

DOI: <http://dx.doi.org/10.33846/hn60702>
<http://heanoti.com/index.php/hn>



RESEARCH ARTICLE

URL of this article: <http://heanoti.com/index.php/hn/article/view/hn60702>

Existence of Research Based Learning Model: Method Improving Knowledge Assimilation

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ABSTRACT

Models of learning and creative thinking ability are important factors that must be considered in improving student learning outcomes. The research development aims to develop research-based practice learning models to improve learning achievements in the development of assimilation and application of student knowledge. The study was conducted on undergraduate Nursing students who were carrying out the clinical practice. The method in this study was the Research Development (RD) method and the second stage was the RBL model trial. The development of RBL models in this study began with the preparation of models, expert tests, empirical tests on practical students, and continued empirical tests on students. Then the model was improved and the final product was determined (final model). Students are involved in the implementation of learning and learning reflection. This research involved 500 students. Data was collected using a student rating or self-evaluation scale consisting of 27 items. The analysis technique used Partial Least Square (PLS). Research output is research-based practice learning models. Research-based learning can improve students' skills in solving problems, thinking critically, scientific work skills, the mastery of physics concepts, students' generic abilities, the science process skills in physics, and students' science literacy.

Keywords: research based learning; practice learning; knowledge

INTRODUCTION

Background

Higher education must be able to carry out a comprehensive lecture process between theory and practice to produce graduates who have the skills and expertise needed in the professional environment to be entered. The educational strategy is an important indicator that is capable of changing human thoughts from less understand to be more comprehend the matter that occurred as a whole. The improvement of comprehension capacity was in the cognitive, affective, and psychomotor domains. Students are intellectuals positioned as 5% of the nation's population in Indonesia which is obliged to improve self quality particularly to improve the quality of nation in general with the knowledge learned during the education on campus in accordance with certain scientific fields ⁽¹⁾.

Research-Based Learning (RBL) is a learning model that leads to the activities of analysis, synthesis, and evaluation as well as improving the ability of students and lecturers in terms of assimilation and application of knowledge. Lockwood, Research-based learning is a system of instruction that used an authentic – learning, problem-solving, cooperative learning, hands-on, and inquiry discovery approach, guided by a constructivist philosophy. Its usefulness had been recognized for many decades but “research in the classroom” had not been adopted as a teaching method by many ⁽²⁾. Research-Based Learning – RBL can strengthen students to be active in learning. This is in line with disclosed According to (Arifin, 2010), in Research-Based Learning - RBL there can make students able; 1) have a strong understanding of basic concepts and methodology, 2) can solve problems creatively, logically, and systematically, 3) have a scientific attitude that is always looking for the truth, is open, and honest. Students are expected to have competent communication, technical and analytical skills to adapt, work in groups and be competitive. Model Research-Based Learning – RBL can be used as a learning reform in higher education to improve the quality of learning and graduates who are ready to face the challenges of the 21st century; work ethic, collaboration, good communication, social responsibility, critical thinking, and problem-solving ⁽³⁾.

RBL allows students the opportunity to practice metacognitive abilities and encourage critical thinking, make predictions, propose causative factors, and present constructive arguments ⁽⁴⁾.

These methods of learning are student-focused, which allow for active learning and better understanding and retention of knowledge. These facilitate students to develop life skills that enhance content knowledge, foster the development of communication, problem-solving, critical thinking, collaboration, and self-directed learning skills. Through these approaches, students are positioned to optimally act resolving real-world experiences. These approaches represent a paradigm shift from traditional teaching and learning philosophy, which is primarily lecture-based. The constructs for teaching through these methods are very different from traditional classroom or lecture teaching and often require more preparation time and resources to support small group learning. Under these methods, the teacher presents students a problem, not lectures or assignments, or exercises. Since students are not handed “content”, the learning becomes active in the sense that students discover and work with content that you determine to be necessary to solve the problem. In the process, the teacher acts as a facilitator and mentor, rather than a source of “solutions.” ⁽⁵⁾.

Purpose

From the explanation above, researchers are interested in finding the existence of appropriate research-based practice learning models to improve learning achievements in the development of assimilation and application of student knowledge.

METHODS

The study conducted on undergraduate Nursing students who were carrying out clinical practice, in hospitals in Sidoarjo and Surabaya, in July 2019 - January 2020. The method in this study was the Research Development (RD) method and the second stage was the RBL model trial. The development of RBL models in this study began with the preparation of models, expert tests, empirical tests on practical students, and continued empirical tests on students. Then the model was improved and the final product was determined (final model). Students were involved in the implementation of learning and in learning reflection.

This research involved 500 students. Data was collected using a student rating or self-evaluation scale consisting of 27 items. It had been tested as valid (0.192 - 0.600) and reliable (0.825). The analysis technique used Partial Least Square (PLS). The research had passed the ethical feasibility No. 021/LPPM.BS/IX/2019 from LPPM Stikes Bina Sehat PPNI.

RESULTS

Table 1. Outer weight- indicator of research variables

| Variable | Outer weight |
|-------------------------------|--------------|
| The use of teaching materials | 0.786 |
| Research findings | 0.894 |
| Latest issue | 0.798 |
| Teaching method | 0.981 |
| Learning process | 0.970 |
| Evaluation | 0.817 |
| Assimilation and knowledge | 0.989 |

Table 1 showed that the outer weight test results of all indicators had a factor loading > 0.5 and a composite reliability > 0.6 . Therefore, these indicators were declared valid and reliable to measure the latent variables used in this study.

Tabel 2. Inner weight test for influence between variables

| Influence | Original | Bootstrap: 5000 | T-statistic | Explanation |
|---|----------|-----------------|-------------|-------------|
| Teaching materials → Findings | 0.714 | 0.717 | 10.155 | Valid |
| Findings → Current issue | 0.671 | 0.668 | 7.348 | Valid |
| Current issue → Learning methods | 0.584 | 0.587 | 6.374 | Valid |
| Learning methods → Learning process | 0.704 | 0.704 | 10.044 | Valid |
| Learning process → Evaluation | 0.691 | 0.697 | 10.890 | Valid |
| Evaluation → Assimilation and knowledge | 0.708 | 0.713 | 10.923 | Valid |

After testing the validity and reliability of all latent variables that the results were valid and reliable, and the test bootstrap gives significant results, then proceed in the analysis of the model with the diagram presented as follows:

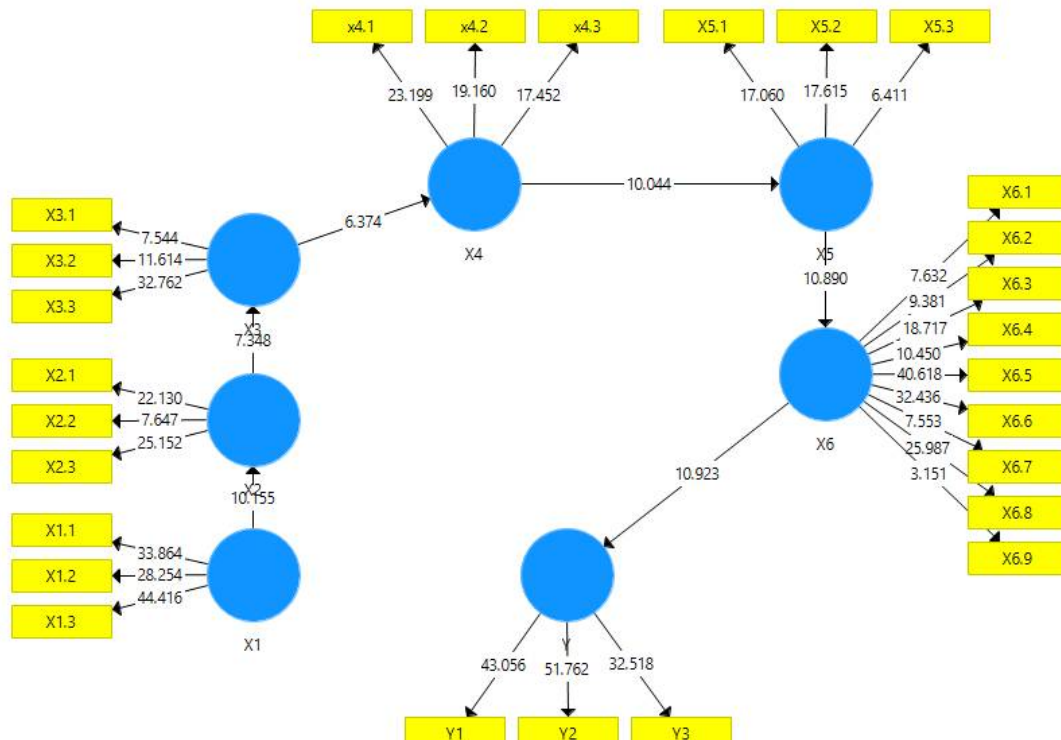


Figure 1. Analysis of exogenous relationship to endogenous models

Tabel 3. Goodness of fit from R-square

| Influence | R-square |
|---|----------|
| Teaching materials→ Findings | 0.868 |
| Findings→ Current Issue | 0.531 |
| Current issue→ Learning methods | 0.302 |
| Learning methods→ Learning process | 0.544 |
| Learning process→ Evaluation | 0.542 |
| Evaluation → Assimilation and knowledge | 0.232 |

The results of all the R-square values indicated that all R-square values were greater than zero. It meant that this research model met the required Goodness of Fit.

DISCUSSION

Research-based learning model (RBL) Lizelwati (2014) and Gravin (Endriani, 2014) is a process of learning and building their knowledge by allowing students to train their abilities through a series of activities observation, and analysis, while Srikoon, et al., (2014) revealed that in the process of learning combines four aspects of understanding that is to formulate problems, analyze, outcome and communicate it. Steps in research-based learning according to ⁽²⁾, Chrystis (2015) are 1) stage of exposure, 2) experience stage, 3) stage of information convey (capstone). The advantages and benefits of a research-based learning model according to Hoskins and Mitchell (2005), Chamdani, et al., (2015) that can increase learning motivation to be more active, have learning independence, high curiosity, critical, creative to improve learning outcomes ^(3,4).

Research-based learning is a student-centered learning model that integrates research into the learning process. The learning process is the implementation of the combination of research and meaningful learning. Research-based learning is multifaceted, referring to various learning methods, so that all students' learning outcomes come from simple research that they do, for example through experiments and field studies ⁽⁵⁾. Research-based learning provides opportunities for students to formulate problems, review theories, construct hypotheses, collect data, analyze data, and conclude the results obtained. Poonpan (2005) states that "Research-based learning

is an effective way to change students' learning and to practice about how to learn by doing. Research-based learning is a system of instruction which uses an authentic learning, problem-solving, cooperative learning, hands-on, and inquiry discovery approach, guided by a constructivist philosophy". Prahmana (2007) defines research-based learning as a model of learning which is authentic, problem-solving, cooperative, contextual (hands-on and minds-on), and inquiry discovery approach based on a constructivist philosophy, so that students can improve their learning independence, critical thinking skills, creativity and communication skills. Research is an activity to discover, develop and test the truth of knowledge and summarize the findings obtained⁽⁶⁾.

The competencies acquired by students after research-based learning are: (a) to have an understanding of the concepts of physics and research methods; (b) to be able to solve problems creatively, logically, and systematically; and (c) to have a scientific attitude that always seeks truth, and be open and honest⁽⁷⁾. The results of relevant research that has been done show that the application of research-based learning that is life skill-oriented can increase the activity and the mastery of the essential concepts of university students in thermodynamics. The use of research-based student worksheets in physics learning is effective in improving the competence of students. Research-based learning with a scientific approach to effectively improve the science process skills of students⁽⁸⁾.

Critical thinking is one of the more complex forms of thinking activity which involves activities in analyzing more specific ideas, differentiating, choosing, identifying, assessing, and developing them in a more perfect direction. Critical thinking is a process and an ability to make rational decisions. Ennis (1996) proposes that the test to measure critical thinking skills is developed from five indicators, namely: (1) analysis, measuring the ability to understand the meaning of varied data, experience, and assessment; (2) Evaluation, measuring the ability to judge information and state the results of one's reasoning; (3) Inference, measuring the ability to identify the information needed to conclude; (4) Deductive reasoning, measuring one's ability which is started from a general idea or a premise to a specific conclusion; (5) Inductive reasoning, measuring one's ability which is started from a premise or an application related to knowledge or an experience to a general conclusion^(9,10).

There are several strategies in integrating learning and research empirically, (Widyawati, Tri Diah, et al. 2007, namely: 1) enriching teaching materials with the results of educators' research, 2) using the latest research findings and tracking history, 3) enriching learning activities with contemporary research issues, 4) teaching material research methods in the learning process, 5) enriching the learning process with research activities on a small scale, 6) enriching the learning process by involving students in activities, 7) enriching the learning process by encouraging students to feel, 8) enrich the learning process with values that must be possessed by researchers⁽⁴⁾.

Research-based learning can improve students' skills in solving problems, thinking critically, and finding knowledge. Research-based learning is effective in improving the mastery of physics concepts and students' generic abilities. Research-based learning can improve the science process skills in physics. Research-based physics learning with a scientific approach is effective in improving students' science literacy.

Research-based learning can increase students' curiosity about the subject matter⁽¹¹⁾. The inquiry methods used in research-based learning can improve cognitive skills, critical thinking skills, scientific work skills, and scientific attitudes of the students⁽¹²⁾. According to Trisnasih (2013) in his research that the application of research-based learning could increase the activity, skill, and knowledge of students in science lessons. Irianti (2007) in her research concluded that the SETS approach was effective for teaching students in physics learning on camera and periscope material. SETS-based science learning can improve the learning outcomes, the process skills, and the activeness of every meeting⁽¹³⁾. A Research-based learning model with a SETS approach was implemented in the laboratory. The importance of laboratory activities to understand the concepts of physics for students is proposed by Ivins and Raghbir. According to Ivins⁽¹⁴⁾, laboratory activities are more effective in helping students learn physics than learning from discussions. Raghbir⁽¹⁵⁾ found out that students showed high level of cognitive ability when they actually acquired knowledge through laboratory activities rather than using the laboratory to verify the theories that had been studied. The inquiry practicum activities are more challenging for students in finding the concept of physics than the verification activities.⁽¹⁶⁾ in their researches found out that the inquiry practicum activities could improve students' skills in conducting practicum. Deters (2005) and Weaver (2008) in their researches found out that the inquiry practicum activities could improve students' skills in thinking logically, solving problems, and give an impressive experience of laboratory activity. Guided Inquiry-based practicum learning can improve the critical thinking skills of students⁽¹⁷⁾.

CONCLUSION

RBL becomes the foundation in increasing students' assimilation and knowledge. Research-based learning can improve students' skills in solving problems, thinking critically, scientific work skills, the mastery of physics concepts, students' generic abilities, the science process skills in physics, and students' science literacy.

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