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STUDI LITERATURE MODEL PROBLEM BASED LEARNING

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Abstract

One method that can help students in the learning process is problem based learning. Problem based learning is one of the constructivist learning flow models that requires students to observe the reality contained in everyday life. The purpose of writing this paper is to dig deeper based on a literature study on the definition of problem based learning, characteristics of problem based learning, theoretical basis of problem based learning, steps of problem based learning, evaluation of problem based learning, advantages and disadvantages of problem based learning. From various written sources, it can be concluded that learning Problem Based Learning is obtained some basic values that must be developed by the teacher in enlivening the learning atmosphere, here the teacher does not only act as the main subject in learning but on the other hand the teacher must involve students so that students' critical thinking skills can develop.

Keywords: Model, Learning, Problem Based Learning

INTRODUCTION

A science teacher who does not master the subject matter to be taught may not be able to teach well, so also if the teacher cannot choose the right method for the material being taught, teaching will not give optimal results. Ivor K. Davis, as quoted (Andrian & Rusman, 2019), suggests that one tendency that is often forgotten is to forget that the essence of learning is student learning and not teacher teaching. Teachers are required to choose a learning model that can stimulate the enthusiasm of each student to be actively involved in their learning experience. One of the learning models that allows the development of students' thinking skills (reasoning, communication and connection) in solving problems is Problem Based Learning or Problem Based Learning (PBM).

The term PBL is thought to have been known during the time of John Dewey. This learning is based on Dewey's study which emphasizes the importance of learning through experience. According to Dewey, problem-based learning is the interaction between stimulus and response which is the relationship between two directions, learning and the environment. The environment presents the problem, while the brain's nervous system functions to interpret the problem, investigate, analyze, and find a good solution

Learning that is only oriented to mastery of the material has proven to be successful in short-term memory competitions, but fails to equip children to solve problems in long-term life (Sofan Amri & Iif Khoiru Ahmadi, 2010). In modern educational practice, stuffing students' minds with various concepts and theories without any experience in the field has proven to be less effective. Take, for example, the medical field. In the past, students were preoccupied with memorizing various theories and concepts of disease management, but when faced with problems in the real world, sometimes theories that have been mastered well may not necessarily be fully implemented or sometimes how to overcome them is not appropriate, because the facts in the field are very varied. An educator only acts as a motivator and

facilitator, but at the end of the activity the educator also evaluates and provides conclusions from the learning activities.

Hamalik (2003) explains that the learning model is a plan or pattern used to shape the curriculum, design teaching materials and guide teaching in the classroom. From the opinion above, it can be concluded that the learning model is a conceptual framework in the form of a lesson plan that describes a systematic procedure used as a guide in classroom learning. One of the learning models that can be applied in schools is the Problem Based Learning model.

RESEARCH METHODS

This research is a type of library research, because this research only uses library sources to obtain data (Zed, 2004). The technique of collecting data is by collecting as much information as possible from various literature sources on PBL. The sources of literature used in this study were obtained from books, journals, research results (theses and dissertations), and other sources such as government policies and curriculum. In literature study, a researcher must follow applicable rules such as systematically identifying theories, finding literature, and analyzing documents that contain information related to the research topic. Thus, after the library materials were collected, the researchers compiled the materials systematically, and classified them as relevant and irrelevant data. At the end of the stage, the researchers conducted an analysis of the theories obtained.

RESULTS AND DISCUSSION

A. Definition Of Problem Based Learning

Problem Based Learning (PBL) was developed for the first time by Prof. Howard Barrows circa 1970s studying medical science at McMaster University Canada. This learning model presents a real problem for students as the beginning of learning then solved through investigation and applied using a problem solving approach. Barrows defines PBL as a learning strategy whose results and teaching and learning processes are directed to knowledge and solving a problem. PBL is a learning strategy that teaches students to solve problems and reflect on their experiences.

Fogarty (1997) states that PBL is a learning approach by making confrontations with students with practical problems, in the form of ill-structured, or open-ended through stimuli in learning. Problem-based learning (Problem Based Learning), here in after abbreviated as PBL, is one of the innovative learning models that can provide active learning conditions for students. PBL is a learning model that involves students to solve a problem through the stages of the scientific method so that students can learn knowledge related to the problem and at the same time have the skills to solve problems (Ward, 2002; Stepien, dkk.,1993 dalam www.lubisgrafura.wordpress.com).

Dutch in M. Taufik Amar (1994) states that PBL is an instructional method that challenges students to learn and to learn, working with groups to find solutions to real problems. This problem is used to relate the curiosity and analytical ability of students and initiatives on learning materials. PBL prepares students to think critically and analytically, and to find and use appropriate learning resources.

In general, PBL is a learning approach that uses real-world problems as a context for students to learn about critical thinking and problem-solving skills, as well as to acquire essential knowledge and concepts from course material or subject matter. Briefly and simply, Rhem (1998) defines PBL as a learning that begins when a problem is presented to students.

So, PBL is a learning method that uses problems as the first step in gathering and integrating new knowledge. These problems then determine the direction of learning carried out in groups.

Problem based learning (PBL) learning model is a learning that focuses on problem solving activities (Dasa Ismaimuza, n.d. 2010). With the intention that students are actively able to find answers to the problems given by the teacher. In this case, educators act more as mediators and facilitators to assist students in actively constructing knowledge. (Siregar, 2016). According to Shoimin (2014), the Problem Based Learning (PBL) learning model is a learning model that can train and develop the ability to solve problems oriented to authentic problems from students' actual lives. This statement was further explained by Shoimin, who stated that PBL can increase scientific activity in students through group work. In the implementation of PBL, students' curiosity will rise so that they are interested in investigating (Sugiyanto, 2009).

According to Arends (2008), PBL is learning that presents students with various authentic and meaningful problem situations, which can serve as a springboard for investigation and investigation. Meanwhile, Sanjaya (2009) also argues that PBL can be interpreted as a series of learning activities that emphasize the process of solving problems faced scientifically.

Based on Savery's (2006) definition, PBL is student-centered learning by empowering students to conduct research, integrate theory and practice, and apply knowledge and skills to develop viable solutions to defined problems. PBL prepares students to think critically, analytically, and learn to use various sources (Dwijanto, 2007). In a PBL environment, according to Blumenfeld (English & Kitsantas, 2013), students learn by building knowledge and making meaning through a process of repeated questioning, active learning, sharing and reflection.

From several descriptions regarding the understanding of PBL, it can be concluded that Problem Based Learning is a learning model that exposes students to real world problems to start learning and is one of the innovative learning models that can provide active learning conditions for students. In PBL learning prioritizes the learning process, where the task of the teacher must focus on helping students achieve self-direction skills. The teacher in this model acts as a problem presenter, a questioner, holding a dialogue, helping to find problems, and providing learning facilities. In addition, teachers provide support that can increase students' intellectual and inquiry growth. This model can only happen if the teacher can create an open classroom environment and guide the exchange of ideas.

B. Characteristics Of PBL

The most important characteristic of the PBL learning model is the emergence of problems at the beginning of learning. According to Arends, various problem-based teaching developments have given the teaching model the following characteristics:

1. Authentic, namely the problem must be rooted in the real world life of students rather than rooted in the principles of a particular discipline.
2. Clear, namely the problem is clearly formulated, in the sense that it does not cause new problems for students which in the end makes it difficult for students to solve.
3. Easy to understand, namely the problem given should be easy for students to understand and adapted to the level of student development.
4. Broad and appropriate learning objectives.
   Broad means that the problem must cover all subject matter to be taught in accordance with the time, space, and available resources
5. Useful, namely the problem is useful for students as problem solvers and teachers as problem makers.

6. Focusing on inter-discipline linkages. The problem posed should involve various disciplines.

According to Amir (2009), the characteristics or characteristics of PBL include:
1. learning begins with giving problems;
2. students in groups actively formulate problems;
3. study and search for material related to the problem and report the solution.

In the PBL strategy there are three main characteristics:
1. First, the PBL strategy is a series of learning activities, meaning that in this learning it does not expect students to just listen, take notes and then memorize the subject matter, but through the PBL strategy students actively think, communicate, search and process data and finally conclude it.
2. Second, learning activities are directed at solving problems. The PBL strategy places problems as the keywords of the learning process. That is, without problems there can be no learning process.
3. Third, problem solving is done by using a scientific thinking approach. Thinking using the scientific method is a deductive and inductive thinking process. This thinking process is carried out systematically and empirically, systematic means that scientific thinking is carried out through certain stages, while empirical means that the problem solving process is based on clear data and facts.

Another feature of the PBL model is that the teacher acts more as a facilitator, mentor and motivator. The teacher poses authentic problems / orients students to real problems (real world), facilitates / guides in the investigation process, facilitates dialogue between students, provides student teaching materials and provides support in efforts to improve students' findings and intellectual development.

I Wayan Dasna and Sutrisno, Department of Chemistry, Faculty of Mathematics and Natural Sciences, State University of Malang, argue that PBL has the following characteristics:
1. Learning begins with a problem
2. Ensure that the problems given are related to the real world of students/students
3. Organizing lessons around problems, not around disciplines
4. Give great responsibility to students in shaping and directly carrying out their own learning process
5. Using small groups, and
6. Require students to demonstrate what they have learned in the form of a product or performance

The characteristics of the PBL process according to Tan include:
1. Problems are used as the beginning of learning.
2. Usually, the problem used is a real-world problem that is presented in a floating manner.
3. Problems usually require multiple perspectives. The solution requires students to use and get concepts from several sciences that have been previously taught or cross science to other fields.
4. Problems challenge students to get learning in new learning areas.

5. Highly prioritize self-directed learning
6. Utilize a variety of knowledge sources, not from one source only.
7. The learning is collaborative, communicative, and cooperative. Students work in groups, interact, teach each other (peer teaching), and make presentations.

Based on the theory developed by Barrow, Min Liu (published in 2005) describes the characteristics of PBL, namely:

1. Learning is student-centered. The learning process in PBL focuses more on students as learning people. Therefore, PBL is also supported by constructivism theory where students are encouraged to be able to develop their own knowledge.
2. Authentic problems from the organizing focus for learning. The problem presented to students is an authentic problem so that students are able to easily understand the problem and can apply it in their professional life later.
3. New information is acquired through self-directed learning. In the problem solving process, students may not know and understand all the prerequisite knowledge, so students try to find their own through the source, either from books or other information.
4. Learning occurs in small groups. In order for scientific interaction and exchange of ideas to occur in an effort to build knowledge collaboratively, PBL is carried out in small groups. The group created demands a clear division of tasks and clear goal setting.
5. Teachers act as facilitators. In the implementation of PBL, the lecturer only acts as a facilitator. However, lecturers must always monitor the progress of student activities and encourage students to achieve the targets to be achieved.

In addition, the characteristics of PBL can be detailed as follows:

1. Problems become a starting point in learning.
2. The problems raised are problems that exist in the real world that are not structured.
3. Problems require multiple perspectives.
4. Problems challenge students' knowledge, attitudes, and competencies which then require identification of learning needs and new areas of learning.
5. Learning self-direction becomes the main thing.
6. Utilization of diverse knowledge sources, their use, and evaluation of information sources is an essential process in PBL.
7. Learning is collaborative, communication, and cooperative.
8. The development of inquiry (finding) and problem solving skills is as important as mastering the content of knowledge to find a solution to a problem.
9. Process openness in PBL includes the synthesis and integration of a learning process.
10. PBL involves evaluating and reviewing student experiences and learning processes.

The PBL structure is usually described in a formulation such as the following:

1. Problem Finding - Problem Analysis - Discovery and Reporting - Integration and Evaluation.
2. Finding Problems - Inquiry Problems - Raising Learning Issues - Finding Peer Teaching - Presenting Solutions - Review.

3. Finding Problems – Analysis - Research and Fieldwork - Reporting and Peer Teaching - Presenting Findings - Reflection and Evaluation.

C. Theory of PBL

PBL is one of the constructivist learning flow models that requires students to observe the reality contained in everyday life (Nurhadi, 2004). Constructivist learning provides opportunities for students to discover the concept of knowledge. The constructivist process carried out together provides opportunities for students to compare ideas from group members, express their knowledge, and learn from group members (Good and Brophy, 1999). The teacher's role in constructivist learning is as a guide and facilitator for students in encouraging students to express learning that requires students to find knowledge concepts independently. In PBL learning, students construct knowledge based on the information and data collected by them in an exploratory learning environment. The PBL model is collaborative learning, in which students build knowledge through mutual communication and shared use of tools and shared representations (Linden et al., 2000).

PBL was developed based on the theory of modern cognitive psychology, that learning is a deep process in which learners actively construct their knowledge through interaction with the learning environment. According to the constructivist view, when individuals are faced with new information, they will use the knowledge and personal experiences they already have to help understand the new material.

The foundation of PBL theory is collaborativism. In collaborativism, students will construct knowledge by building reasoning from all the knowledge they already have and from all that is obtained as a result of interacting with fellow individuals. It also implies that the learning process moves from the transfer of information to student facilitators to a process of social and individual knowledge construction.

Savery (2006) emphasizes the importance of collaboration because he sees that in the world of work later collaboration is needed in working with teams, and therefore in PBL information is shared with each group member to be done collaboratively. In addition, PBL also adheres to constructivism, namely humans can only understand everything from what they construct themselves.

D. Steps Problem Based Learning

PBL-based learning steps

ACTIVITY	STEPS	ADVISOR
Group Discussion I	Identify the problem Problem analysis Hypothesis/logical explanation/systematic Knowledge identification Identification of known knowledge	Facilitator
Independent/Individual Study	Determination of learning resources Identify new knowledge Synthesis of old and new	Source person

ACTIVITY	STEPS	ADVISOR
	knowledge to be applied to problems	
Group Discussion II	Repetition of activities Summarizing what was not learned Summary of results/reporting to the next issue	Facilitator

From other sources, obtained PBL steps are as follows:

NO	INDICATOR	TEACHER ACTIVITIES
1	Student orientation on the problem	Explain the learning objectives, explain the logistics needed, and motivate students to be involved in problem solving activities
2	Organizing students to learn	Help students define and organize learning tasks related to the problem
3	Guiding individual or group experiences	Encourage students to collect appropriate information, carry out experiments to get explanations and solve problems
4	Develop and present the work	Helping students in planning and preparing appropriate works such as reports and helping them with various tasks with their friends
5	Analyze and evaluate processes	Helping students to reflect or evaluate their investigations and the processes they use

The five essential applications of PBL are as listed in Gallagher et.al (2000) are:

1. Student orientation on problems
   At the start of learning, the teacher conveys the learning objectives clearly, fostering a positive attitude towards the lesson. The teacher conveys that it is necessary to elaborate on the following matters:
   a. The main purpose of learning is not to learn a number of new information, but rather how to investigate important problems and how to become independent learners,
   b. The problem under investigation does not have an absolutely correct answer. A complex solution has many sometimes conflicting solutions.
   c. During the inquiry stage of learning, students are encouraged to ask questions and seek information with the guidance of the teacher, and
   d. At the stage of analysis and problem solving, students are encouraged to express their ideas openly.
2. Organizing students to learn
   PBL requires collaboration skills among students to investigate problems together. Therefore they also need help to plan their investigations and study assignments. Organizing students into cooperative learning groups also applies to organizing students into PBL groups. The point here is that the teacher helps students define and organize learning tasks related to the problem to be solved.

3. Help student research
   At this stage the teacher encourages students to collect data or carry out experiments until they really understand the dimensions of the problem. The goal is for students to gather enough information to construct their own ideas. Students will need to be taught how to be active investigators and how to use appropriate methods for the problem being studied. After students collect enough data they will begin to offer explanations in the form of hypotheses, explanations and solutions. During this stage the teacher encourages all ideas and fully accepts them.
4. Develop and present the work
   At this stage the teacher helps students in planning and preparing the work to be presented. Each group presents the results of problem solving obtained in a discussion. The presentation of this work can be in the form of reports, posters or other media.
5. Analyze and evaluate the problem solving process
   This final stage includes activities intended to help students analyze and evaluate their own thought processes and in addition to evaluating the investigative and intellectual skills they have used.

E. PBL Evaluation

According to Savery (2003), evaluation or assessment of PBL results is carried out according to its type, namely:

1. Results-oriented assessment (outcome)
   Can be carried out with academic papers and essays where students are asked to criticize and reflect on a problem, it can also be in the form of modified essay questions, practical experience through clinical reasoning exercises and case scenario analysis.
2. Process-oriented assessment.
   Process-oriented assessment can take the form of triple-jump exercise, self-assessment, peer-assessment, and self-reflection.
3. Portfolio assessment

Used to see student progress in the PBL process to the end.

F. Advantages And Disadvantages OF PBL

Kurniawati (2013) argues that the advantages of PBL are that students are very enthusiastic and have a broad perspective on solving pollution problems, including the creative process of alternative solutions. The advantages of the PBL Learning Model are as follows:

1. Problem solving in PBL is good enough to understand the content of the lesson
2. Problem solving takes place during the learning process to challenge students' abilities and provide satisfaction to students.
3. PBL can improve learning activities.
4. Helping the transfer process of students to understand problems in everyday life.
5. Helping students develop their knowledge and helping students to take responsibility for their own learning.

According to W. Sanjaya (2007) PBL has several advantages, including:

1. Challenging students' abilities and providing satisfaction to discover new knowledge for students.
2. Increasing students' motivation and learning activities.
3. Assist students in transferring student knowledge to understand real world problems.
4. Helping students to develop their new knowledge and take responsibility for their learning. In addition, PBL can encourage students to conduct their own evaluation of both the results and the learning process.
5. Develop students' ability to think critically and develop their ability to adapt to new knowledge.
6. Provide opportunities for students to apply the knowledge they have in the real world.
7. Develop students' interest in continuously learning even though studying in formal education has ended.
8. Make it easier for students to master the concepts learned in order to solve world problems

According to Abuddin Nata (2009), the PBL learning model is considered to have various advantages as follows:

1. Can make education in schools more relevant to life, especially to the world of work.
2. Can familiarize students with dealing with and solving problems skillfully, which they can then use when facing real problems in society in the future.
3. Can stimulate the development of creative thinking skills and comprehensively, because in the learning process, students do a lot of mental processes by highlighting problems from various aspects.

Smith, as quoted by M. Taufiq Amir (2010), who specifically examined the various dimensions of the benefits of problem-based learning strategies further found that students would: increase their problem-solving skills, be easier to remember, increase their understanding, increase their knowledge relevant to the world of practice, encourage them to think, build leadership and teamwork, learn skills and motivate students.

The PBL method has several advantages including (Wina Sanjaya, 2010):

1. Problem solving is a pretty good technique to better understand the content of the lesson.
2. Problem solving can challenge students' abilities and provide satisfaction to discover new knowledge for students.
3. Problem solving can improve student learning activities.
4. Problem solving can help students how to transfer their knowledge to understand problems in real life.
5. Problem solving can help students to develop new knowledge and take responsibility for the learning they do. Besides that, problem solving can also encourage students to evaluate both the results and the learning process.
6. Through problem solving, students can show that every subject (mathematics, science, history and so on), is basically a way of thinking, and something that must be understood by students, not just learning from lecturers or from books.
7. Problem solving is considered more fun and liked by students.

8. Problem solving can develop students' ability to think critically and develop their ability to adapt to new knowledge.
9. Problem solving can provide opportunities for students to apply the knowledge they have in the real world.
10. Problem solving can develop students' interest in continuously learning even though studying in formal education has ended

The disadvantages of the PBL Learning Model are as follows:

1. If students experience failure or lack confidence with low interest, students are reluctant to try again.
2. PBL requires sufficient time for preparation.
3. Lack of understanding about why the problems are solved, the students are less motivated to learn.

Problem Based Learning is a learning model that also has several weaknesses. According to Sanjaya (2007:219), the weaknesses are as follows: a) if students do not have confidence that the problem being studied is difficult to solve, then students will feel reluctant to try; b) need to be supported by books that can be used as understanding in learning activities; c) learning the Problem Based Learning model takes a long time; d) not all mathematics subjects can be applied this model.

The disadvantages of PBL according to Abuddin Nata (2009) include:

1. Problems that match the level of students' thinking are often difficult to find. This happens, because there are differences in the level of thinking ability of the students.
2. Generally requires more time than the use of conventional methods. This happens partly because in solving the problem it is often out of context or in an inefficient way of solving it.
3. Often have difficulty in changing study habits from initially learning by listening, recording and memorizing information conveyed by lecturers, to learning by searching for data, analyzing, formulating hypotheses, and solving them themselves.

It can be concluded that from some of the advantages and disadvantages of the Problem Based Learning learning model, there are several basic values that must be developed by the teacher in enlivening the learning atmosphere, here the teacher not only acts as the main subject in learning but on the other hand the teacher must involve students so that students' critical thinking skills can develop even though it can still be assessed that not all subject matter can be presented in the form of problems to obtain a solution, but at least by working together it can foster the interests and talents of students indirectly.

CONCLUSION

The essence of learning is that students learn and not teach teachers. One of the learning models that allows the development of students' thinking skills (reasoning, communication and connection) in solving problems is Problem Based Learning or Problem Based Learning (PBM). Problem Based Learning is a learning model that exposes students to real world

problems to start learning and is one of the innovative learning models that can provide active learning conditions for students. In PBL learning prioritizes the learning process, where the task of the teacher must focus on helping students achieve self-direction skills. Some of the characteristics of PBL are Problems being a starting point in learning, Problems raised are problems that exist in the real world that are not structured, Problems require multiple perspectives, Problems challenge students' knowledge, attitudes, and competencies which then require identification. Learning needs and new areas of learning, and learning self-direction becomes the main thing. PBL is one of the constructivist learning flow models that requires students to observe the reality contained in everyday life. Evaluation or assessment of PBL results is carried out according to its type, namely: outcome-oriented assessment (outcome), process-oriented assessment, and portfolio assessment. The strengths and weaknesses of this Problem Based Learning learning model are obtained some basic values that must be developed by the teacher in enlivening the learning atmosphere, here the teacher does not only act as the main subject in learning but on the other hand the teacher must involve students so that students' critical thinking skills can develop even though they are still It can be assessed that not all subject matter can be presented in the form of problems to obtain a solution, but at least by working together it can foster the interests and talents of students indirectly.

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