

The Effect of Problem-Based Learning on Learning Outcomes of Pendidikan Agama Islam

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Abstract: This study aimed to analyze and describe instructions applying problem-based learning in school. The research design is a systematic literature review conducted in seven steps. Data searched and retrieved from google scholar. Eligibility criteria for selected studies are articles published between 2017-2021 and written in the Indonesian language. This study concluded that applying problem-based learning in instruction positively affects learning outcomes, especially problem solving and critical thinking ability. PBL steps commonly used in classrooms are the teacher planning the lesson, stating the learning objectives, explaining the subject matter, dividing the group, students carrying out investigations, the teacher providing feedback. These steps are more of a learning activity than a sequence of learning activities.

Keywords: problem-based learning; learning outcomes; Pendidikan Agama Islam

Introduction

Regulation of the Minister of Education and Culture number 65-year 2013 recommended incorporating discovery learning in instruction. It is a method of teaching through an inquiry process to solve the problem. This article used a problem-based learning term to review instructional practices that require students to solve problems prepared by teachers. Problem-based learning (PBL) is an instructional method that students learn through complex

and open-ended problems (Ali, 2019). The teacher guides students (Hmelo-Silver, Duncan, & Chinn, 2007) to solve a problem through an inquiry process. Solving the problem requires the process of inquiry.

Problem-based learning is a student-centered learning model where students are faced with problems, and the teachers act as facilitators (Angelle, 2018). They help students (Hmelo-Silver et al., 2007) solve problems using information from various sources and everyday experiences. PBL is a learning approach that places students at the

center of learning (Yuan, Williams, & Fan, 2008). Students are facilitated to work in groups and work together (collaboratively) in investigations to find solutions to problems faced by students. The teacher acts as an enabler or facilitator, allowing students to work together in problem-solving. PBL is done collaboratively in small groups (Yew & Schmidt, 2009). Working in groups will build students' perceptions of shifting conceptions of knowledge source authority (Cockrell, Caplow, & Donaldson, 2000). Group work allows students to interact with external resources and cooperate in reviewing these resources. Teachers who apply PBL see that students actively participate in learning activities (Basilotta Gómez-Pablos, Martín del Pozo, & García-Valcárcel Muñoz-Repiso, 2017).

PBL emphasizes the problem-solving process rather than the final result (Angelle, 2018). Solving problems faced by students is a learning activity that is the responsibility of students. This situation is related to students' motivation and sense of community (Wijnen et al., 2018) in solving problems. The emphasis on this process is supported by self-assessment and peer-assessment to measure competence in solving the issues at hand. The characteristics of the issues faced by students in PBL are related to real-world problems that are unstructured or ill-structured (Savery, 2006; Walker & Leary, 2009). Teachers who apply PBL with the characteristics of the issues above show differences with classes that use traditional teaching in terms of intrinsic goals, elaborative learning strategies, critical thinking, self-regulation, and group learning (Sungur & Tekkaya, 2006).

Teaching practices in Indonesia still place the teacher as the center of instruction (Ariska, 2018; Kuswanto, 2014; Setiawan & Amboro, 2017). The teacher prepares a lesson plan without involving students, the teacher conveys the material in the learning process,

conducts an assessment with criteria that the teacher only knows. However, technological developments and government regulations have accelerated the paradigm shift towards student-centered learning. Literacy programs, contextual learning, the adoption of an inquiry learning approach are some of the events that support this paradigm shift. The practice has implications for the shifting of learning models that emphasize students. The teacher's role is still dominant in the learning process.

This learning model promises conformity to current needs. 21st-century skills require students to think critically and creatively, work collaboratively, and communicate their work to the public. This learning model is widely applied in learning activities at all levels of education. However, due to methodological problems, not many studies have provided valid and reliable explanations about the impact of PBL on learning outcomes. The study will review research that meets the inclusion criteria regarding the relationship between problem-based learning and learning outcomes.

Literature Review

The practice of problem-based learning was first implemented in the medical school of McMaster University in the mid-twentieth century (Barrows, 1996). PBL is accepted by various communities and spreads internationally and has grown so significantly (Ghani, Rahim, Yusoff, & Hadie, 2021) that multiple definitions and approaches have emerged (Beddoes, Jesiek, & Borrego, 2010). PBL begins when students are confronted with open, unstructured, authentic (real-world) problems and work in teams to identify learning needs and develop viable solutions. The teacher acts as a facilitator rather than the primary source of information (Prince & Felder, 2006). Another

view of PBL is a student-centered learning approach that empowers students to conduct research, integrates theory and practice, and apply knowledge and skills to find answers to given problems. The key to the success of this approach is the selection of unstructured problems (usually multidisciplinary) and the teacher who guides the learning process and conducts detailed questions at the end of the learning experience (Savery, 2006).

Although PBL is defined and practiced in various ways, according to Kolmos and de Graaff (in Mann et al., 2021), several critical pedagogical principles can be grouped into three approaches: learning, social, and content. The learning approach is understood as a learning process with problems, including identification, analysis, and solution activities. Teachers use prepared problems to support specific skill acquisition or real-life problems to have authentic learning experiences. These problems then become the starting point and goal of the learning process.

The social approach describes PBL as a learning process in social action, where students learn through dialogue and communication. This activity occurs in two ways. First, the teacher facilitates students to work in teams to solve the problems at hand. Second, the learning process is a shared responsibility. Each student can manage their learning to participate in problem-solving teamwork.

The content approach emphasizes the selection of knowledge and skills. PBL practice is characterized by the integration of concepts from various subjects to solve problems. However, this approach is often constrained by compatibility with the curriculum, the specific knowledge, and skills that need to be developed in certain subjects.

These pedagogical principles are in which they use prior knowledge to build knowledge, collaborative learning, and active

involvement in the learning process. PBL activities include student problem analysis, identifying relevant facts, and applying existing knowledge and experience to solve problems (Yew & Schmidt, 2012; Zhou, 2018). Problems in PBL activities must be problems or situations related to the real world that include missing information or unclear answers, such as unstructured case studies (Miner-Romanoff, Rae, & Zakrzewski, 2019). The use of unstructured case scenarios engages students in resource exploration and independent information seeking, necessary skills in the nursing workforce, and maybe the first step towards persistence.

The teacher acts as a facilitator, not as a lecturer. By helping construct knowledge, guiding research, strengthening understanding of complex concepts, and opening access to resources, teacher-facilitators assist groups in building awareness and linking concepts. In addition, the facilitator encourages participants to reflect on the group's processes and results. Facilitators can also be coaches or mentors who offer feedback and encouragement (Salari, Roozbehi, Zarifi, & Tarmizi, 2018). Although PBL is not a new learning approach, it is an ideal option, evidence-based, and can fill skills gaps (Seibert, 2021).

Research Method

This research approach is a systematic review to provide a map of PBL practice and advice to teachers and schools. The systematic review is defined as a scientific procedure guided by a set of explicit and strict norms to prove the completeness, immunity of bias, and the technique and implementation of openness and accountability (Dixon-Woods, 2019). This review mainly uses data from quantitative research results to describe the performance

of PBL in secondary schools and the equivalent.

This review is directed to answer the following questions:

1. What is the evidence in the literature about the impact of PBL on PAI learning outcomes?
2. How are the PBL steps in PAI learning?

To ensure that the review is carried out systematically, the following steps are presented and illustrated in figure 1.:

1. Scoping the review: the researcher begins by developing criteria for selecting the literature in the study (Table 1).
2. Literature search: the researcher, next, identifies the relevant literature by using the previously formulated keywords (Table 2). The researcher recorded the literature in tabular form to make it easier to assess according to the criteria.

Figure 1. Steps of Scientific Literature Review

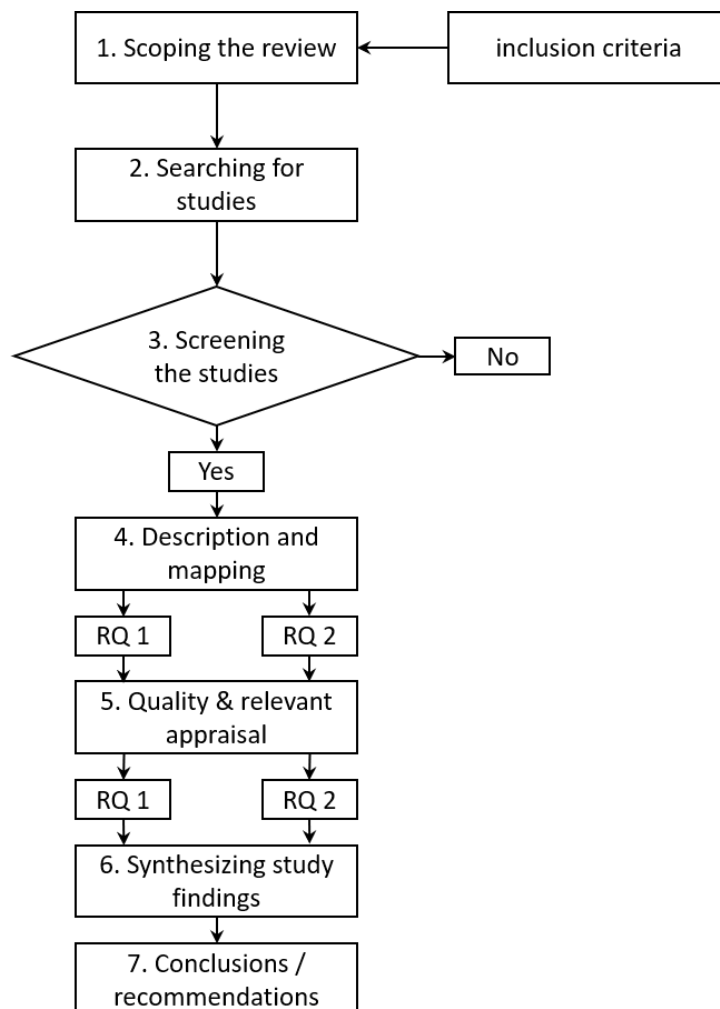


Table 1. Inclusion criteria for the study

Topic	The literature deals with research questions.
Recency	literature published between 2017 – 2021
Research context	The research was carried out in secondary schools, and the equivalent
Research base	The library is the result of field research (whether qualitative, quantitative, development, or action research)
Transparency	The methodology underlying the research is explicitly stated
Reliability / validity	The research methodology underlying the findings must be valid and reliable under the research design.

Table 2. Type of bibliography, keywords, and place to search

Type of bibliography	Journal articles, research reports
Keywords	“Problem-based learning” AND “hasil belajar” OR “prestasi belajar” AND “Pendidikan Agama Islam”
The place to search	scholar.google.com

Table 3. Criteria for judging 'weight of evidence.'

Level/criterion	Methodological quality	Methodological relevance	Topic relevance
1: Excellent	An excellent study design justifies all of the decisions made, such as sample size, instrument, and analysis. There is clear evidence that procedures were taken to maximize the validity and dependability of the data.	The research questions are expressed clearly. The methodology is highly relevant to research topics and provides comprehensive responses to them.	The study is very closely related to one of the core review questions, and it provides excellent data on which future policy and action might be based.
2: Good	The research design is outlined clearly, evidence of sensible judgments made to provide valid and reliable results.	The research questions are either stated explicitly or can be inferred from the text. The findings	The research supports one of the core review issues and adds to the body of knowledge.

Level/criterion	Methodological quality	Methodological relevance	Topic relevance
		respond to the research questions.	
3: Satisfactory	Although the research strategy is oblique, it looks to be reasonable and likely to produce valuable results.	Although the study questions are not explicitly stated, they appear to be primarily matched by the research approach and findings.	One of the primary review questions applies to at least part of the study findings.
4: Inadequate	The research design is not specified and has faults.	Research questions that are not mentioned or that are not matched by the design	Key questions are not addressed in the study.

3. Literature screening: each article was screened based on inclusion criteria. Reference to these criteria is to avoid bias about the literature used to answer the research questions above. By assessing each library using the same standards and recording the results, the basis for concluding becomes transparent.
4. Description and mapping: the researcher wrote an outline of the methodology and findings of each piece of literature included in the review. The records include the population, study design, and critical characteristics related to the research question. It is used to describe a "descriptive map." The map provides a systematic description of the research activity associated with each query (Harden & Thomas, 2005).
5. Assessment of quality and relevance: the researcher examines each literature in the descriptive map in terms of:
 - The reliability of the results is assessed based on the quality of the research methodology. That should be carried out with the research design (methodological quality).
 - Appropriate use of research design to answer research questions (methodological relevance)
 - Accuracy of research focus to answer review questions (topic relevance)
 - Assessment of weight of evidence (WoE) (Gough, 2007) is based on evaluating each of the criteria above (table 3).
6. Synthesize the results: this review uses a Narrative Empirical Synthesis approach to combine mapping results to present a combination of results from one library in a structured summary. The steps include an overview of the research methodology, findings, and weight of evidence from the mapping that has been carried out into specific themes. Each paragraph summarizes the critical statements and is based on relative evidence. When findings support literature with high WoE, it is categorized as solid evidence. Literature that has low WoE is classified as reasonable evidence.

7. Conclusions / Recommendations: This study formulates recommendations related to the findings to explain the basis for the suggestions. The recommendation includes potential limitations in the generalizability or transferability of the results.

Findings

The study of the selected literature shows that instruction using problem-based learning can improve learning outcomes (Irwanto, 2018) compared to traditional methods (Hudayah, 2018; Nurfauliyah, 2018; Purnamasari, 2018). Learning outcomes increase, especially problem-solving skills (Mulyani, Zulyadaini, & Defitriani, 2019). Problem-solving skills in learning that apply PBL have a better impact than learning using other learning models, namely cooperative and conventional learning (Mulyani et al., 2019). The term traditional method refers to learning that uses lecture and question and answer methods.

Pendidikan Agama Islam - as a subject or group of subject matter- emphasizes applying teaching materials rather than understanding concepts. The relevance of the material to the real needs of students is a priority in the learning process. The steps for problem-based learning are explaining the matter, grouping the students, distributing worksheets, students working on assignments, the teacher accompanying students on studies, the teacher asking students randomly to explain answers, students summarizing the lesson at the end of the learning activity (Ramli, 2017). Different practices are as follows: orientation; defining & organizing students for learning; guiding independent or group investigations; developing and present works; reflection and assessment (Nursimah, 2021). Before the learning process takes place, the teacher

prepares a lesson plan to guide student learning activities.

Effectivity of Problem-Based Learning

Research on the effect of PBL on learning outcomes in this review shows a positive correlation. This research was conducted in one single event, one piece of learning activities, no information on sustainability or series of instructional events was found.

Research reports on problem-based learning are classified into three, namely curriculum design and PBL learning, PBL effectiveness, and theory and practice in active learning (Hallinger, 2020). The three groups are not contradicted, but they illustrate each other's support to describe PBL more comprehensively. A review of the impact of PBL on learning outcomes is a judgment on the effectiveness of PBL. The experience of implementing problem-based learning for 15 years using "progress test" data shows an increasing trend (Vleuten, Verwijnen, & Wijnen, 1996). The research indicates the effectiveness of PBL in achieving learning objectives.

An extensive review of the effectiveness of PBL states that PBL does not provide convincing evidence that PBL can improve basic knowledge and learner performance, at least not as much as would be expected given the extensive resources required to implement PBL. This condition raises questions about the appropriateness of the PBL theory and the validity of its research base (Colliver, 2000). Other studies (Norman & Schmidt, 2000) agree with the statement. Still, they comment that the application of PBL as the sole intervention and is used to measure cognitive and skill levels that are common can produce no differences with traditional instruction methods. The review

suggests rethinking the promise of PBL effectiveness. The PBL approach to learning is more challenging, motivating, and enjoyable. That condition can be a good *raison d'être* so that the implementation costs are not too high (Norman & Schmidt, 2000).

Steps of Problem-Based Learning

The steps of instruction are the path to the goal. The application of this learning model is adapted to the context and school climate. Those steps in the literature reviewed can be stated as follows:

Plan for the implementation of instruction

A learning plan is an instructional plan for several days that includes learning activities and assessments. This term needs to be distinguished from a lesson plan that is used for one day or meeting. The learning plan considers the principles: individual diversity, students as the center of learning, active student engagement, development of reading and writing culture, feedback, linkage, and integration, as well as accommodation to various modes of learning and adoption of information and communication technology in education (Yunus & Alam, 2018). These principles provide space for the application of learning that encourages students to build their knowledge independently with the teacher's help (more knowledgeable others). This principle is in agreement with the constructivism assumptions that underlie PBL. Effective learning planning can be achieved by focusing on essential knowledge and skills, focusing on the individual needs of all students, using response-to-intervention to address instructional needs, and integrating technology for added value to

teaching and learning (Grant, Hindman, & Stronge, 2013).

State learning objectives

The learning process in the classroom begins with conveying learning objectives in the form of competencies that are stated operationally (Permendikbud number 22 the year 2016). Learning objectives need to be distinguished from assessment indicators. Learning objectives are a reference in learning while learning indicators are a reference in assessment. The achievement of competence measures the success of learning. This competency becomes a reference in the learning process and assessment.

The purpose of learning using problem-based learning is to help students (1) identify processes related to the problem and explain the actions that need to be taken (2) use an effective reasoning process, (3) realize the limitations of knowledge, (4) meet needs knowledge through self-directed learning and social knowledge construction, and 5) evaluating student learning and performance (Hmelo-Silver & Barrows, 2006, 2015). The teacher as a facilitator strives for all students to be active in the learning process, keep the learning process on track, explore students' deep thoughts and understanding, and encourage students to be independent in managing their learning and seeking information.

Presenting the instructional content

The strategy used to deliver content in the form of competence can be done in various ways, not limited to mainstream methods such as lectures and questions and answers. Presentation of computer-assisted material to facilitate learning communication is increasingly being used. This teaching

mode is seen as effective (Asubiojo & Ajayi, 2017; Naidu, Barrett, & Olseb, 2011). In addition, the suitability between learning styles and modes of delivery impacts improving student learning outcomes. The delivery method is embodied in the learning style-based approach in instructional delivery (Vaidya & Joshi, 2018).

Presentation of material by the teacher is the initial observation stage of students in understanding the concepts that will be used to recognize and answer real-world problems. The information provided, especially in the form of examples, provides an overview of the context of the problems solved by students, not as material for solving problems. The information provided departs from the initial knowledge possessed by students (Savery, 2019). In addition, teachers also provide access to resources to solve problems.

Divide students into small groups

Student groups are one of the characteristics of PBL. This grouping of students can be done after exposure to the material or earlier. This way of working will build cooperation skills, a spirit of togetherness (*esprit de corps*), exchange of ideas, and transmission of knowledge. The active engagement of each group member in the discussions is a critical component of a successful study in a problem-based learning environment (Lindblom-Ylänne, Pihlajamäki, & Kotkas, 2003). Effective communication also contributes to the cohesiveness of student groups. Through communication, knowledge is acquired and shared among group members (Mitchell, Canavan, & Smith, 2010).

Several factors, namely influence group work in PBL that has an impact on learning outcomes: first, students' prior knowledge that is devoted to understanding and explaining the problems faced by

students; second, the student's initial knowledge becomes the basis for assembling new relevant information to answer the problem; third, the motivation of students who grow and develop to solve problems and adjust to performance criteria; and fourth, the behavior of teachers who are influential in guiding their students. The effectiveness of this behavior is influenced by social equality, expertise in teaching materials, and the ability to align with students' cognitive levels (Schmidt & Moust, 2000). Even if peers replace the teacher's role as a facilitator, it does not affect student learning success (Steele, Medder, & Turner, 2000).

The students conduct research

The teacher then presents the problem and asks students to find answers to the problem. Problems are formulated carefully to encourage students to learn (Mitchell et al., 2010). The assignments given by the teacher are equipped with worksheets that include criteria, work procedures, and reporting systematics, as well as self-assessment or reflection (Kenney, 2008; Sari, Sumarmin, & Hilda, 2018). The implementation of research in learning that applies PBL requires a shift in the learning center. Implementation of instruction requires a structured way of learning and reduced teacher direction (Beringer, 2007). This transfer of authority can motivate students, encourage self-directed learning and have implications for learning outcomes.

Understanding the concept of the theme, agreed criteria, worksheets, and group members is the first step in planning, implementing, and reporting the project to be carried out. At the planning stage, students develop concepts that are relevant to the problem to be studied. This concept can increase according to student findings. After that, students agree on the work procedures to be carried out by referring to the

worksheet. At the implementation stage, students collect data, manage data, and write group work reports.

The teacher gives a feedback

Feedback is a vital component of PBL success (Hmelo-Silver & Barrows, 2006; Mubuuque, Louw, & Van Schalkwyk, 2017). Student responses to teacher feedback can vary. Some students can be motivated by positive feedback, some by negative feedback, some by both (Van Dijk & Kluger, 2011). The teacher's role is essential in providing balanced comments to encourage student learning (Carless, 2006). The balancing is done by assessing the competencies possessed by students and identifying gaps in the areas of performance carried out. The factors that determine the effectiveness of feedback in learning have been described. Three questions determine that effectiveness: (1) where do I go? or feed up; (2) how do I go? or feedback; and (3) what next? or feed-forward (Hattie & Timperley, 2007).

The research uses the perspective of feedback intervention theory, which assumes that providing feedback will change three loci of control: learning tasks, task motivation, and meta-tasks. This study concluded that effectiveness would decrease when attention is close to self and away from the task (Kluger & Denisi, 1996). However, feedback will have a lasting impact if students are given the space to self-monitor their performance (Carless, Salter, Yang, & Lam, 2011). Feedback should provide students with space to self-assess the assigned task and stay focused on doing the task.

Conclusion

Instructional practices in Indonesia are in transition to student-centered learning.

The application of PBL in instruction requires the active role of students and placing students as the center of learning. The literature shows that PBL affects learning outcomes, especially learning requiring students to think high-order and critically. The effectiveness of the use of PBL can be found, although the practice of PBL is a one-shot session.

The implementation of problem-based learning in Indonesia is not yet entirely student-centered. The assistance (not facilitation) of teachers is still quite significant in solving problems. PBL steps commonly applied in classrooms are the teacher planning the lesson, stating the learning objectives, explaining the subject matter, dividing the group, students carrying out investigations, the teacher providing feedback. These steps are more of a learning activity than a sequence of learning activities.

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