The Comparison Of Problem-Based Learning And Explicit Instruction Model For Maintaining Environmental Sustainability In Primary Schools Of Manado City

Treesje K. Londa[1]
Pasca Sarjana, Universitas Negeri Manado
e-mail: treesjelonda@unima.ac.id

Olivia J. Lalamentik[2]
Pasca Sarjana, Universitas Negeri Manado
e-mail:

ABSTRACT

Improving learning at the elementary school level can be done by implementing innovative learning models. Explicit problem based models that can be used by teachers in teaching and for students through active and enjoyable learning processes. The teacher's ability is measured using two Teacher Performance Assessment Instruments while student success is measured by achieving learning outcomes. This study compares problem-based learning and the application of explicit learning learning models with the theme of preserving the environment in Manado's elementary schools aimed at improving student learning outcomes for science subjects for elementary schools by comparing problem-based learning and explicit teaching models and creating a learning environment in learning environment for elementary school students class I to VI by comparing the use of problem-based learning and explicit teaching models. The results of the study show that environmental studies in elementary schools can be implemented using a learning model that fits the abilities of elementary school students at each level. Problem-based learning models can improve student learning outcomes. The explicit learning learning model can improve student learning outcomes. Problem-based learning and explicit teaching models can create a pleasant atmosphere for student learning. Problem-based learning and explicit teaching models can shape and develop better character of students in school to preserve and love the environment.

Keywords: Primary School, problem-based learning, explicit instruction.

INTRODUCTION

The process of education to achieve the maximum quality of human resources[1], generally can be implemented through the implementation of learning starting from primary school (SD) to the level of Higher Education (PT) [2]. The implementation of learning in the process of formal education is closely related to the figure of educators (teachers) and students (students) whom equipped with infrastructure, facilities, curriculum, textbooks, learning media, and other supporting factors that are very influential to achieve the quality of human resources[3]. The Government has implemented various efforts to improve human resources including changes in the primary schools' curriculum from Education Unit Level Curriculum (KTSP)

to 2013 Curriculum (K13), although not all schools have implemented it [4].

The implementation of learning at the elementary level that can form an independent and loving person can be learned through all subjects taught. The science subject in primary schools should be taught appropriately by teachers so that students are trained to find their own problems in the environment as well as to find solutions to the problem. Teachers must apply appropriate methods, strategies, and learning approaches to each theme embed with concept to be understood and performed by students in everyday life. If the teachers apply the right learning model with a fun learning atmosphere, then the teacher has successfully formed the personality of students who are able to find a solution to any problem that they face especially to be stocked for the education at the next level [5].

The facts based on observations made in SDN 25 Manado whom using K13 indicated that the learning process had not been implemented optimally in the implementation of thematic learning in grade III with the theme of preserving the environment. Teachers still dominated the learning process (teacher centered), lectured more, used less appropriate learning methods/models, and students were less involved in the use of props [6]. Discussion activities that were less directed by the teachersturned into a storytelling and playing time for students. After that, the report of the discussion results became a laughing matter for other students. Some students seemed bored to learn that often came out of the classroom because the learning process seemed less motivating for the students to participate. Students actively played and were less serious in completing Student Worksheet (LKS) resulted in unexpected evaluation results. The Minimum Performance Criteria (KKM) set at 70% could not be achieved by 24 out of a total of 35 students. This meant that only 31.43% reached the KKM though this school was the target school for K13 implementation.

The learning process that had been observed indicated the condition of the class that was not conducive and must be improved [7] . What kind of learning model fosters motivation and expels child boredom in learning? An active, creative, effective, and fun learning model. The reason is simple: One of the many theories about the brain studied in education is what Meier (2004) calls the Brain Triune Theory. This theory states that the human brain consists of three parts, namely the reptilian brain, the middle brain (limbic system), and thinking brain (neocortex) [8]. If the feeling of learning (child) is in a positive state (happy, pleased), then the child's mind will "step up a level" from the midbrain to the neocortex (thinking brain). This results in an effective learning. Conversely, when a child's feeling is in a negative state (tense, frightened) like militaristic learning, the child's mind will "step down a level" from the midbrain toward the reptile brain [9]. In this situation, learning will not progress or even stop altogether. Situations like this should be realized by teachers when teaching so that they can make the right decisions in the implementation of learning [10].

The improvement that must be done in this learning process is by applying innovative learning models [11]. The selected learning model were the

problem-based and explicit instruction learning models [12]. These learning models can improve the learning process; for teachers in teaching and for students in actively and having fun learning. Teachers' ability can be measured using the Teacher Performance Appraisal Instrument (GPA) 1 and 2 while student success is measured by achieving learning outcomes.

METHOD

In this study, the authors used two class groups, namely the experimental class group and the control class group [13]. The experimental class will be treated using a problem-based learning model and the control class using explicit instruction learning models. The average difference in the final test (post-test) score in the experimental class and in the control class was compared to determine whether there were significant differences in learning outcomes between the two classes. Table 1 illustrates the research design used in this study.

Table 1. Research Design

Group	*Pre-Test*	Treatment	*Post-Test*
Control Class	O1	X	O2
Experiment Class	O3	X	O4

Data Source

Suggests that: the data source in the study is the subject from which the data obtained. So, the source of data in this study was all 3rd graders in 8 primary schools of Manado city: SD GMIM 17, SD GMIM 31, SD GMIM Malalayang, SD Kristen Rehobot, SD Negeri 3, SD Negeri 7, SD Negeri 25, SD Negeri 50

Techniques used in data collection in this study were interviews, documentation, tests, and literature studies. The data obtained were analyzed in several ways, as follows Data Pre-test and Post-test

ANALYSE AND INTERPRETATION

1. Research Data Description

The experimental class was given the treatment of the problem-based learning model application and the control class was given the treatment of explicit instruction learning model application. The number of samples in the experimental class was 144 people and the number of samples in the control class was 143 people. Data descriptions of the results of this study were processed and presented in terms of mean, variance, standard deviation, minimum and maximum scores [14].

The primary schools in control class were SD GMIM 17 Manado, SD GMIM 31 Manado, SD GMIM Malalayang, SD Kristen Rehobot Manado, SD Negeri 3 Manado, SD Negeri 7 Manado, SD Negeri 25 Manado, SD Negeri 50 Manado. The primary schools in experiment class were SD GMIM 17 Manado, SD GMIM 31 Manado, SD GMIM Malalayang, SD Kristen Rehobot Manado, SD Negeri 3 Manado, SD Negeri 7 Manado, SD Negeri 25 Manado, SD Negeri 50 Manado.

Pre-test data is the data taken before the treatment. This data describes the student's initial ability as measured by pre-test before obtaining learning material.

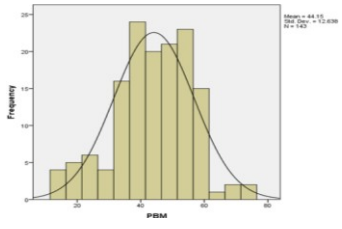
Furthermore, post-test data is data of student learning outcomes after getting the learning materials. Pre-test and post-test data processing used the help of computer program called SPSS version 22. Description of research result data wasthe output of SPSS program from pre-test to post-test data of control class and experiment class presented in Table 2.

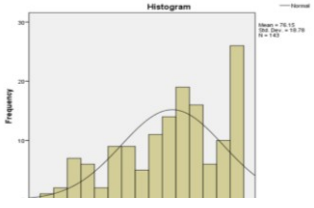
Table 2. Statistic Description

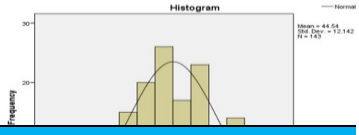
Descriptive Statistics						
	N	Range	Min	Max	Std. Deviation	Variance
PBM (Posttest)	143	70	30	100	18.780	352.675
EI (Posttest)	144	72	28	100	16.438	270.224
PBM (Pretest)	143	60	14	74	12.638	159.718
EI (Pretest)	144	60	12	72	12.130	147.148
Valid N (listwise)	143					

Sum	Mean	Std. Deviation	Variance
10889	76.15	18.780	352.675
11256	78.17	16.438	270.224
6313	44.15	12.638	159.718
6424	44.61	12.130	147.148

The histogram of the four groups of data is presented in this figure:







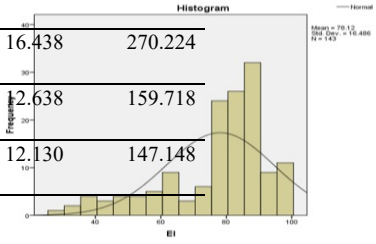


Figure 1. Experiment class pre-test to Experiment class post-test

2. Descriptive Analysis

The data used in this descriptive analysis process were pre-test and post-test data of the experimental class and control class. Based on the two types of data, the gain value from the control class and the experimental class was retrieved as presented in the Tables 3 and 4.

Table 3. Pre-test, post-test, and gain of control class

	PRE-TEST	POST-TEST	GAIN
SUM	6313	10889	4576
MEAN	44.15	76.15	32
MIN	14	30	16

MAX	74	100	26
VARIANS	159.718	352.675	192.957
STANDARD DEVIASI	12.638	18.780	6.142

Table 4. Pre-test, post-test, and gain of experiment class

	PRE-TEST	POST-TEST	GAIN
SUM	6424	11256	4832
MEAN	44.61	78.17	33.56
MIN	12	28	16
MAX	72	100	28
VARIANS	147.148	270.224	123.076
STANDARD DEVIASI	12.130	16.438	4.308

Data in Table 3 above shows pre-test result of control class with average value of 44.15, minimum data of 14, maximum data of 74, variance of 159.718, and standard deviation equals to 12.638. Furthermore, post-test data result shows average value of 76.15, minimum data of 30, maximum data of 100, variance of 352.675, and standard deviation equals to 18.780. Based on the pre-test and post-test data, the obtained gain value in the control class has average value of 32, minimum of 16, maximum of 26, variance of 192.957, and standard deviation of 6.142.

Data in Table 4 above shows pre-test result of experiment class with average value of 44.61, minimum data of 12, maximum data of 72, variance of 147.148, and standard deviation equals to 12.130.

Furthermore, post-test data result shows average value of 78.17, minimum data of 28, maximum data of 100, variance of 270.224, and standard deviation equals to 16.438. Based on the pre-test and post-test data, the obtained gain value in the experiment class has average value of 33.56, minimum of 16, maximum of 28, variance of 123.076, and standard deviation of 4.308.

Based on the pre-test and post-test data averages of the control class and experimental class, the following N-Gain values are obtained.

$$N - Gain_{Control\ Class} = \frac{76.15 - 44.15}{100 - 44.15} = \frac{32}{55.85} = 0.57$$

$$N - Gain_{Experiment\ Class} = \frac{78.17 - 44.61}{100 - 44.61} = \frac{33.56}{55.39} = 0.61$$

The result of N-Gain calculation on the control class shows the value of 0.57 or can be interpreted as the gain value is in the medium position, as well as the calculation of N-Gain in the experimental class showed the value 0.61. This can be interpreted as a result of teaching treatment using a problem-based learning model in the control class and explicit instruction learning in the experimental class gave a moderate impact on learning outcomes or results in improved learning outcomes or understanding of subject matter with the theme of preserving the environment.

3. Discussion

Based on the results of data description analysis and hypothesis test described above it can be interpreted that

the application of these two models together can provide an impact of improving student learning outcomes on learning with the theme of preserving the environment [15] . The results of data analysis from research conducted in eight elementary schools in Manado City consisting of two classes namely control class with treatment of problem-based learning model and experimental class with the treatment of explicit learning learning models on learning with the theme of preserving the environment, showed that there was no difference in learning outcomes with the theme of environmental preservation in both classes. But based on gain value analysis, there was an increase in learning outcomes with the theme of preserving the environment in the experimental class and the control class, and the gain value of the experimental class with the treatment of explicit learning learning models higher.

The results of this study confirmed the opinion of Djumingin [16] that the problem-based learning model has advantages such as 1) Problem solving can challenge students' ability and give satisfaction to determine new knowledge for students, 2) Problem solving can improve student's learning activity, 3) Problem solving can help students how to transfer their knowledge to understand real-life problems, and 4) Problem solving can help students to develop new knowledge and be responsible for their learning. Likewise, the application of explicit instruction learning model can make students active and involved in learning and mastering the knowledge.

CONCLUSION

Based on the results of the research, there are several conclusions formulated, as follows:

1) Environmental studies in Manado city primary schools can be carried out using learning models that are appropriate to the level of ability of elementary school children.
2) Problem-based learning model can improve learning outcomes of Natural Science subject of students grade I to VI Primary School in Manado city.
3) Explicit instruction learning model can improve learning outcomes of Natural Science subject of students grade I to VI Primary School in Manado city.
4) Problem-based and explicit instruction learning model can create a fun atmosphere for learning Natural Science of grade I to VI students of primary schools in Manado city.
5) Problem-based and explicit instruction learning model can form and develop a character of students in grade I until VI Manado city primary schools to preserve and love the environment.

REFERENCES

Astin, A. W. (1984). Student involvement: A developmental theory for higher education. *Journal of college student personnel*, *25*(4), 297-308.

Hadi, S. (2002). *Effective teacher professional development for the implementation of realistic mathematics education in Indonesia*. University of Twente [Host].

Ehrich, L. C., Hansford, B., & Tennent, L. (2004). Formal mentoring programs in education and other professions: A review of the literature. *Educational*

administration quarterly, *40*(4), 518-540.

Khasanah, I. N. (2015). *The implementation of 2013 curriculum by the English teacher and its barriers (a case study at the 10th grade of SMA N 1 Rembang in 2014/2015 academic year)*(Doctoral dissertation, UIN Walisongo).

Herstatt, C., & Von Hippel, E. (1992). From experience: Developing new product concepts via the lead user method: A case study in a "low-tech" field. *Journal of product innovation management*, *9*(3), 213-221.

Chin, C. L. Teacher Quality in Primary Education: The Singapore Experience. *PROCEEDING ICETE 2016*.

Stevenson, R. B. (2007). Schooling and environmental education: Contradictions in purpose and practice. *Environmental education research*, *13*(2), 139-153.

Roxo, M. R., Franceschini, P. R., Zubaran, C., Kleber, F. D., & Sander, J. W. (2011). The limbic system conception and its historical evolution. *The scientific world journal*, *11*, 2427-2440.

Dubé, L., & Parent, A. (1981). The monoamine-containing neurons in avian brain: I. A study of the brain stem of the chicken (Gallus domesticus) by means of fluorescence and acetylcholinesterase histochemistry. *Journal of Comparative Neurology*, *196*(4), 695-708.

Govindasamy, T. (2001). Successful implementation of e-learning: Pedagogical considerations. *The internet and higher education*, *4*(3-4), 287-299.

Forrester, R. H. (2000). Capturing learning and applying knowledge: an investigation of the use of innovation teams in Japanese and American automotive firms. *Journal of Business Research*, *47*(1), 35-45.

MacWhinney, B. (1997). Implicit and explicit processes: Commentary. *Studies in Second Language Acquisition*, *19*(2), 277-281.

Sharan, S. (1980). Cooperative learning in small groups: Recent methods and effects on achievement, attitudes, and ethnic relations. *Review of educational research*, *50*(2), 241-271.

Barras, C., & Gauvain, J. L. (2003, April). Feature and score normalization for speaker verification of cellular data. In *2003 IEEE International Conference on Acoustics, Speech, and Signal Processing, 2003. Proceedings.(ICASSP'03).* (Vol. 2, pp. II-49). IEEE.

Hannafin, M. J. (1992). Emerging technologies, ISD, and learning environments: Critical perspectives. *Educational technology research and development*, *40*(1), 49-63.

Djumingin, S. (2017). The Practice of Lesson Study Model in Teaching Writing Report Text. *Journal of Education and Learning*, *11*(1), 103-110.

ACKNOWLEDGEMENTS

The authors would like to thank who had agreed to be the respondents in this study include FGD involved in order to formulate