



RESEARCH ARTICLE

RESEARCH-BASED LEARNING GUIDLINE DESIGN

*¹Rustam I. Husain, ²Zulaecha Ngiu and ³Julhim S. Tangio

¹Faculty of Education, Gorontalo State University, Indonesian

²Faculty of Social Science, Gorontalo State University, Indonesian

³Faculty of Mathematics and Natural Sciences, Gorontalo State University, Indonesian

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ABSTRACT

This study is a development research-based learning guideline aimed to increase students' learning ability and is the continuation of the previous study. research-based learning (RBL) is one of the methods within the Student-Centered Learning (SCL) which integrates research into a learning process. Research as a structured, systematics, scientific, and multifaceted steps in discovering the answer to certain questions.

INTRODUCTION

Research-based learning (Widayati *et al.* in Prahmana, 2015) is a learning method which utilized the authentic learning, problem-solving, *cooperative learning*, *contextual (hands on & minds on)*, and *inquiry discovery approach* under the guidance of the constructivism philosophy. Within its implementation, research based learning can be carried out through various methods, which are student-centered learning, where students are required students' active participation in discovering, interpreting, and reorganizing the knowledge independently.

Regulation of the Minister of Education and Culture of the Republic of Indonesia (henceforth will be called as Permendikbud RI) No. 49 of 2014 mentions that scientific writing in forms of final paper, thesis, and dissertation, is one of the prerequisites that students need to meet either in bachelor, graduate, or postgraduate levels in order to obtain the degree. The graduate degree requires the scientific writing to be published in national journal, whereas for postgraduate degree (master degree) the students are required to published a scientific writing in nationally accredited journal, and for doctoral degree, the scientific writing should be published in internationally reputed journal. Specifically for the purpose of obtaining full professorship position, a lecturer is required to publish their academic writing in international journals indexed by Scopus. For graduate students, the academic paper writing/final paper writing take about two to six semesters (Bangun, *et al.* 2011). In addition to that, the Law of the Republic of Indonesia (henceforth will be called as Undang Undang or UU RI) No. 14 of 2005 stipulates that teacher as

professional workers serves to increase teacher's dignity and role as agent of learning to increase the quality of the national education. Teacher as a professional means that teacher's jobs can only be carried out by a person who has certain competencies, pedagogic competencies (ability to manage learners' learning), individual competency (ability as a strong individual, with good manners and attitude, wise, and can become a good role model for learners), social competencies (teacher's ability to communicate and interact effectively and efficiently with fellow teachers, parents, learners, and the surrounding community), and professional competencies (ability to comprehensively master the learning). Professional competencies are teacher's ability in content knowledge which at least comprises of mastery of two things: (a) comprehensive master of the topic based on the standard content of the educational unit, topic, or topic groups that will be taught, and (b) relevant concepts and methods of the science, technology, and arts, which conceptually underpin the program of educational unit, topic, subject that will be taught. In brief, professional competency is strongly tied to the mastery of subject materials as the preparation for students, teachers candidate. Problem-solving learning or learning to solve problem is explained by Cooney, *et al.* (in Shadiq, 2004:16) as: "...the action by which a teacher encourages students to accept a challenging question and guides them in their resolution." This shows that problem-solving learning is an action which carried out by a lecturer in order to motivate the students to accept challenges thrown at them (questions) which direct the students in their quest for discovery. The fact, however, is that there are many students who are lacking in the mastery of this topic. Many students find it difficult to solve the problem (question) especially in proving the hypothesis.

*Corresponding author: Rustam I. Husain

Faculty of Education, Gorontalo State University, Indonesian

Most students are yet able to conduct proper investigation. They are yet able to make a correlation between theory, definition, and postulate, hence, proving the hypothesis tend to be less systematic and unable to prove or solve a problem. As the result, students often find it frustrating when their findings are unable to prove the hypothesis. Therefore, research-based learning is needed to be taught to students through problem-based learning (problem solving). The learning is initiated by presenting problems, from simple proving to complex proving process, thus, students clearly know the correlation between concepts and able to appropriately prove them. Based on the description above, what needs to be done next is designing research-based learning to ease students in implementing the research-based learning.

Theoretical Review

Research-based learning (RBL) is one of the methods within student-centered learning (SCL) which integrates research into learning process. RBL is a multifaceted process which refers to various learning methods. RBL provides opportunity for students to collect information, develop hypothesis, collect data, analyze data, and draw conclusion based on the available data. Within these activities, learning by doing approach is applied. RBL is a learning method which utilizes the authentic learning, *problem-solving*, *cooperative learning*, *contextual (hands on & minds on)*, and *inquiry discovery approach* guided by the constructivism philosophy (Widayati *et al*, 2010:4). Constructivism philosophy consists of four aspects namely: learning that develops students' knowledge, learning that develops students' prior knowledge, learning as social interaction process, and learning which aims to achieve the hands on experience. There are several strategies to empirically integrate learning and research. Those are; (1) enriching the teaching material with teacher's research result, (2) using the latest findings and tracking history, (3) enriching learning activities with contemporary issues, (4) teaching research method topic within the learning process, (5) enriching learning process with small-scale research activities, (6) enriching the learning process by involving the learners' within the activity, (7) enriching the learning process by encouraging the learners to feel, and (8) enriching the learning process with values that should be adhered by a researcher (Masri Kudrat Umar, *et al*. 2011). The following are the nature of the research-based learning (Widayati *et al*, 2010: 8): 1). Encourage lecturer to conduct research or update knowledge by reading and utilizing other's research results as educational material. 2). Encourage active participation of students in learning process to the extent of as active partners for lecturer. 3). Learners' become more scientifically competent and research competent as well as becoming apt in identifying problems and solve them appropriately 4). Learners can be independent, critical, and creative, hence, open opportunity for the emergence of new ideas and innovations. 5). Learners are trained to master ethics, especially professional ethics such as avoiding plagiarism.

RESEARCH METHODS

This study is a desk study on previous study result. Data collection method in this study is carried out through tracking the journals that are either electronically available or locally available within the library. The result of this data collection is then sort out based on the set criteria, pre-intervention and post intervention data are available. From each model, the result

from 2 studies are selected to be further analyzed. The analysis uses comparative method to determine the impact of research-based learning model implementation, the score gap before and after the intervention, and then divided by the score before the intervention (in percentage) to determine the extent of research-based learning influence on learning outcome.

FINDINGS AND DISCUSSION

Several models of RBL can be developed to suit the characteristics of the study and the available facilities within an educational unit. This RBL strategy should be carefully taken into consideration for its effective implementation and the achievement of the RBL objectives. The strategy to incorporate learning and research is empirically developed in Griffith University: enriching topic material is using findings from lecturers' previous research. Lecturers can present their findings in class as a first-hand example in a lecture, which expected to help students understand ideas, concept, and research theory. Utilizing the latest findings and tracing the roots for the discovery of those latest findings. The dynamic of knowledge and science development is presented within a lecture as a historical development of that science and enriching the learning activity with contemporary research issues. In this learning process, it can be initiated by asking students to propose current research issues that are relevant to the present topic being discussed. Research methods can also be taught within the learning process and enriching the learning process through a small-scale research activity. In this learning process, learners' groups are asked to conduct research together.

Enriching the learning process by involving the learners in institutional level of research activities. In this RBL, it is noted that a) learners are given research task as part of a larger research activities conducted at institutional level b) organize learners as research assistants for more senior students or lecturer's research. c) carry out visits to research centers. Enrich the learning process by encouraging learners to become part of the research culture in their faculty/department. In this strategy, in this strategy, learners are expected to be part of the research within their own faculties, department. In order to achieve all those above, several activities as follow can be followed up: a) provide information to learners on research activity and the advantage of the research in that particular department or faculty, b) conduct the general lecturer or expert lecture session from other institution to present their research result as direct reference for learners, c. encourage learners to actively participate in research seminar activity, either as participant, presenter, or as steering committee of the seminar. Enrich the learning process with values that should be upheld by a researcher.

Those values consist of values that should be understood by the learners, such as: objectiveness, appreciation for research findings, respect toward other's view, tolerance toward uncertainty, and ability to analyze. Those values can be delivered through: a) reflecting a researcher's values within class interaction, b) present a researcher's journey before the result is published including several revisions made on the study. c) present a well-structured presentation which inspire learners on several values, such as: presenting a research article which contains different argumentations on a similar topic then asking the learners on its validity and presenting the conclusion. Development of RBL model is carried out through:

model development, expert trial, empirical test, model improvement and determining the final product. The RBL can be carried out with the following main facets: (1) implementation of research results through development of lesson plan, and (2) implementation of research results in learning process. Implementation of research results in development of a lesson plan encompasses: (a) syllabus development, (b) lesson plan development, (c) methods, strategies, and learning approaches' selection, (d) development of topic materials, (e) development of students' working (f) learning media selection, and (g) assessment of the learning outcome. These documents should be internalized by appropriate research results. Implementation of research results in learning process is implemented through the following stages; (1) Introduction; (facts + knowledge) provide facts from research that may give raise to various perceptions and interpretations which need to be answered through learning activity (2) core activity, (observation+ knowledge + skill) conduct activities that involve senses, correlating with the previous knowledge and modeling those activities, and (3) closing (knowledge and attitude) conclude discussion related to topic, needed skill, and attitude.

Conclusion

Based on the discussion above, it can be concluded that research-based learning taken into consideration the following things:

- Enrich teaching material with lecturer's research results
 - Uses latest research results and trace down history
 - Enrich learning activity with contemporary research issues
 - Teach research method materials in learning process
 - Enrich the learning process with small-scale research activities
 - Enrich the learning process by encouraging learners to feel as part of the research culture in the faculty/department
- Enrich the learning process by involving the learners' in institutional research activities.
 - Enrich the learning process with values that should be maintained and upheld by the researchers

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