

## DOES PROBLEM-BASED LEARNING IMPROVE STUDENTS' SELF-DIRECTED LEARNING ABILITIES?

Sri Sundari<sup>1\*</sup>, Fajmei Aisah Rahmawati<sup>2</sup>

<sup>1</sup>Medical Faculty and Health Science, Universitas Muhammadiyah Yogyakarta, Bantul – Indonesia

<sup>2</sup>Medical Faculty and Health Science, Universitas Muhammadiyah Yogyakarta, Bantul – Indonesia

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### ABSTRACT

**Background:** Self-Directed Learning has recently received a lot of attention from educational institutions in Indonesia. The self-directed learning skill stimulate students to develop themselves. Thus, whatever the learning method used in the teaching and learning process, it is hoped that they carry out self-directed learning well. Currently, there are various learning methods, including the 208+ Problem Based Learning (PBL) method and conventional methods. It is important to know which method can shape students' self-directed learning skill.

**Aim:** This study aimed to measure the difference of students' self-directed learning in PBL and conventional method at Universitas Muhammadiyah Yogyakarta.

**Method:** This is non-experimental research. It used analytical observational research design and a cross sectional approach. The stratified random sampling used in this study. There were 90 students who became a sample. A questionnaire from the Self-Rating Scale for Self-Directedness in Learning (SRSSDL) by Fisher was used to measure SDL skill in this study. The data were analyzed using a simple linear regression test.

**Result:** The result showed that the average SRSSDL score of dentistry student (KG) was (208±8,11), Civil engineering (TS) was (195,7±2,1), dan international relation (HI) was (194,7±3,3). Statistically, it has significance difference (p=0,035). GPA score of KG students (3,2±0,13), TS students (3,1±0,13) dan HI students (3,07±0,09). It can be concluded that statistically significant difference (p=0,046).

**Conclusion:** It can be concluded that there is a difference in SDL skill between students who use PBL and conventional method.

**Keywords:** self-directed learning, problem based learning, conventional method, average score

### PRACTICE POINTS

- The using of PBL in increasing students' self-directed learning
- Students who have been in PBL method has self-directed learning much better than the conventional one.

\*corresponding author, contact: sundari\_purbo@yahoo.com.sg

## INTRODUCTION

Learning is a creative thinking process that can improve both students' thinking skills and construct new knowledge.<sup>1</sup> The old paradigm, teacher-centered, still exists in the education system in Indonesia, although there are some new methods which can support better learning process. It allows teachers to motivate, encourage, facilitate, students so that they can construct their knowledge.<sup>2</sup>

Teacher centered learning was used in many educations system but universities in Indonesia began to shift from a teacher-centered learning to student-centered learning. This is influenced by changes in the orientation of educational institutions in line with the increasingly global era.<sup>3</sup> The Student-Centered Learning system encourages students to be self-motivated, then strives to achieve the competencies. This can be done by discussing, so students dare to express opinions, learn to solve problems they face, and do not hesitate to consult with teachers. With the Student-Centered Learning system, it is expected that students will be active and creative, so that they can complete their studies smoothly and on time. Furthermore, graduate students are also expected to be able to compete in the real world. The application of this condition system requires teachers to always follow the development and progress of Science and Technology so that they are able to facilitate students well.<sup>4</sup>

In the Student-Centered Learning system, students need to be guided so that learning can run effectively, dynamically, and produce high competence. Several learning models that can be applied to the Student-Centered Learning system include Small Group Discussion (SGD), Role-Play and Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Contextual Learning (CL), Problem Based Learning (PBL), Collaborative Learning, and Project Based Learning (PJBL).<sup>5</sup> Factors that can affect the ability of self-directed learning are culture and curriculum. Learning using the PBL system can improve SDL skills.<sup>6</sup> Students in college must have a self-directed learning skill because it helps them to become long-life learner.

The ability to learn independently or Self-Directed Learning is needed by all students who are expected to be able to develop their knowledge. Currently, the concept of self-directed learning is widely known and applied in various fields of medical and clinical science. However, in reality there is misunderstanding in the concept of Self-Directed Learning itself.<sup>7</sup> Several factors that hinder students' self-directed learning abilities include: (1) Lack of time management, (2) Lack of responsibility in self-study. It leads to imperfect application of self-directed learning.<sup>8</sup> Ineffective methods will reduce the cognitive, affective, and psychomotor abilities of individuals. This study aims to compare the self-directed learning ability and the grade point achievement of students who undergo the learning process using PBL and conventional methods in exact and social study programs.

## METHODS

This study used a quantitative design with a cross sectional approach. The research was conducted at the Universitas Muhammadiyah Yogyakarta from January to June 2020. The intervention group was students of dental study program while a comparison group, international relations students and civil engineering. The number of samples was determined using Baileys's theory, stated that 30 sample is a bare minimum. The population was all 4<sup>th</sup> semester students of Dentistry, Civil Engineering and International Relations study programs. Random sampling was used in this study. The instrument used to measure self-directed learning ability is Fisher's Self-Rating Scale for Self-Directedness in Learning (SRSSDL) questionnaire. Selected students were given a questionnaire and a cumulative achievement index through google form. There was a student who did not send back the form so another sample was taken randomly. The data were tabulated and processed statistically using Kruskal Wallis. This research has been approved by the Ethics Committee of the Faculty of Medicine and Health Sciences No. 348/EP-FKIK-UMY/VII/2019.

**RESULTS AND DISCUSSION**

There were 90 sample came from three different departments namely dentistry, civil engineering, and international relation. There were 30 sample for each department. Respondent's characteristic include department and self-directed learning score can be seen below.

**Table 1. Self SS Directed Learning Readiness Ability and Grade Point Average**

		Frequency (%)		
SRSS DL score	High	10 (33,3)	4 (13,3)	4 (13,3)
	Moderate	20 (66,7)	26 (86,7)	26 (86,7)
	Low	0 (0)	0 (0)	0 (0)
	<b>Total</b>	30 (100)	30 (100)	30 (100)
GPA score	> 3,5	0 (0)	0 (0)	0 (0)
	>= 3 – 3,5	25 (83,3)	15 (50)	16 (53,3)
	< 3	5 (16,7)	15 (50)	14 (46,7)
	<b>Total</b>	30 (100)	30 (100)	30 (100)

Based on the table 1, it can be seen that this study involved three department at the Universitas Muhammadiyah Yogyakarta, namely, the Dentistry as many as 30 people (33.3%), the Civil Engineering as many as 30 people (33.3%), and the International Relations as many as 30 people (33.3%). The SRSSDL score was divided into 3 categories, namely low, moderate, and high. In dentistry program, there were no SRSSDL Score categorized as low, 20 people (66.7%) in the moderate category and 10 people (33.3%) in the high category. In the Civil Engineering, there were 26 people (86.7%) in the medium category and 4 people (13.3%) in the high category. Meanwhile, the International Relations has 26 people (86.7%) categorized in the medium category and 4 people (13.3%) in the high category.

The GPA are categorized into 3, based on the regulation of the minister of education and culture of the republic of Indonesia number 49 of 2014 concerning the national standards of higher education, namely Satisfactory (<3), Very Satisfactory (>=3-3,5) and With Praise (> 3,5). The GPA results obtained by the Dentistry are 5 people (16.7%) in the satisfactory category, 25

people (83.3%) are in the very satisfactory category, and there are no respondents which categorized in with praise. While the results of the GPA of the Civil Engineering Study Program obtained 15 people (50%) were in the satisfactory category, 15 people (50%) were in the Satisfactory manganese category, and there were no respondents in the category with praise. Then for the International Relations Study Program, 14 people (46.7%) were in the satisfactory category, 16 people (53.3%) were in the very satisfactory category, and there were no respondents in the category with praise.

**Table 2. Kruskal Wallis Non-Parametric Test of SRSSDL**

	Department	N	Mean	p
SRSSDL	Dentistry	30	207,97	0,035
	Civil engineering	30	195,73	
	International relation	30	194,57	

Post-hoc Mann-Whitney test: Dentistry vs Civil Eng. p=0,029; dentistry vs Inter rel. p=0,025; Civil Eng. vs Inter. Rel. p=0,584

Based on the table 2, it is known that the p value is 0.035, gotten from the Kruskal Wallis test analysis. It can be concluded that there is a difference in SRSSDL scoring between the three groups. It is also found that the average score of the SRSSDL from high to low was the Dentistry, Civil Engineering, and International Relations. The Post Hoc test using Mann-Whitney showed that, the p value of Dentistry and Civil Engineering is 0.029, the Dentistry and International Relations is 0.025. Thus, it can be stated that there is a significant difference of SRSSDL between the two groups. Meanwhile, there is no difference between the Civil Engineering and International Relations.

**Table 3. Kruskal Wallis Non-Parametric Test on GPA**

	Department	N	Mean	p
GPA	Dentistry	30	3,1842	0,046
	Civil engineering	30	3,0773	
	International relation	30	3,1280	

Post-hoc Mann-Whitney: Dentistry vs Civil Eng p=0,014; Dentistry: Inter. Rel p=0,129; Civil Eng: Inter. Rel p=0,345

Based on the table 3, it can be concluded that there is a difference in GPA results between the three groups. The average GPA from high to low is the Dentistry, International Relations and Civil Engineering. The results of the Post Hoc analysis using the Mann-Whitney test showed that the Dentistry and Civil Engineering is statistically difference (pvalue= 0.014). While the Dentistry and International Relations and the Civil Engineering and International Relations there is no difference.

and Non-PBL methods (Civil Engineering and International Relation study program). Based on the non-Parametric test for each variable, it shows the difference of students' Self-Directed Learning both Problem Based Learning and conventional methods. These results are in accordance with research conducted by Almasoudi<sup>9</sup> who states that PBL can improve the cognitive ability. PBL is stronger than learning with a conventional curriculum. This is also in line with the opinion that the problem-based

**Table 4. Statistical Results of the Correlation of the Self-Rating Scale for Self-Directedness in Learning (SRSSDL) with the GPA of Each Study Program**

	GPA Average	SRSSDL	p	r
Dentistry	3,184	207,97	0,000	0,661
Civil engineering	3,077	195,73	0,000	0,778
International Relation	3,128	194,57	0,000	0,743

Based on the table 4, it is known that students' SDL skill and GPA of International Relations has a significant relationship (p value = 0.000). The correlation score of 0.743 indicates that the correlation direction is positive with a strong correlation.

The correlation analysis of SRSSDL scores and GPA of Dentistry students is statistically significant P=0,000. The correlation value of 0.661 indicates that the direction of the correlation is positive with a strong correlation. So, it can be concluded that there is a significant relationship between the SDL and the GPA of Dentistry students with a unidirectional correlation.

The results of the correlation analysis of the SRSSDL score with the GPA of Civil Engineering students is significant to (p = 0.000) which shows that the relationship between SDL and GPA. The Spearman correlation value of 0.778 indicates that the direction of the correlation is positive with a strong correlation strength. It can be concluded that there is a significant relationship between SDL and the GPA in all of the 3 study Program (Dentistry, Civil Engineering and International).

From the three groups, it can be concluded that there is a relationship between Self Directed Learning and student GPA results, both with PBL (Dentistry)

learning model is learning that provides problems at the beginning so that students are directed to apply problem solving strategies as their learning strategies. This can improve their thinking skills and independent learning skills.<sup>10</sup> The difference in increasing students' critical thinking skills between PBL classes and conventional classes occurs because Problem Based Learning (PBL) students are trained to develop broader critical thinking skills compared to conventional classes.<sup>11</sup> In Problem Based Learning (PBL), students are expected to find the right solution based on what they understand also explore various alternative problem solving. Students are free to express their opinions, so that students become active during the learning process. In this case, it can be seen from the difference in Self Directed Learning between Dentistry students who study using the PBL method and Civil Engineering and international relation students who study using conventional methods. PBL method enhances the self-directed learning skills better than the conventional teaching method.<sup>12,13,14,15</sup>

However, this study contradicts to the research conducted by Nyambe et al<sup>8</sup> who reported that both internal and external factors affected self-directed learning skill. The internal factor is motivation while learning process, facilities and infrastructure is an

external factor. In addition, the role of the lecturer/tutor as a role model also affects students who are confused about getting information sources, so that students do not know whether the information is right or wrong.<sup>8</sup>

In this study, there were differences in learning outcomes (GPA) between students who used the PBL method and the conventional method as mentioned in the previous research.<sup>16</sup> The group of students who used the PBL method, namely Dentistry, obtained an average result higher than the average result of Civil Engineering and International Relations students who used non-PBL or conventional methods. SDL ability of students also affects the average learning outcomes seen from the GPA. The learning process with the Problem Based Learning method makes students able to adapt, physically active, active in composing in groups, students are also better able to solve problems related to the material and the impression of pleasure in the learning process is more visible compared to conventional methods that only focus on the teacher so that students become less active and make the class feel quiet.<sup>17</sup> This SDL ability can also be improved by developing learning methods that are suitable for adult learning, including using structured online learning so that student activities can be monitored.<sup>18</sup>

In this study, it was found that there was a relationship between Self Directed Learning and GPA results. This is in accordance with previous research which states that Self Directed Learning has a significant positive relationship with the GPA also self-directed learning has been proven in giving effect to the GPA. The GPA can be influenced either by the high or low students' self-directed learning. If students are high self-directed learning, their GPA can be optimal and vice versa.<sup>19</sup> Students with high SDLR have higher self-management abilities than students with moderate SDLR, this is because students with high SDLR are able to manage their time well, especially time to study, set strict time limits to get things done, regularly, systematically, and is responsible for the educational process.<sup>20</sup>

Based on the data, there are SRSSDL scores of Dentistry students which are higher than International Relations students, but the average

GPA of Dentistry students is not much different from that of International Relations students. There are so many factors including the learning environment, gender, learning motivation and the selection of the chosen learning method.<sup>21</sup> A study conducted by<sup>19</sup>, with the title The Relationship of Self-Directed Learning with Student Grade Point Average which says that Self Directed Learning is not the only factor that affects academic achievement index, SDL only affects 27.4% of student academic achievement index in the study. This research is also supported by research conducted by<sup>22</sup> who states that the factors of readiness, independence, and the environment have an influence of 35.9% on academic achievement. In this study, it was found that the average self-directed learning of the three variables was still in the medium category. It means that the majority of subjects are successful in planning, setting goals and choosing learning strategies that suit themselves but have not been fully successful in carrying out the planning. Internal factors such as physical health, availability of free time, hobbies or hobbies, self-maturity and intelligence and external factors such as the environment can have positive or negative influences on one's personality.<sup>19</sup>

### **Limitations**

The limitations of this study include a very limited research sample and sampling using the Google form. It would be better if the GPA data collection was seen directly in the academic section and filling out the questionnaire was filled in directly and waited by the researcher.

### **CONCLUSION**

Based on the results of statistical analysis and discussion, it is known that the self-directed learning readiness skill of students in the dental study program is the highest compared to the civil engineering and international relations study program. The GPA of dental students is also the highest when compared to the other 2 study programs. For this reason, it can be concluded that the learning process using PBL is able to increase students' self-directed learning readiness skills (SDLRS) so that students have a higher GPA.

## RECOMMENDATION

It can be concluded that the PBL becomes one factor that affect students' self-directed learning. Thus, PBL can be considered as the most applicable method in a study program. In addition, it is necessary to conduct research on this self-directed learning ability using more research samples and a wider study program.

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## COMPETING INTEREST

The authors declare no conflict of interest related to the study in this manuscript.

## LIST OF ABBREVIATIONS

PBL: Problem based learning

Non-PBL: Non-problem-based learning

SDL: Self-directed learning

## AUTHORS' CONTRIBUTION

*Sri Sundari* – data analysis and publication manuscript

*Fajmei Aisyah* – developing research proposal and collecting data

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