Unveil Problem Based Learning on Physics Learning: 
A Literature Review

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Abstracts. Scientific literacy is one of the benchmarks for the ability of words in the divinity of daily life. This study is about problem-based learning (PBL) on learning physics from aspects of the word, not, and its implementation. The writing of this article uses literature reviews. First of all, the study problem is formulated, then while it is being experienced by existing and relevant researchers to be analyzed. Data collection techniques with electronic journals through google scholar, Scopus, Microsoft academies, Harzing’s Publish or Parish, and crossref. From the results of 20 articles from journals and 3 e-books. Based on the results of the analysis concluded that the Problem Based Learning model is a skill skill, thinking analysis skills, and scientific attitudes. The results of the journal synthesis show that there have been no research results linking the learning-based problem model to the variety of science literacy skills. This becomes a loophole and basis for advanced research and development of e-Module-based learning problems. The thing behind the varied skills of science skills is one of the problems one sign of learning there is a problem, student-centered learning, and learning in a small group.

1. Introduction
The education has a very important role for the development of a country. The quality of education an Agra influenced by many factors. The quality of education is determined by several factors such as curriculum, teachers or teaching staff, facilities, and learning resources. Teachers have an important role in improving the quality of learning in the classroom. To improve the quality of learning, teachers can conduct innovative learning in the classroom. Innovative learning prioritizes students at the center of learning. One model of student-centered learning is Problem Based Learning (PBL).

It's ringing in a good way from the person who's doing it. Retention, learning attitudes, and active use of learning only by learning where pupils are about, and sucking with, what they learn [1].

1.1 Problem Based Learning
Good learning in the classroom is able to foster an understanding of students' concepts and ways of thinking. Many models are able to foster understanding of the concepts and ways of thinking of students, one of which is Problem Based Learning (PBL) model. PBL was introduced by Barrow and Tamblyn (1980) and is suitable for use because it can strengthen students' ability to learn a principle and concepts and to gain knowledge from many different situations. PBL is a constructivist learning model that helps students solve problems and thinking [2]. Model problem based learning is a set of teaching models that use problems as a focus to develop problem solving skills, materials, and self-regulation [3]. PBL is one of the learning models that is primarily designed to develop students' critical thinking skills, problem solving skills, intellectual skills, learn the role of adults with experience through real and simulated situations, and become independent learners [4].
Ali mason suggested that Problem Based Learning, is a learning model that uses problems as a first step in collecting and integrating new knowledge [5]. In addition, Syahroni Ejin stated that problem based learning is learning model in which students are faced with real-life (contextual) problems from the environment so as to improve students’ conceptual understanding and critical thinking skills [6]. According to Rahmadani and Anugraheni problem based learning emphasizes problem solving activities in learning. Through the problem based learning model, students learn through problem solving activities that can hone students’ thinking skills. Problem based learning is learning 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 the subject matter [7].

According to Paul Eggen and Don Kauchak, the phases of the problem based learning model include: (1) reviewing and presenting problems, (2) developing strategies, (3) implementing strategies, (4) discussing and evaluating results. In the phase of reviewing and presenting problems, the teacher is able to review the knowledge needed to solve problems and give students specific and concrete problems to solve. In the strategy formulation phase, students can formulate strategies to solve problems and the teacher provides feedback to students. In the strategy implementation phase, students are able to apply strategies in solving problems and the teacher carefully monitors and provides feedback to students. In the phase of discussing and evaluating the results, the teacher guides the discussion about the students’ efforts and the results they get [1]. Heller created problem-solving steps in science through five stages: (1) visualizing the problem, (2) describing the problem in a physics description, (3) planning a solution, (4) implementing the plan, (5) examining and evaluating [4].

Hmelo-Silver & Barrows stated that the problems that arise in problem based learning, learning are the questions given do not have a single answer, meaning that students must be involved in exploration with several answer solutions. Student involvement in problem based learning activities can help develop students' critical thinking skills, because in problem based learning activities, students are fully involved in learning process activities through problem solving. In problem based learning activities, students can develop critical thinking skills as a step in solving problems and can draw conclusions based on what they understand [8].

So the problem based learning Model or problem-based learning model is a learning model that involves students in learning activities and prioritizes real problems in the school, home, or community environment as a basis for acquiring knowledge and concepts through critical thinking and problem solving skills.

1.2 Critical Thinking

According to Eggen and Kauchak critical thinking is the ability and tendency of a person to make and make assessments of conclusions based on evidence. Eggen and Kauchak stated that with critical thinking, a person can adjust, adjust, change, or improve his thoughts, so that he can make decisions to act more appropriately [1]. Critical thinking skills in learning mathematics can be developed in schools to colleges. Berpikir critically focused on systems, structures, concepts, principles, and a tight connection between one element and the other element.

Based on the opinion above, it is necessary to have a learning process that involves many students actively, especially in the learning process in the classroom. The success of the learning carried out is determined by the applied learning process. Therefore, the researchers tried to analyze the improvement of students’ thinking processes.

2. Method

The type of research used is article review. Article review is done by summarizing and analyzing research data from several previous research results. Research data collection was carried out by browsing articles in Online Journals, Google Scholar, Scopus, Microsoft Academics, Harzing’s Publish or Parish, and Crossref. The keywords used by the researcher in searching the articles are problem based learning, and critical thinking.
From a search using the keyword problem based learning and critical thinking by a few articles then have articles that meet the criteria of Problem Based Learning to improve skills be r thought critical is the availability of the data before the procedure and after the action in the form of scores and N-gain. The analysis technique is carried out using a comparative method to determine the impact of the application of the problem based learning model. The analysis used in this study is to compare the difference in scores before and after the action using the problem based learning model.

3. Results and Discussion

The results of the study obtained 20 articles related to the problem based learning model in improving students’ critical thinking skills. Data on article titles and authors are contained in the discussion table. Data from the research report is still very wide, but only taken 18 articles that are relevant. The data of the article are processed by summarizing and determining the results of research with Problem Based Learning. Then the data is reported back by means of qualitative and quantitative descriptions. The data from the analysis of the Problem Based Learning model can be seen as follows:

| No | Description                          | Initial Learning Score | Final Score |
|----|--------------------------------------|------------------------|-------------|
| 1  | Students’ Critical Thinking Skills   | 499                    | 583         |
| 2  | Maximum scores                       | 725                    |             |
| 3  | Percentage students’ critical thinking skills | 68.82% | 80.41% |

Based on Table 1 above shows that the learning problem based learning model can improve the ability of critical thinking students. The average percentage increase in students’ critical thinking before using Problem Based Learning was 68.82% increased to 80.41%. The average value before problem based learning and after problem based learning had a significant increase of 11.59%. This is also shown from Table 2 regarding the following summary of critical thinking skills data.

From Table 2 above, it is known that the Problem Based Learning Model can improve critical thinking skills, analytical thinking skills, scientific attitudes, and thinking skills. Of the nine articles analyzed, the average increase in critical thinking skills of students was 17.29. Most of the nine articles analyzed the relationship between problem based learning models and critical thinking skills, analytical thinking, and scientific attitudes.

Based on the results of the analysis of the journal, a synthesis was obtained that provides an overview of research that is able to summarize and follow up on the analysis of the journal, namely by conducting research to determine the relationship between problem based learning (PBL) models and scientific literacy skills. The results of the journal synthesis show that there are no research results linking PBL-based e-Modules with science literacy skill variables. This is a gap and the basis for research on the development of PBL-based e-Modules. The background of the scientific literacy skill variable is that one of the characteristics of PBL is the existence of a problem, student centered learning or student-centered learning, and students learning in small groups.

| No | Research Title                                                                 | Code | Average Value | The Improved |
|----|--------------------------------------------------------------------------------|------|---------------|--------------|
|    | Project Based Learning and Problem Based Learning: Are They Effective To Improve Student’s Thinking Skills? | [9]  | 46,85         | 12,92        |
| No | Research Title                                                                 | Code | Average Value | The Improved |
|----|--------------------------------------------------------------------------------|------|---------------|--------------|
|    |                                                                                |      | Pretest       | posttest     | Average RAT |        |
| 2  | The Influence of Problem Based Learning on Critical Thinking Skills and Competen| [10] | 54,17         | 93,75        | 44,58       | 17,29  |
| 3  | Developing Critical-Thinking Skills through the Collaboration of Jigsaw Model wi| [11] | 48,44         | 69,23        | 44,58       | 17,29  |
| 4  | Development of *PBL* Model Science Comic Media to Improve Analytical Thinking   | [12] | 43,10         | 73,65        | 44,58       | 17,29  |
| 5  | Development of *PBL* Model Science Comic Media to Improve Scientific Attitude   | [13] | 23,60         | 28,53        | 44,58       | 17,29  |
| 6  | Development of Devices Problem Based Learning Models Assisted by Virtual Exper| [14] | 29,9          | 62,8         | 44,58       | 17,29  |
| 7  | The Effect of Problem Based Learning on Students' Critical Thinking Skills      | [15] | 126,43        | 140,91       | 44,58       | 17,29  |
| 8  | The Improving Critical Thinking Skills using Problem Based Learning             | [16] | 9,52          | 19,69        | 44,58       | 17,29  |
| 9  | The Effectiveness of Problem-Based Learning (PBL)                               | [17] | 17,95         | 48,66        | 44,58       | 17,29  |

Table 3 shows that: (1) the results of the study on the effectiveness of problem-based learning on improving students' science literacy skills with code [17] have a n-gain score of 0.55 which means the PBL model effectively improves students' science literacy skills. (2) The results of the study on the effectiveness of problem-based learning on improving students' scientific attitudes with code [17] have a n-gain score of 0.57 which means the PBL model effectively improves students' science literacy skills. (3) The development of problem-based learning model devices assisted by virtual experiments to improve the mastery of student concepts on material optical instruments with code [13] having a n-gain score of 0.47 means the development of pbl models effectively improves mastery of student concepts. (4) The effect of problem based learning on students' critical thinking skills with code [14] has a n-gain score of 0.25 which means the PBL model affects students' critical thinking skills. (5) The development of PBL model IPA comic media to improve analytical thinking skills with code [12] has a n-gain value of 0.51, meaning pbl-based comic media effectively improves students' critical thinking skills. (6) The results of research on the development of comic media IPA PBL model to improve analytical thinking skills with code [12] has a n-gain score of 0.43 which means the development of comic media IPA PBL model improves the analytical thinking skills of students. (7) Problem based learning approach with support interactive multimedia in physics course: its effects on critical thinking disposition with code [18] has a value of n-gain of 0.53, which means that pbl interactive multimedia-assisted approach affects students' critical thinking skills.

Based on the results of the research above, it can be seen that each research conducted to obtain different results of increasing the percentage and N-gain scores for critical thinking, analytical thinking, and scientific attitudes. The differences in the results of the research that have been analyzed are caused by internal factors and external factors. Internal factors are factors that exist within the students themselves (such as health, interests, talents, intelligence, body condition), while external factors are factors that come from outside of students, namely family factors, school environment, and community environment.
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| No | Research focus                                                                 | Code | N-gain | Criteria | Conclusion |
|----|-------------------------------------------------------------------------------|------|--------|----------|------------|
| 1  | The Effectiveness of Problem-Based Learning in Improving Students Scientific Literacy Skills | [17] | 0.55   | medium   | Increased  |
| 2  | The Effectiveness of Problem-Based Learning in Improving Students Scientific Attitudes | [17] | 0.57   | medium   | Increased  |
| 3  | Development of Devices Problem Based Learning Models Assisted by Virtual Experiment to Improve Mastery of Students Concept of and Material Optical Instruments | [13] | 0.47   | medium   | Increased  |
| 4  | The Effect of Problem Based Learning on Students' Critical Thinking Skills     | [14] | 0.25   | medium   | Increased  |
| 5  | Development of PBL Model Science Comic Media to Improve Analytical Thinking Ability | [12] | 0.51   | medium   | Increased  |
| 6  | Development of PBL Model Science Comic Media to Improve Scientific Attitude    | [12] | 0.43   | medium   | Increased  |
| 7  | Problem Based Learning Approach with Supported Interactive Multimedia in Physics Course: Its Effects on Critical Thinking Disposition | [18] | 0.53   | medium   | Increased  |

The background of the research place also affects the research results obtained because they come from different regions. The level of student ability is also different so that it also affects the learning outcomes obtained. The health condition of students is also an influence, because when researchers take research data, students' health conditions are sick so they are not optimal in doing the tasks given by the teacher. The application of different curricula can also have an impact on learning outcomes. In addition, the learning process carried out by the teacher even though using the same type of model, there is a possibility that the application will experience differences.

4. Conclusions and Suggestions
Based on the results of the analysis, it is concluded that the Problem Based Learning model can improve critical thinking skills, analytical thinking skills, and scientific attitudes. The results of the journal synthesis show that there is no research linking the problem based learning model with the variable science literacy skills. This is a gap and a basis for further research and development, e of problem based learning based. Things underlying science literacy skill variables that one of the characteristics of problem based learning is the existence of a problem, learning centered on students and learning in small groups.

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