Advances in Social Science, Education and Humanities Research, volume 465
Proceedings of the 1st Annual Conference on Education and Social Sciences (ACCESS 2019)

The Effect of Problem Based Learning Model with Character Education on Science Process Skills

K. Sri Kusuma Wardani*
Primary School Education Study Program
Universitas Mataram
Mataram Indonesia
srikusumawardani@unram.ac.id

Aisa Nikmah Rahmatih
Primary School Education Study Program
Universitas Mataram
Mataram Indonesia

N L P. Nina Sriwarthini
Primary School Education Study Program
Universitas Mataram
Mataram Indonesia

I W. Sadia
Magister of Science
Universitas Pendidikan Ganesha
Denpasar Indonesia

***Abstract*—** This study aims to analyze the differences in the science process skills between students learning with problem-based learning models with character education and students who learn by direct learning models. The type of research is a quasi-experimental study design with non-equivalent pre-test and post-test control group design. The population of the study was 146 students of all grades VII at SMPN 3 Seririt in the academic year 2017/2018. The samples were taken by cluster random sampling technique. The sample consisted of two classes (VII B and VII C) with a total of 64 students. The Data were analyzed by using descriptive statistics and ANCOVA, with hypothesis testing performed at a significance level of 0.05. The results showed there were a significant difference, with a value of $F = 27.766$; $p < 0.05$. in the science process skills between groups of students who learned by using problem-based learning models with the character education and those students who learned by using direct learning.

Keywords **—** problem based learning, character education, science process skills

I. INTRODUCTION

Human resources become a determinant of the development of a nation. Human resources become a weapon for a nation to be able to survive and compete in the current era of globalization, especially in the fields of science and technology. This causes, the creation of human resources quality absolutely necessity for a nation, and education is a very important weapon for creating well-qualified human resources.

Education needed in the era of globalization is not only education that merely facilitates students to know something, but it is also able to create a learning atmosphere and learning process which encourage students actively develop their potential [1].

There are various attempts have been made by the government to improve education, one of them is by refining the curriculums, from the 2006 Education Unit Level Curriculum to the 2013 Curriculum. This later curriculum was actually designed to encourage learning processes that are focused on students so students are able to understand the concepts taught by educators.

The National Education emphasizes the importance of forming and developing student character and being able to shape student character so that it can educate the nation's life. [2]. Therefore, the quality of human resources is not only in the aspect of knowledge, but also in the aspect of attitude (spiritual attitude and social attitude) and aspects of skills. The aspects of spiritual attitude can make humans who have noble character and faith and devotion to God Almighty. The social attitude aspect makes human beings responsible and independent. The aspects of knowledge can make people knowledgeable, and capable. The aspects of skills can make humans creative and skilled [3].

In fact, the rapid development of science and technology has led to social value changes in society that have a major impact on the students' characters or behaviors. The development of science and technology in the era of globalization seems to have significantly influenced the students' characters or behaviors, such as ethics and manners which have begun to neglected. Therefore, character education needs to be increased in its intensity and quality in all levels of education, and this can be done generally by integrating it into all subjects in schools, especially into natural science learning.

The implementation of character education in schools is based on three important reasons, namely: 1) the need for good character to become an integral part of human beings; 2) the school is a good and conducive place to carry out the process of learning and education of values; and 3) character education is essential for building moral society. The Character education has two main objectives namely policy and kindness. Education about kindness is the basis of democracy, and for this end, there are two important moral values that must be taught in character education, namely respect and responsibility [4].

Another thing that needs to be considered in natural science learning is that it refers to the education within the 2013 curriculum which encourages the the involvement of students to actively discover their own concepts of science through mental processes. Therefore, natural science learning should be based mostly on observational and experimental methods to activate students' science process skills.

Based on the preliminary study conducted at SMPN (Junior High School) 3 Seririt dealing with students' science process skills, it was revealed that the average score of class VII students in natural science subjects reflected in their midterm grade was classified into low as presented in Table 1.

TABLE I. SCORES MIT-TERM TEST OF GRADE VII STUDENTS

Score	Class				
	VIIA	VIIB	VIIC	VIID	VIIE
Knowledge Score	64,5	62,5	63,5	70,0	73,8
Skill Score	65,0	62,0	61,0	69,0	70,0
Classical Completeness (%)	65	63	62	80	85

In accordance with the Republic of Indonesia Minister of Education Regulation No. 81A 2013, which states that learning activities must involve a scientific approach, such as: observing, asking questions, gathering information, associating, and communicating [5]. The scientific approach is then integrated into teaching and learning process in schools by using innovative learning models so as to be able to bring various advantages within the learning activities of students and to overcome educational problems especially in natural science learning [6].

It is assumed that the appropriate learning model to be used is problem-based learning (PBL). Problem-based learning is a learning model that involves students to solve a problem through the stages of the scientific method so that students can learn knowledge related to the problem and at the same time they have the skills to solve problems [7].

The problem-based learning model is then integrated with character education, so that it can improve the science process skills. Considering various natural science learning problems in schools and the characteristics of students, it is necessary to develop innovative learning model and the learning model developed is a problem-based learning model with character education for character building and improving the science process skills.

This is supported by some related studies, such as that is conducted by Safrina. Her study aims to determine the effect of the application of the PBL model on the process skills and understanding of students' scientific concepts in chemical substances in food in class VIII MTsN Meureudu. The results of the study showed that the application of PBL models to chemical substances in food positively affected the process skills and understanding of students toward scientific concepts in chemical substances in food [8].

The second study was conducted by Sadia, which aimed to develop an integrated character education model of learning science (Biology) in junior high schools by applying the inquiry learning model. The results of empirical tests of inquiry learning models containing character education using a one-shot case study design indicated that there was a significant development in student character. This shows that the inquiry learning model with character education developed in this study was effective in improving students' character [9].

The third study was conducted by Wardani. This study aimed to determine the effect of a laboratory inquiry learning model containing local genius content on improving the science process skills of Grade VIII students of Junior High School 4 Singaraja. The results of the study showed that the application of laboratory inquiry learning models containing local genius content could improve students' science process skills [10]. Based on those related studies above, the purpose of this study is to analyze the differences in science process skills between students who study with problem-based learning model containing character education and students who learn by direct learning model.

II. METHOD

The type of research is quasi-experimental, because not all variables and the conditions of the experiment can be tightly managed and controlled. The population of the study was all VII grade students of SMPN 3 Seririt in the academic year 2017/2018, which consisted of five classes, namely VIIA, VIIB, VIIC, VIID, and VIIE. The Sample of the study was taken by using cluster random sampling technique. Based on the random lottery, it was obtained that class VIIC got treatment with problem based learning model containing character education and class VIIB got treatment with direct learning. This study, using a nonequivalent pretest-posttest control group design [11]. The research design is presented in Figure 1.

Experiment	O_1	X_1	O_2
Control	O_3	X_2	O_4

Notes:
O_1, O_3 : Pre observation (*pre-test*).
O_2, O_4 : Post observation (*post-test*)
X_1 dan X_2: Treatment with MPBL-PK treatment with MPL.

Fig. 1. Non-equivalent Pre-test Post-test Control Group Design

The dependent variable of the study is the science process skills. The independent variables are a problem-based learning model with character education in the experimental group and a direct learning model in the control group. This study used initial process skills as covariate variables. The data collected were the science process skills of students as measured by the observation sheet dealing with the science process skills.

The Data were analyzed descriptively and with one-way covariance analysis. Descriptive analysis was used to describe the average scores and standard deviations of students 'initial process skills and students' process skills. Testing the research hypothesis is used one-way covariance analysis. Before testing the hypothesis, the normality of the data distribution was tested using the Kolmogorov-Smirnov and Shapiro-Wilk statistics, the variance homogeneity test between groups using the Leven's test of equality of error variance, and the linearity test using the test of linearity. All hypothesis testing was performed at a significance level of 0.05 [12].

III. Results and Discussion

A. General Description of Research Results

Average scores (M) and standard deviations (SD) of students' science process skills for groups of students who learn with problem-based learning models containing character education (PBLM-CE) and learning groups that use direct learning models (DLM) before and after treatment is presented as in Table 2.

TABLE II. General Descriptions of Research Data

Unit Analysis	Group	M		SD	
		Pre	*Post*	*Pre*	*Post*
Science Process Skills	PBLM-CE	29.00	75.00	6.70	8.50
	DLM	32.00	53.00	7.40	7.90

In Table 2, it is found that after treatment the PBLM-CE group showed better achievement within the natural science process skills.

B. Hypothesis Testing

The results of normality test data using Kolmogiorov-Smirnov and Shapiro-Wilk statistics show that the statistical values obtained have a significance number greater than 0.05. Therefore, the distribution of initial process skills data and students' process skills is normally distributed. Homogeneity variance test results using the Leven's test of equality of error variances for groups of learning models showed figures of statistical significance of Levene greater than 0.05. This shows that the variance between learning models is homogeneous. The linearity test shows the statistical f deviation from linearity is 1.046 with a significance value of 0.437. The significance level is greater than 0.05, so the relationship between initial process skills and students' process skills is linear. Because of the assumptions that the data are normally distributed, the variance of all data is homogeneous, and the relationship between initial process skills and student process skills is linear, so the analysis continues to ANCOVA with one-way process skill data. The analysis results are presented as in Table 3.

TABLE III. Summary of One Path Covariance Results for Testing Hypothesis

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
PRE	895.728	1	895.728	20.478	0.000
MODEL	2272.808	1	2272.808	27.766	0.000

Based on the summary of ANACOVA results presented in Table 3, it can be concluded that: First, the effect of initial process skills on students' science process skills at this significance rate is less than 0.05. These results indicate that the initial process skills affect the science process skills, but the effect has been eliminated using ANACOVA, so that if there are differences in the science process skills of students between each learning model, this is really caused by the different treatment given. Second, the effect of independent variables on the dependent variable namely the science process skills of students obtained a significance value of 0.000. The significance number is smaller than 0.05, so HO is rejected. Thus, the decision can be taken that there are differences in science process skills between students who learn by using PBLM-CE and students who learn by using DLM.

The results of this study indicate that PBL-CE represents a learning model where students are the center of activities in learning (student-centered) and DLM represents a learning model where the teacher as the center of activity (teacher-centered) on learning the concept of energy and its changes. Statistically, there is a significant difference in the achievement of science process skills of students at a significance level of 0.05. This difference is because there is a better treatment than another treatment, in terms of achieving students' science process skills. Based on the results that have been obtained that PBLM-CE is superior compared to DLM. The basis for determining that PBLM-CE is better at providing opportunities for achieving maximum process skills compared to DLM is that PBLM-CE provides opportunities for students to learn in real terms (not imaginary) about the subject matter. Students are confronted with problems that often occur in their daily lives, which might cause enthusiasm in participating in learning. These real problems arouse students' curiosity to solve those problems which in turn will make students' concepts understanding stored in long-term memory.

The findings of the study are in line with research conducted by Safrina [8] which shows that the application of the PBL model is better so that it affects the process skills and understanding of students' science concepts. The findings of this study are also in line with findings in research conducted by Rofikhatul [7] which show that the application of PBL models with mind mapping has succeeded in increasing students' understanding of concepts.

Other research by Wardani [10] shows that increasing understanding of concepts and science process skills can be improved by applying innovative learning models designed with a constructivist approach and the PBL model is one of the learning models designed with a constructivist approach.

IV. Conclusion

Based on the results of research and discussion, it can be concluded that there are differences in science process skills between students who study with problem-based learning models containing character education (PBLM-CE) and those students studying with direct learning models (DLM). Students who learn with the problem-based learning model with character education PBLM-CE) are able to achieve higher scores in natural science process skills than those students who learn with the direct learning model (DLM).

References

[1] Wulandari, N.I., Wijayanti, A., & Budhi, W. Effectivity of Learning Model Problem Based Learning Toward Science Learning Outcomes Observed from Students' Communication Skill. *Jurnal Pijar MIPA* XIII (1), 2018, 51-55.

[2] Mulyasana, D. *Pendidikan Bermutu dan Berdaya Saing*. Bandung: PT Remaja Rosdakarya, 2015.

[3] Suastra, I W. *Pembelajaran Sains Terkini*. Singaraja: Universitas Pendidikan Ganesha, 2013.

[4] Sadia, I W. Model-Model Pembelajaran Sains Konstruktivistik. Yogyakarta: Graha Ilmu, 2014.

[5] Kemendikbud. Pendekatan Scientific (Ilmiah) dalam Pembelajaran. Jakarta: Pusbangprodik, 2013.
[6] Zubaidah, S., Mahanal, S., & Yuliati, L. *Ragam Model Pembelajaran IPA SMP*. Malang: Universitas Negeri Malang, 2013.
[7] Rofikhatul, W.R., Supardi, K.I., & Sulhadi. The Implementation of Problem Based Learning with Mind Mapping to Improve The Student's Understanding of Concept. *Journal of Primary Education* 7(2), 2018, 163–171.
[8] Safrina, Saminan, & Hasan, M. Pengaruh Penerapan Model *Problem Based Learning* (PBL) terhadap Keterampilan Proses Sains dan Pemahaman Siswa pada Materi Zat Kimia dalam Makanan pada Siswa Kelas VIII MTsN Meureudu. *Jurnal Pendidikan Sains Indonesia* 3 (1), 2015, 186-194.
[9] Sadia, I W. Implementasi Model Pembelajaran Inkuiri Bermuatan Pendidikan Karakter dalam Pembelajaran IPA untuk Memperbaiki Karakter Siswa SMP. *Seminar Nasional Riset Inovatif II, 2014.*
[10] Wardani, K.S.K. Pengembangan Perangkat Pembelajaran IPA Terpadu dengan Setting Inquiry Laboratorium Bermuatan Content Local Genius untuk Meningkatkan Pemahaman Konsep dan Keterampilan Proses Sains Siswa SMP. *Prosiding Seminar Nasional MIPA 2016*, ISBN 978-602-6428-00-4.
[11] Candiasa, I M. *Statistik Multivariat Disertai Aplikasi dengan SPSS.* Singaraja: Universitas Pendidikan Ganesha, 2016.
[12] Sugiyono. *Stastika untuk Penelitian*. Bandung: Alfabeta, 2013.