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The Difference of Students' Learning Activities and Output Due to Problem-Based Teaching Model by Using Practicum Method with Video Observation Method

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Info Article

Abstract

This study aims to describe the difference between students' activity and learning outcome between students who do problem-based teaching model practicum method and students who do problem-based teaching model video observation method. This study is quasi-experimental with the posttest-only design. The population of this research is the whole of grade VIII students. The samples of the study are VIIID (experimental class 1) and VIIIC (experimental class 2) which are taken using cluster random sampling technique. The result of this study is the class who did problem-based teaching model practicum method got post-test result 77,31. While the class who did problem-based teaching model video observation method got 70,75. According to the Mann-Whitney test with Asymp. Sig (2-tailed) 0,002 < 0,05, it can be assumed that there is a significant difference on students' learning outcome between class who did problem-based teaching model practicum method and class who did problem-based teaching model video observation method. The average of students who are very active and active on the experiment class 1 is 85,15% and experiment class 2 is 78,90%. Based on the study result, it shows that there is a difference of activity and learning outcome between students who did problem-based teaching model practicum method and problem-based teaching model video observation method.

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INTRODUCTION

Taniredja *et al.*, (2012) argues that improving the quality of education in schools can be pursued through many ways including increasing initial readiness for new students, improving teacher competence, improving curriculum content, improving the quality of learning and assessing student learning outcomes, providing adequate teaching materials and the establishment of learning facilities. The teacher is obliged to create an educational atmosphere that is meaningful, fun, and creative and has a professional commitment to improving the quality of education.

Based on the observation and interview results with science teachers of SMPN (State Junior High School)17 Tegal, the science learning process has used the 2013 curriculum and the teacher has tried to create learning so that students are active. The learning process is carried out with the lecture method, discussion and question, and answer but student learning outcomes are not optimal. This can be seen from student learning outcomes that are lower than KKM. Digestive system material is considered difficult so students prefer memorization methods to understand the material.

Problem-based teaching is one of the appropriate learning models that help students master the digestive system material and achieve optimal activity and learning outcome. Problem-based teaching is a learning method that corresponds to the 2013 curriculum. Problem-based teaching is one of four suggested learning models for use in the 2013 curriculum (Permendikbud, 2014). Problem-based teaching is a learning model that presents students with authentic, meaningful problem situations that can make it easy for students to conduct investigations, develop thinking skills, problems solving, experience being independent and confident students. Students are not designed to listen to as much information as possible from the teacher (Ibrahim & Nur 2000). The use of learning models will maximal if learning methods selected in accordance with learning material. The learning method used in this research is the practicum method and observation method. The practicum method is a learning method that teaches students to be critical, to analyze, and to find answers to various problems through direct experiences. While the observation method is a way of teaching by inviting students to observe an object carefully. The purpose of this study is to describe the differences in activity and student learning outcomes between those who use problem-based teaching with practicum method and video observation method.

RESEARCH METHOD

This research was carried out in the odd semester 2017/2018 school year in class VIII SMPN 17 Tegal. This research is a quasi-experimental study with the posttest-only design. The population in this study is all eighth-grade students of SMPN 17. The samples taken in this study are class VIII D as experimental class 1 (problem-based teaching model with practicum method) and class VIII C as experimental class 2 problem-based teaching model video observation method) with cluster random sampling technique. It means that both classes are randomly selected. The independent variable in this study is a problem-based teaching model with practicum methods and problem -based teaching with video observation. The dependent variables in this study are the students' learning outcomes and activities during the learning process. The analyzed data is in the form of data on student learning outcomes, student learning

activities, students' and teachers' responses. Cognitive learning outcomes are measured by posttest questions that have been determined for validity, reliability, power difference and level of difficulty. Student activity data was taken with a questionnaire of students' observation activity. Student learning outcomes are analyzed descriptively quantitative tests included normality, homogeneity and Mann-Whitney test, while the results of student activities were analyzed in the qualitatively descriptive method.

RESULT AND DISCUSSION

The research result shows that the average value of posttest experimental class 1 is higher than in experimental class 2.

Table 1. Posttest value data for experimental class 1 and experimental class 2

Description	Experiment 1	Experiment 2
The number of students	32	32
The highest score	87	83
Lowest value	57	53
Average	77.31	70.75

The posttest value is then analyzed by a normality test. The normality test in this study uses the Kolmogorov–Smirnov test. The results of tests of normality value of experimental class 1 and 2 posttest are presented in Table 2.

Table 2. Results of the Analysis of the Normality Test of the Posttest Value

	Experiment Class 1	Experiment Class 2
Kolmogorov-Smirnov Statistic	0.171	0.154
Df (degree of freedom)	32	32
Significance	0.018	0.051
Decision	Abnormal	Normal
Information	Sig. <0.05	Sig.> 0.05

Based on Kolmogorov-Smirnov test calculations, the significance value of experimental class 1 is 0.018 and experimental class 2 is 0.051. The data shows that the significant value in the experimental class 1 is smaller than 0.05, so the data is not normal while in the experimental class 2 the data is normal. The homogeneity test in this study uses the Levene's test with α = 0.05. The analysis results show that the sig value > 0.05. It stated that the results of both class' posttest have samples that got the same variety. The posttest value of the two classes was then analyzed using the non-parametric hypothesis test because the data were not normally distributed and homogeneous. Based on the Mann-Whitney test that the value of Asymp. sig (2-tailed) is 0.002 < 0.05, it can be concluded that there is a difference in the average learning outcomes of experimental class 1 and experimental class 2 where the average value of experimental class 1 is higher than the class experiment 2. The results of the analysis show that there is a significant difference between the posttest scores of the students of experimental class 1 and the experimental class 2.

The cognitive learning outcomes of the digestive system material of the experimental class 1 which was taught with problem-based teaching model practicum method were higher

than the experimental class 2 which was taught by the problem-based teaching model practicum method. It is because, in problem-based teaching practicum methods, students are given problems and solved by practicum so students are involved in finding out the answers to the problems presented and finding concepts related to the digestive system material. This is in line with the research of Sulastini *et al.*, (2014), that there are significant differences between classes that use Problem Based Learning practicum-based models with classes that use conventional methods. Problem-based teaching model is a learning that presents real condition problems through authentic and meaningful problems, namely in learning accompanied by direct experience both through laboratory activities and daily activities that can challenge students to solve the problems they face (Dwijayanti, 2010). Through practicum methods, students are also given the opportunity to experience themselves, follow the process, and observe an object, analyze, prove, draw conclusions about an object's state or process something (Sagala, 2005).

In the experimental class 2, students were taught using problem-based teaching model learning with video observation methods without practicum. This can affect the motivation and interest of students to solve problems, suspected students less interested in learning atmosphere. Lack of interest or interest in students makes students tend to lose focus in learning activities and understand the material. This is consistent with the opinion of Djamarah and Zain (2006) that learning interest tends to produce high achievement, whereas learning interest that is less will result in low learning achievement.

Student learning activities also have an influence on student learning outcomes. Student activity in this study, obtained from observations during the learning process takes place by using observation sheets of student activities. Activities observed were visual activity, mental activity, oral activity, listening activity, writing activity, and emotional activity.

Table 3. Recapitulation of Student Percentage in Activity Category during the Learning Process

No.	Criteria	Experiment 1 (%)				Experiment 2 (%)			
		Meeting							
		1	2	3	4	1	2	3	4
1	Very active	15,62	15,62	21,87	21,87	-	6,25	18,75	15,62
2	Active	50,00	68,75	71,87	75,00	62,50	75,00	65,62	71,87
3	Enough Active	34,37	15,62	6,25	3,12	34,37	18,75	15,62	12,50
4	Less active	-	-	-	-	3,12	-	-	-
5	Not active	-	-	-	-	-	-	-	-
	Percentage of Very Active and Active (%)	65,62	84,37	93,74	96,87	62,50	81,25	84,37	87,49
	Average of each class (%)	85,15				78,90			

Table 4. Recapitulation of Results of Observation of Student Activities in learning

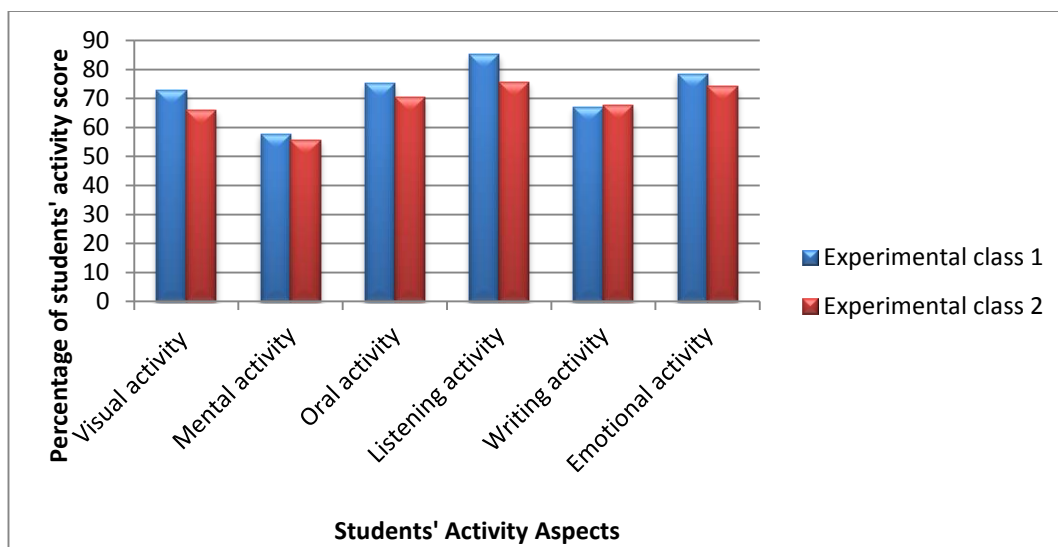| No.	Observed aspects	Experiment 1 (%)				Experiment 2 (%)			
		Meeting							
		1	2	3	4	1	2	3	4
1	Visual activity	69	70	73	79	50	68	71	75
2	Mental activity	52	56	60	63	49	55	57	62
3	Oral activity	65	71	76	89	62	68	77	75
4	Listening activity	79	84	88	90	72	73	78	80
5	Writing activity	60	64	69	75	67	63	68	73
6	Emotional activity	73	77	79	85	71	74	75	77

Figure 1. The Differences of the regular activity of students in experimental class 1 and 2

Based on the results of the score analysis of each aspect of student activity, it showed an increase from the previous meeting (Table 4). The aspect of visual activity in experimental class 1 is higher because learning is not monotonous so students are interested and pay attention to learning well. Mental activity is the lowest activity of all aspects of the activity observed because students are not familiar with problem-based teaching models so in their groups there are only one or two active students. However, at the next meeting, there is an increase in percentage. Oral activity in the experimental class 1 is higher because students are more active in giving questions and not shy to express opinions. The activity of listening to experimental class 1 was higher than the experimental class 2 because in the experimental class 1 student actively listened to their opinions and presentations. It is because they were curious about the results of the other group's lab work and listened to the teacher's explanation well. Student writing activities in experimental class 1 and experimental class 2 tend to be the same. In the experimental class 1students are required to record the results of practicum observations, record summaries of important learning material and compile questions and in the experimental class 2 students are also required to record summaries and compile questions. The emotional activity of experiment class 1 is higher because learning makes students interested and learns well, students sit with their groups and are not noisy.

Students' activity in experiment class 1 was better than experimental class 2. This happens because the learning in the experimental class 1 provides more opportunities for students to move and perform so that learning is more enjoyable. In general, the results obtained showed that the problem-based teaching model applied in the experimental class 1 and experimental class 2 made the students active, according to the opinion of Furoida RR (2013), problem-based teaching models can improve student learning outcomes and activities.

Based on the analysis results of the students' response questionnaire, students of the experimental class 1 and 2 expressed interest in learning with problem-based teaching practical methods for experimental class 1 and problem-based teaching of video observation methods for experimental class 2, generally. The existence of problems in learning make students feel curious and challenged to solve the existing problems. All students in experimental class 1 who

use learning with problem-based teaching models practicum methods provide a "very good" response to each question item. This can be seen from the average percentage of all "yes" answers that are more than 81%. In the experimental class 2 also gave a positive response to the teaching model based on the problem of video observation methods. Based on student questionnaire responses in experimental class 1 and 2, it can be concluded that the problem-based teaching model of practicum method in experimental class 1 and problem-based teaching model video observation methods both increase learning outcomes. However, experimental class 1 learning outcomes are better than experimental class 2.

From the analysis of the teacher's questionnaire responses, it can be seen that the teacher gave a positive response to the learning process that used problem-based teaching practicum methods and problem-based teaching video observation methods with their respective advantages. In the teacher response, it identified that the teacher has good response toward problem-based teaching model practicum method than a problem-based teaching model video observation method. This is because according to the teacher, the problem-based teaching model practicum method requires students to be active more than the problem-based teaching model video observation method. The teacher never used a problem-based teaching model before and interested in the applied model in experimental class 1 and 2 which will be used for other materials.

CONCLUSION

According to the result of data analysis and discussion that have been done, it can be concluded that there is the difference in activity and learning outcomes between students who are taught using problem-based teaching model practicum method and students who did problem-based teaching model video observation method. The activity and learning outcome of students in experimental class 1 is higher than experimental class 2.

REFERENCES

Djamarah & Zain. 2006. *Strategi Belajar Mengajar*. Jakarta:Rineka Cipta.

Dwijayanti P & Yulianti D. 2010. Pengembangan Kemampuan Berpikir Kritis Mahasiswa melalui Pembelajaran Problem Based Instruction pada Mata Kuliah Fisika Lingkungan. *Jurnal Pendidikan Fisika Indonesia*, 1(6): 108-11.

Furoida RR. 2013. Penerapan Model Pembelajaran Problem Based Instruction dalam Meningkatkan Hasil Belajar Mata Pelajaran Keselamatan, Kesehatan, Keamanan Kerja (k3) dan Higiene Sanitasi di SMK N 6 Surabaya. *E-journal boga* 2 (1): 74-79).

Ibrahim, M., dan Nur, M., 2000. *Pengajaran Berdasarkan Masalah* . Surabaya: University Press.

Kemendikbud. 2014. Materi Pelatihan Guru Implementasi Kurikulum 2013 Tahun Ajaran 2014/2015 Mata Pelajaran Matematika SMP/MTs. Jakarta : Kementrian Pendidikan dan Kebudayaan RI.

Sagala, S. 2005. *Konsep dan Makna Pembelajaran*. Bandung: Alfabeta.

Sulastini, NW, Suniasih, NW., dan Meter IG. 2014. Model Pembelajaran Problem Based Learning Berbasis Praktikum terhadap Hasil Belajar IPA Siswa Kelas V SD Gugus III Sukawati. *Jurnal Mimbar PGSD Universitas Pendidikan Ganesha*. Vol 2 (1).

Taniredja *et all*. 2012 . *Model-model Pembelajaran Inovatif* . Bandung: Alfabeta.