

# Project-Based Learning (PjBL) Method: Improving Critical Thinking and Problem-Solving Skills for Nursing Students

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## ABSTRACT

Problem-solving skills and critical thinking are very important for nursing students in carrying out their roles as nursing managers after graduation. Many nursing managers cannot perform optimally in terms of their critical thinking skills and problem-solving abilities within the hospital service units. Because of this shortage, the nursing faculty needs to improve its graduates' ability through more effective learning methods that can improve critical thinking and problem-solving skills. One of the available alternatives is applying Project-Based Learning (PjBL) in the Nursing Management Residency course. The purpose of the study is to seek out whether or not PjBL method is able to improve students' critical thinking skills and problem-solving abilities. This study used classroom action research with three cycles. Each cycle was carried out in four stages: implementation, action, observation, and reflection. The research subjects were Master's students at the Master of Nursing Study Program, taking residency courses in the third semester of the 2020/2021 Academic Year. Each student was evaluated for critical thinking skills through questionnaires, and, as for problem-solving skills, observations and assignment reports were used. The data were analyzed using descriptive statistics and presented on averages. The results show that there is an increase in critical thinking skills at an excellent category at cycle III (score 85.08 out of 100), and the results of observations on the ability to solve problems at the identification stage of problem priorities rest at the sufficient category (score 73.14 out of 100), constructing problem-solving program at good category (score 77.63 out of 100) and the ability to implement problem-solving programs at good category (score 81.2 out of 100).

**Keywords:** *Problem Based Learning, Nursing, Critical Thinking, Problem Solving Skill*

## 1. INTRODUCTION

The Nursing Management Residency course is a core course at the Master of Nursing Study Program as determined by the Indonesian Nurses Education Association [1]. The status means that every nursing higher education institution that runs such a study program requires students to take this course before graduating. This form of residency learning is clinical learning which aims to enable Master's students to be able to apply concepts and principles of nursing leadership and management directly in health service installations/units (hospitals) in improving the quality of nursing services through critical thinking skills and the ability to solve health service problems.

So far, the learning method for the residency course has used lectures through active lectures. Several topics have been carried out through group discussions, presentations, and hospitals' practicums. When associated with course achievements, the outcomes of

this residency course are complex. In addition to understanding the concepts, real experience is needed in supervising care management and nursing service management. In the last three years, the results of the evaluation of the tracer study shows that the achievement of residency courses on a macro basis had not been satisfying, although, in quantity, 99% of students passed this course. Feedbacks from graduate employers reveal that our graduates' abilities are considered weak in leadership, strategic management, and problem-solving in the field. In the future, this problem certainly needs to be addressed through better learning strategies.

One of the strategies that can be applied to solve these problems is implementing Project-Based Learning (PjBL). PjBL strategies consist of three main stages, namely: 1) Project learning planning stage; 2) implementation of project learning; 3) Project learning evaluation stage. The three stages support and relate to one another and should be made so as an effort to achieve the project learning objectives optimally[2].

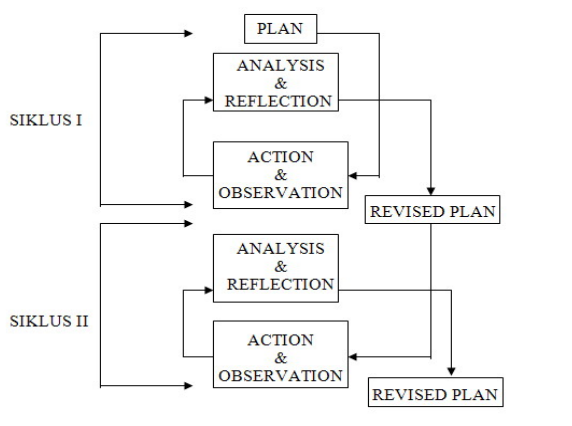
PjBL method is a student-centered learning model. This learning model is challenging and requires students to design, solve problems, make decisions, carry out investigative activities, and provide opportunities for students to be directly involved [3].

Reflecting on various literature and research findings related to the PjBL model, the aims of the Nursing Residency course can be achieved using this model. In addition to increasing understanding of concepts, PjBL also requires real experiences in managing nursing service problems through critical thinking and problem-solving skills.

## 2. METHODS

### 2.1. Study design, setting, and population

This type of research is classroom action research (CAR). CAR was carried out through three cycles. Each cycle consisted of four stages of CAR, namely planning, implementation, observation, and reflection. The subjects (population) of this research were all students of the Master of Nursing Study Program at the Faculty of Nursing, Andalas University, in the 2021 academic year, taking the Residency course. Six students participated as research subjects (sample). This research aims to implement the PjBL strategy to increase critical thinking ability. The implementation of research activities follows scheme 1.



Schematic 1. Kemmis and McTaggart Model

### 2.2. Study Questionnaire

The research instrument used was the critical thinking instrument developed by Gotoh [4], containing thirteen elements of critical thinking. The validity and reliability of the instrument have been tested by research by Arif et al. on nursing students. To observe the problem-solving ability, an observation sheet was used, which had been developed by the teaching team of the courses.

## 3. RESULTS AND DISCUSSION

Before implementing the classroom action, the researcher evaluated the learning quality of the Nursing Management residency course in the odd semester of 2020 using the PDCA approach. This activity aimed at finding out the problems that occurred in the learning achievement process. From the evaluation activities, it was found that the students experienced: 1) the lack of ability to solve problems in the field because conventional learning methods were not able to meet subject competence, which required student activity, and 2) the pedagogical abilities of the lecturer team varied: while the senior members of the team teaching were highly competent and younger ones were not so. Overall, such a competence gap affects the critical ability of students. The evaluation results above showed that the Nursing Management Residency learning remained teacher-centered learning in which it was the lecturers who dominated the learning process. In what follows, we show the results of observing the students' critical abilities in cycles I, II and III of the implementation of actions and students' problem-solving abilities after applying the PjBL model.

### 3.1. Student's Critical Thinking Ability In Project Based learning Method

We also conducted a critical thinking ability item analysis using thirteen assessment indicators. These assessment indicators were included in the implementation of the residency. The details of the results are shown in Table 1.

Table 1: Average Measurement of Students' Critical Thinking Ability Indicators in Project-Based Learning (Pjbl) Learning Method in the Residency course.

Element Indicator	CYCLE 1		CYCLE 2		CYCLE 3	
	X	Category	X	Category	X	Category
Open-minded	76	Sufficient	88	Excellent	98	Excellent
Taking action when the evidence and reasons are sufficient	74	Sufficient	92	Excellent	100	Excellent
Considering the whole situation	71	Sufficient	89	Excellent	93	Excellent
Finding information	75	Sufficient	91	Excellent	98	Excellent

Looking for truth/accuracy as much as possible	71	Sufficient	76	Sufficient	83	Good
Solve problems systematically and thoroughly	73	Sufficient	93	Excellent	96	Excellent
Looking for alternatives	69	Sufficient	91	Excellent	88	Excellent
Looking for reasons/cause	72	Sufficient	84	Good	86	Excellent
Looking for a clear statement of a problem	75	Sufficient	75	Sufficient	84	Good
Remembering the basic	81	Good	88	Excellent	89	Excellent
Using credible sources and mentioning them	81	Good	91	Excellent	96	Excellent
Trying to be relevant to the main idea	76	Sufficient	84	Good	90	Excellent
Sensitive to the feelings, level of knowledge, and level of ability of others,	76	Sufficient	84	Good	94	Excellent
Total Critical Thinking Ability	68.7	Sufficient	80.15	Good	85.0	Excellent

In total, our students' critical thinking skills show an increase in each cycle. In the first cycle, the students' critical thinking skills only reach the good category at covering the components of the basic concept of nursing management services and using credible critical sources. This indicates that critical and creative thinking skills had not yet developed in cycle I. The shortage of students' critical thinking skills in the first cycle is reflected in their learning behavior. The indicators of critical thinking skills include determining the credibility of a source of information, distinguishing between relevant or valid from irrelevant or invalid and between facts and judgments, identifying and evaluating assumptions, biases, and points of view, and evaluating evidence to support the confession[5].

In cycle II, the ability to think critically on the elements of seeking truth and the ability to diagnose problems did not change and remained at the sufficient category. This posed a concern for the lecturers, and improvements to learning in cycle II were needed. The material for establishing a diagnosis, which had used the PDCA concept, was adjusted to how the hospital used the diagnosis using the Kaizen concept, which contains disruptive concepts. Resident students are educated to be future professional nursing management consultant candidates. Future nurses must be challenged to face various changes in the times dubbed the era of disruption. This era is understood as an era marked by disruption, innovation, and the threat of the loss of old ways in various fields, including social, cultural, educational, economic, and health. Such an era is expected to have its own influence, especially for nurses and nursing students. The era of disruption challenges students to be more active in seeking information and knowledge, learning independently, being creative, and thinking critically. Because of the big challenges of life in the future, students should be prepared to unlock their critical thinking abilities through learning methods.

In cycle III, improvements and guidance were carried out involving research related to the latest service management using an accreditation framework. In this way, our students' critical thinking skills increased, reaching the good and excellent categories. The results of this study are similar to the evidence related to the implementation of the PjBL in mathematical problem-solving abilities. In this, students who had mathematical problem-solving skills were taught using the PjBL method, and they performed better than those taught using the expository learning model[6].

### **3.2. Students' Problem Solving Ability In Project Based learning Method**

Observations on problem-solving or making projects were assessed using the project rubric. The project rubric contains three observation components, namely: a) problem identification and priority, consisting of seven observation items, b) problem-solving program, consisting of eight observation items, c) problem-solving program implementation, consisting of ten observation items. Detailed observation results can be seen in Table 2.

Table 2: Average Problem-Solving Ability of Students in Project-Based Learning (PjBL) Method in Residency course

Element Indicators	X	Category
<b>A. Problem identification and priority (n=6)</b>		
1. Development of the conceptual framework for the assessment	74	Sufficient

referring to the theory and model of nursing management		
2. Data collection using relevant methods and sources	78	Good
3. Ability to identify problems logically and systematically using fishbone analysis	75	Sufficient
4. Ability to prioritize problems using the PSBH/PSBN approach	71	Sufficient
5. Ability to write the results of the study systematically and logically	73	Sufficient
6. The ability to write the results of the study in correct Indonesian according to the rules of scientific writing	69	Sufficient
7. Using up-to-date references	72	Sufficient
<b>Average Problem Identification and Priority Ability</b>	<b>73.14</b>	<b>Sufficient</b>
<b>B. Problem-Solving Program (n=6)</b>		
1. Ability to formulate problems	79	Good
2. Ability to set clear and measurable goals and indicators	75	Sufficient
3. The ability to choose alternative programs or interventions that are relevant to the problem and objective to be achieved and feasible to implement	80	Good
4. Ability to choose alternative programs or interventions referring to theories and concepts of management and nursing leadership	82	Good
5. Ability to prioritize the plan that has been prepared	88	Excellent
6. Ability to write planning results in correct Indonesian according to scientific writing rules	79	Good
7. Using up-to-date references	69	Sufficient
8. Provide systematic and logical arguments against the plan that have been prepared	69	Good
<b>Average Problem Solving Ability</b>	<b>77.63</b>	<b>Good</b>
<b>C. Implementation of Problem-Solving Programs (n=6)</b>		
1. Ability to socialize the planned activity	84	Good
2. Ability to manage activities	85	Excellent
3. The ability to work with nurses and other health workers as needed	90	Excellent
4. Activeness in responding to changes that occur	78	Good
5. Ability to manage available resources	76	Sufficient
6. Attitude in directing and receiving feedback from roommates or other health professionals	85	Excellent
7. Attitude in directing and receiving residency supervisor feedback	89	Excellent

8. Ability to show creativity	64	Lacking
9. Ability to demonstrate a responsible attitude	80	Good
10. Discipline in carrying out residency	90	Excellent
<b>Average problem-solving implementation ability</b>	<b>82.1</b>	<b>Good</b>

The results of observations of the six students who participated in the residency projects showed that their average ability at the time of identification and priority of problems in government hospitals and private hospitals in Pekanbaru was at the sufficient category. The element of identification and priority of the problem has seven observation items. The lowest observation score is on the ability to write the study results in correct Indonesian according to the rules of scientific writing (Score 69, out of 100). The low ability to write the problem affects the clarity of the problem formulation. The results of this observation are different from the observations on 20 prospective mathematics teachers, where the results show that prospective mathematics teachers can formulate good problems (formulate) but still have low ability to implement (employ) and the ability to interpret (interpret/evaluate)[7]. This difference results from the different work backgrounds and expertise of the respondents. The master students of our nursing program have worked in the hospital for a long time as clinical practitioners. Such positions require them to master professional skills other than writing skills, especially in scientific writing.

The supervisor can review the students' understanding of concepts and theories about nursing service management to reduce this problem. Reviewing concepts as a form of refreshment on previous learning will help students easily formulate problems in good language. Knowledge of concepts and theories has proven to be very helpful in understanding (defining) problems and in working (solving) problems [8] Picus et al., 1983; [9]. Lee, 2016; [10]. Daulay & Ruhaimah, 2019). Lecturers can do this by: (1) asking students to read carefully and analyze the situation carefully; (2) creating a problem situation and then asking students to understand the problem; (3) asking students to write down a problem or convey the problem to others; (4) asking students to list important data and foreign words to understand the problem; (5) teaching students to cross out unnecessary information; (6) teaching students to reconceptualize problems in the visual or graphic form [11].

#### 4. CONCLUSION

The results of the study have led us to two important conclusions. First, the PjBL model can improve students' critical thinking skills to an excellent

level after cycle III. Secondly, the PjBL model, however, has not been able to improve students' abilities in formulating problems with the correct Indonesian language according to the rules of scientific writing; instead, they perform 'good' in providing the ability to design problem-solving programs and implement problem-solving programs.

## AUTHORS' CONTRIBUTIONS

This article provides information about the PjBL in the Residency course. The learning model is advantageous in emphasizing the aspect of cooperation so that students with low academic ability and high academic abilities can work and learn together in completing lecture assignments and produce good results, presentations, or performances. The PjBL model produces results and motivates students to reflect on their satisfaction with what has been learned in a real project.

## ACKNOWLEDGMENTS

This study is supported by the Institute of Educational Development and Quality Assurance (LP3M) of Andalas University.

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