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Problem-Based Learning Strategy based on Cognitive Style to Improve the Learning Outcomes of Nursing Students

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Abstract

Problem-based learning (PBL) are very effective in nursing schools, because nursing students will face problems when they provide nursing care. Important problems that often occur in learning activities are learning outcomes. One of the characteristics of students that is important to understand and think about by lecturers is cognitive style. This study discusses PBL learning strategy and cognitive styles on learning outcomes in the nursing diploma III program, using a quasi-experimental design. The results: (1) there were significant differences in the learning outcomes of understanding basic nursing concepts between PBL group and DI group, (2) there were significant differences in understanding concepts between FI group and FD group, (3) there was an interaction between PBL learning strategies and strategies for learning with cognitive styles FI and FD. Thus PBL has advantages over DI in achieving learning outcomes understanding concepts depends on cognitive style. Educational institutions are expected to make policy policies to improve the quality of learning, especially in developing student-centered learning strategies.

Keywords*: Problem based learning, Cognitive style, Learning outcomes.*

Introduction

The progress of management of health personnel education in various levels and types will greatly determine the quality of health workers who are graduated. Therefore, the belief in the importance of advancing the process of education of health personnel must be truly considered important by the managers of educational institutions(1). Learning strategies are basic in efforts to help students in learning activities to achieve learning. Thus, teachers can use teaching materials as learning media(2). Learning strategies are a series of materials and learning procedures that are used together to obtain student learning outcomes(3).

The use of learning strategies that are lacking or inappropriate, which does not involve students playing an active role will influence student learning outcomes. The low student learning outcomes will have an impact on the decline in the quality of students in mastering the competencies of the subjects that must be mastered. This situation will lead to the low quality of graduates produced by these universities. Important problems and often faced in learning activities are the resulting incompatibility of learning outcomes as stated in the learning objectives. Understanding the character of the content of the subject matter, the character of students, and also the learning process is a determinant of success in learning. Bloom (1976)(4) describes the relationship between student characteristics and the quality of learning and learning outcomes. Increasing the quality of learning and the ability of students to learn science in an effective and efficient way is influenced by the use of appropriate learning strategies.

PBL is a learning process that starts from real problems in life, based on a problem students are stimulated to learn problems based on the knowledge and experience previously possessed by students. This will make them have new knowledge and experience. PBL

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learning strategies are very effective to use in nursing schools, because nursing students will be faced with problems when they provide nursing care and students are then required to solve the problem.

Comparison of PBL strategies in this study is used direct instruction strategy (direct learning). This learning strategy is a learning strategy that is actually teacher center. This strategy according to the researcher is a strategy that can be used because it is in accordance with basic declarative nursing learning and procedural knowledge.

The purpose of this study is to test and analyze: 1) the presence or absence of differences in the learning outcomes of understanding basic nursing concepts between groups of students who learn to use PBL learning strategies with DI. 2) there is a difference in the learning outcomes of conceptual understanding between groups of students who have a cognitive style FI with FD. 3) whether there is an interaction between PBL and DI learning strategies with cognitive styles FI and FD on the learning outcomes of understanding the basic concepts of nursing of students.

Materials and Method

This quasi-experimental research involved 129 nursing students who divided into experiment and control group, selected by cluster sampling technique. To determine the treatment class differently, random assignment was done. The design used in this study was factorial design (2x2). The experimental class studied using PBL learning strategy, and the control class using the DI learning strategy. The moderator variable was cognitive style, namely: field dependence and field independence. The dependent variable was learning outcomes (understanding and application of concepts). The variables that need to be controlled were the ability of lecturers, learning facilities and learning time. The research instrument were: GEFT cognitive style test and learning outcomes test. The data was analyzed by MANOVA (Multivariate Analysis of Variance).

Findings

The understanding the concept obtained by the price of F=70.829 with a significance value of 0.000 (there was significant differences in understanding basic nursing concepts between groups of students who learn to use PBL strategy and DI strategy.

Table 1. The Results of MANOVA I

Effect		Value	F	Hypothesis df	Error df	Sig.
Intercept	Pillai's Trace	0.997	19488.374a	2.000	124.000	0.000
	Wilks' Lambda	0.003	19488.374a	2.000	124.000	0.000
	Hotelling's Trace	314.329	19488.374a	2.000	124.000	0.000
	Roy's Largest Root	314.329	19488.374a	2.000	124.000	0.000
Learning Strategy	Pillai's Trace	0.376	37.329a	2.000	124.000	0.000
	Wilks' Lambda	0.624	37.329a	2.000	124.000	0.000
	Hotelling's Trace	0.602	37.329a	2.000	124.000	0.000
	Roy's Largest Root	0.602	37.329a	2.000	124.000	0.000
Cognitive Style	Pillai's Trace	0.380	37.983a	2.000	124.000	0.000
	Wilks' Lambda	0.620	37.983a	2.000	124.000	0.000
	Hotelling's Trace	0.613	37.983a	2.000	124.000	0.000
	Roy's Largest Root	0.613	37.983a	2.000	124.000	0.000
Learning Strategy*Cognitive Style	Pillai's Trace	0.074	4.983a	2.000	124.000	0.008
	Wilks' Lambda	0.926	4.983a	2.000	124.000	0.008
	Hotelling's Trace	0.080	4.983a	2.000	124.000	0.008
	Roy's Largest Root	0.080	4.983a	2.000	124.000	0.008

Exact statistic

Design: Intercept+Learning-strategy+Cognitive-style+Learning-strategy*Cognitive-style

Table 2. The Results of MANOVA II

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig
Corrected-Model	Learning outcomes understanding concepts (post test)	a 3474.119	3	1158.040	43.769	0.000
Intercept	Learning outcomes understanding concepts (post test)	618039.669	1	618039.669	23359.087	0.000
Learning-strategies	Learning outcomes understanding concepts (post test)	1874.021	1	1874.021	70.829	0.000
Cognitive-style	Learning outcomes understanding concepts (post test)	1966.999	1	1966.999	74.344	0.000
Learning-Strategy* Cognitive-Style	Learning outcomes understanding concepts (post test)	264.808	1	264.808	10.009	0.002
Error	Learning outcomes understanding concepts (post test)	3307.276	125	26.458	0.027	0.870
Total	Learning outcomes understanding of concepts (post test)	649425.000	129			
Corrected-Total	Learning outcomes understanding of concepts (post test)	6781.395	128			

R-Squared=0.512 (Adjusted R-Squared=0.501)

This can also be shown in terms of the estimated marginal means of understanding the concepts in both learning strategies (PBL and DI) as follows.

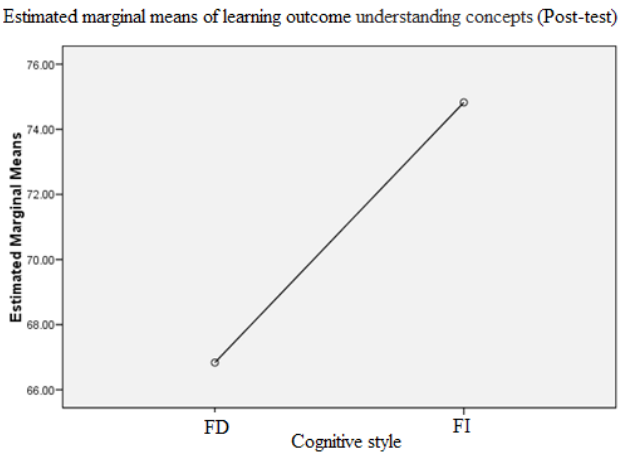

Figure 1. The estimated marginal means of understanding concepts in both learning strategies (PBL and DI)

The mean-score of conceptual understanding of PBL group was higher than DI group. The F score for understanding basic nursing concepts based on cognitive style was 74.344 with p-value of 0.003 (there was a significant difference in understanding the concept between groups of students who have cognitive style FI and cognitive style FD.

This can also be shown in the form of an estimated marginal means of understanding the concepts based on cognitive style (FD and FI) as follows.

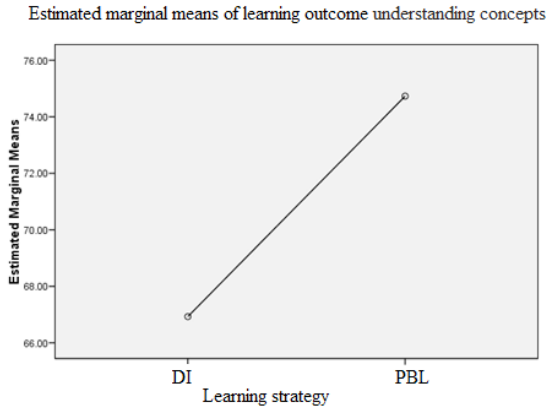

Figure 2. Marginal mean (estimated marginal means) understanding of concepts based on cognitive style (FD and FI)

It can be seen that the average value of the conceptual understanding of the student group had a relatively higher cognitive style FI than the average value of the student group that had the cognitive style of FD.

The results of calculating data to test hypotheses regarding the interaction between learning strategies and cognitive styles of students towards the ability to understand basic nursing concepts can be seen by looking at the calculated F scores and significance scores on the source learning strategy and cognitive style. Based on the table it is known that F = 10.009, with p-value = 0.002 (there was significant effect on the interaction between PBL learning strategies and DI learning strategies with the cognitive style of FI and FD on understanding the basic concepts of student nursing.

This can also be shown in terms of the estimated marginal means of understanding basic student nursing concepts based on the interaction of learning strategies (PBL and DI) and cognitive styles (FI and FD).

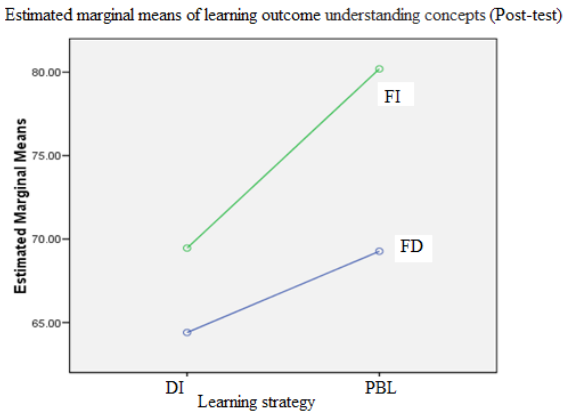

Figure 3. Estimated marginal means for understanding basic student nursing concepts based on the interaction of learning strategies (PBL and DI) and cognitive styles (FI and FD)

It can be seen that the average value of understanding the concept of student groups with PBL learning strategies that have a cognitive style FI and FD was relatively higher than the average value of the student group of good DI learning strategies that had cognitive styles FI and FD. The two lines will eventually intersect, so this reinforces the results of the MANOVA test which shows that there is a significant influence on the interaction between PBL learning strategies and cognitive learning strategies with FI and FD towards understanding basic nursing concepts.

Discussion

There are significant differences in the learning outcomes of understanding basic nursing concepts between groups of students who learn to use PBL strategy with groups of students who study using the DI strategy. This result is in accordance with Arend's theory[5], that PBL is a learning outcome of the investigation process, understanding, and providing a way out of the problem. It can be interpreted that the main principle of PBL is to solve authentic problems. Problems presented in class are initial stimuli and basic contexts of learning.

By using PBL learning strategies, students are stimulated to learn so that conceptual understanding of the material is well achieved. The difference in learning outcomes between classes / groups of students learning using PBL learning strategies with DII shows that learning outcomes are influenced by learning strategies, even though students are given learning material and questions and the same facilities.

This is in line with Yudiernawati's research (2015) which states that there are differences in the learning achievement of nursing nursing clinical learning applications between learning and PBL strategies with direct learning strategies[6].

Some studies that show the effectiveness of PBL strategies in improving learning outcomes one of them is Oliveira et al (2016)[7] which states that:

"The teaching strategies used and tested in the RCT with the aim of developing CT in undergraduate nursing students included PBL, the concept map, simulation, reflective writing, Role Modeling and Animated Pedagogical Agents. Furthermore, based on the meta-analysis of the studies included, the effectiveness of PBL was demonstrated in the increased overall CT scores

from homogeneous studies. This result confirmed our hypothesis that the teaching strategies that show better efficacy in RCT are those that involve the use of active methodologies."

The results show that there are significant differences in the learning outcomes of conceptual understanding between groups of students who have cognitive styles and students who have cognitive style of FD This shows that the ability to understand the concept of students who have a FI cognitive style is better than students who have a cognitive style of FD.

Woolfolk (1993) describes the definition of cognitive styles. Cognitive styles are about individuals to receive and organize information from the surrounding environment. Based on these opinions, it can be interpreted that what is meant by cognitive styles is the way a person processes, stores, or uses information to examine a task or interpret various types of environmental situations[8].

The results of this study are in line with the results of research from Udiyono, U. Research results from Hikmawati et al. (2013) also support that there is an influence of cognitive style on students' mathematics learning outcomes. While the marginal mean of mathematics learning outcomes of students who have the FI cognitive style is better than the mathematics learning outcomes of students who have the FD cognitive style[9].

The success in the group of students who have the cognitive style FI, shows that students who have the cognitive style FI are strong analytical power (in response to the stimulus have a tendency to use their own perceptions and more analytical), more autonomous in concluding a conclusion, independent in working duty and confidence in his abilities because he has a high level of intellectuality and feels efficient when the task is done alone. A student with a cognitive style FD, finds difficulties in processing, but easily perceives when information is manipulated according to the context. He will be able to separate stimuli from the context.

The results of the calculation of data in order to test the hypothesis obtained the results that there is an interaction between PBL learning strategies and strategies of learning with the cognitive style FI and FD on understanding the concept of basic nursing students.

The results of data calculations to test hypotheses about the interaction between learning strategies and cognitive styles of students towards the ability to understand basic nursing concepts can be known by looking at the calculated F scores and significance scores on the source learning strategy and cognitive style. Based on table 3, it is known that F = 10.009, with p-value of 0.002 (there was a significant effect on the interaction between PBL and DI strategy with the cognitive style of FI and FD).

The results of research that supports the results of this study are Shi, Changju (2011) which states that the results of the study show that cognitive style has a significant influence on the choice of learning strategies for students[10]. Similarly, Suliani (2014)[11] conducted a study on the effect of learning and cognitive style on students' critical thinking skills in learning history. The results of the study obtained results that there is an influence of the interaction between learning strategies and cognitive styles on students' critical thinking skills in learning history.

Conclusion

Based on the results of research and discussion, the conclusion of PBL learning strategies has advantages over DI learning strategies in achieving learning outcomes understanding concepts depends on the cognitive style possessed by students.

Educational institutions are expected to make policies to improve the quality of learning, especially in the development of learning strategies that are more student-oriented or better known as student centered learning. Lecturers are advised to use PBL learning strategies in managing nursing learning to improve student learning outcomes. PBL is a learning approach that is used to stimulate high-level thinking of students in situations that are oriented to real-world problems, including learning how to learn.

Conflict of Interest: No

Ethical Clearance: Yes

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