimum completeness criteria. This indicates that high learning activity criteria may not necessarily indicate a complete learning result.

The data retrieval of student responses aims to determine the student's response to the learning done which can then be used as an evaluation of the deficiencies and advantages of subsequent learning improvement materials. Questionnaires distributed to students inquire about the benefits they receive after learning, including the ease of understanding the material and increasing student activity in learning. Recapitulation results show that 71.87% of students respond very well, 25% of students respond well, and 3.13% of students respond well enough. From the questionnaire can be concluded that most students strongly agree that learning with the use of Kalibanger river as a source of learning to make students better understand the environmental pollution material. Based on students' responses, none of the students gave bad or bad responses to the learning, thus it can be concluded that the advantages of Kalibanger river utilization learning as a learning resource can already be perceived by the students.

In addition to the students' responses, the researchers also conducted interviews with subject teachers who taught science subjects VII class D and VII F to find out the teacher's response after the implementation of Kalibanger river utilization learning as a source of learning environmental pollution materials. The teacher's impression on this learning is the learning of Kalibanger river utilization as a source of learning environmental pollution material is good because it gives opportunity to the students to learn directly from the surrounding environment. Teachers also argue that learning by utilizing the river Kalibanger is in accordance with the chapter being studied ie environmental pollution. Based on teacher's observation on student's interest during student learning becomes more enthusiastic and not feel bored.

The involvement of students in acquiring knowledge in learning also makes students more active at the time of learning. Judging from student learning outcomes, more completed students are more than 70%. This shows the students more easily understand the learning by applying this learning. However, the teacher also advised that in the learning process conducted outside the classroom students can be more conditioned so that the learning atmosphere remains conducive so that the purpose of the learning can be achieved.

CONCLUSION

From the results of research, data analysis and discussion obtained the conclusion that the learning model of river Kalibanger utilization as a source of learning environmental pollution materials give an effect into learning outcomes and student learning activities.

Suggestions in this research is that teachers should apply the learning by utilizing Kalibanger River as a source of learning environmental pollution material in their students in order to improve cognitive learning outcomes considering this learning has proven effective in improving learning outcomes and student learning activities. When doing the learning done outside the classroom such as learning with the utilization of river Kalibanger, teachers should conduct a survey of the premises in advance so as to know the place well and do not disrupt the activities of residents who are in the environment.

REFERENCES

Anggraito, Y. U., & Palupi D. 2006. Peningkatan Aktivitas Siswa Dalam Kerja Ilmiah Melalui Pembentukan Kelompok Kooperatif dalam Penilaian Autentik. *Jurnal Penelitian Pendidikan 1 (22) Semarang Lembaga Penelitian UNNES*

Ariawan, K.D., Jampel I.N, Rati, N.W. 2016. Pengaruh Model Pembelajaran Kooperatif Tipe Group Investigation Berbasis Media Lingkungan Terhadap Hasil Belajar IPA Siswa Kelas IV di Desa Sidetapa. *E-Journal PGSD Universitas Pendidikan Ganesha Vol:4 No:1 Tahun:2016*

Aunurrohman. 2011. *Belajar dan Pembelajaran*. Bandung: Alfabeta

Ayuwanti, Irma. Meningkatkan Aktivitas dan Hasil Belajar Matematika Menggunakan Model Pembelajatan Kooperatif Tipe *Group Investigation* di SMK Tuma'ninah Yasin Metro. *Jurnal SAP Vol.1 Desember 2016*

Davi, *et al*. 2012. Penerapan Pembelajaran Kontekstual untuk Meningkatkan Motivasi Belajar pada Materi Aljabar bagi Siswa Kelas VIII-B SMP Negeri 10 Malang. *Jurnal Universitas Negeri Malang*: Malang

Djamarah, S.B. 2008. *Psikologi Belajar*. Jakarta: Rineka Cipta

Johnson, B. E. 2009. *Contextual Teaching and Learning*. Bandung: MLC

Kombuayo, S., Palimbong, A., & Jamaludin. 2014. Pemanfaatan Lingkungan Sekitar sebagai Sumber Pembelajaran IPS Siswa Kelas III SDN None-Bone Kecamatan Bangkurung Kabupaten Banggai Laut. *Jurnal Kreatif Tadulako Online Vol. 5 No.9*

Moha, H. 2015. Pemanfaatan Lingkungan sebagai Sumber Belajar Pada Pembelajaran IPA di Kelas V SDN 13 Kabila Kabupaten Bone Bolango. *Jurnal Pendidikan Guru Sekolah Dasar Universitas Negeri Gorontalo: Gorontalo*

Mu'iz. 2013. Penerapan Model Studi Lapangan Pada Materi Keanekaragaman Hayati dengan Memanfaatkan Lingkungan Sekolah. *Jurnal Pendidikan Biologi Universitas Negeri Semarang 2(3)*

Navy, A. 2013. Manajemen Sumber Belajar dalam Meningkatkan Mutu Pembelajaran Sains (Studi Kasus di Pratomseksa (SD) Sassanasuka Thailand). *Jurnal Manajemen Pendidikan Universitas Negeri Malang*: Malang

Putra, S., R. 2013. *Desain Belajar Mengajar Kreatif Berbasis Sains*. Yogyakarta: DIVA Press

Rusman. 2010. *Model-model Pembelajaran*. Jakarta: Rajawali Press

Saifutra, O. 2015. Pemanfaatan Lingkungan Sebagai Sumber Belajar Mata Pelajaran IPA Kelas IV Sekolah Dasar. *Jurnal Program Kurikulum dan Teknologi Pendidikan Universitas Negeri Yogyakarta*: Yogyakarta

Sanjaya W. 2006. *Strategi Pembelajaran*. Jakarta: Kencana Prenada Media

Sudewi, Ni., I. W. Subagia, & I. N. Tika. 2014. Studi Komparasi Penggunaan Model Pembelajaran Problem Based Learning (PBL) dan Kooperatif Tipe Group Investigation (GI) Terhadap Hasil Belajar Berdasarkan Taksnomi Bloom. *E-journal Proram Pasca Sarjana Universitas Pendidikan Ganesha Program Studi IPA, Vol. 4*

Suprijono, A. 2010. *Cooperative Learning (Teori dan Aplikasi PAIKEM).* Pustaka Belajar: Yogyakarta

Uno, B., H., & Mohammad, N. 2013. *Belajar dengan Pendekatan PAILKEM: Pembelajaran Aktif, Inovatif, Lingkungan, Kreatif, Efektif, Menarik.* Jakarta: Bumi Aksara

Widodo, & Lusi Widayanti. 2013. Peningkatan Aktivitas Belajar dan hasil Belajar Siswa dengan Metode *Problem Based Learning* pada siswa kelas VII A MTs Negeri Donomulyo Kulon Progo Tahun Pelajaran 2012/2013. *Jurnal Fisika Indonesia No.49 Vol XVII Edisi April 2013*