



Implementation of Interactive Science Module Based on *Problem Based Learning* to Increase Activeness Study

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Abstract

This study aims to determine the effectiveness of the implementation of interactive modules of Science based on Problem Based Learning (PBL) in improving the learning activity and achievement of fourth-grade students of SDN 09 Bungku. The research methods used were observation, interviews, and evaluation of student learning outcomes before and after implementing the module. The results showed that the implementation of interactive modules based on PBL significantly improved student learning activity. Students became more enthusiastic, actively discussed, asked questions, and solved problems independently or in groups. In addition, student learning achievement also experienced a significant increase, with all students achieving the Minimum Completion Criteria (KKM). This interactive module provides an enjoyable and meaningful learning experience by presenting contextual materials, visual illustrations, and interactive activities that stimulate critical thinking and student creativity. The teacher acts as a facilitator who guides students in using the module to make the learning process more effective and structured. This study recommends the use of interactive modules based on PBL as an alternative innovative learning that can improve motivation, involvement, and student learning outcomes in elementary schools.

Keywords: Implementation, interactive modules, Problem Based Learning, student learning activity.

Introduction

Education plays a strategic role in forming a competent, creative, and competitive generation in the era of globalization. In the context of learning in the 21st century, one of the main challenges faced by the world of education is improving the quality of the learning process that is not only centered on teachers, but emphasizes more on the activeness and involvement of students. Quality education is education that can optimally arouse students'

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potential by applying innovative and meaningful learning methods and media. (Savitri, Afandi, and Ismiyanti 2025) .

The active learning process is an important key to achieving these goals. According to (Yulizah, Sulistiyono, and Rozi 2025) , learning will take place actively if educators are able to use various interesting learning methods and media, so that students can play an active role during learning activities. Active learning is not just listening to the teacher's explanation, but requires students to think critically, discuss, solve problems, and engage in various activities that encourage cognitive, affective, and psychomotor involvement.

However, the reality in the field shows that there are obstacles in realizing active learning. Based on the results of initial observations at SDN 09 Bungku, it was found that fourth grade students still showed low learning activity. Students tend to be passive, waiting for instructions from the teacher, and are less involved in the learning process. This condition causes the learning process to become monotonous and does not foster students' enthusiasm for learning, thus impacting low understanding of the material.

One of the causes of the low student learning activity is the use of conventional learning methods, where teachers dominate the teaching and learning process and students are not given enough space to participate actively. In order to overcome this problem, a more innovative and participatory learning approach is needed. *Problem Based Learning* (PBL) is one of the relevant approaches to answer these problems. PBL is a learning model that places students as the center of learning and actively involves them in solving real and contextual problems. Dwi Rahayu et al. (2020) explained that PBL is able to develop students' critical thinking skills, collaboration skills, and problem solving because students are encouraged to explore, discuss, and draw conclusions independently. (Divia Rahmadini and Muhammadi 2025) .

As a supporting media for the implementation of PBL, the use of interactive modules is an effective tool. Interactive modules not only present materials textually, but are also equipped with visual, audio, video features, and interactive practice questions so that they can attract students' attention and facilitate diverse learning styles. This kind of module supports students to learn independently, increase the attractiveness of learning, and develop optimal learning activity. (Nabila, Mawarsari, and Purnomo 2025) added that the advantages of PBL include motivating students to get used to facing real problems and fostering an attitude of social solidarity through group work. Meanwhile, interactive e-modules also encourage students to learn how to learn independently, work together, and use technology wisely in learning.

In the context of Natural and Social Sciences (IPAS) subjects, the application of interactive PBL-based modules is very appropriate. IPAS material that is contextual and directly related to everyday life is very possible to be packaged in the form of interesting problem solving for students. By using interactive PBL-based modules, students learn to understand concepts and experience a meaningful learning process through direct involvement in finding solutions to the problems presented in the module. (Putri, Hindun, and Suharni 2025) .

By considering the empirical conditions at SDN 09 Bungku, and considering the urgency of increasing student learning activity, the author is interested in conducting this research with a classroom action approach to directly observe how the implementation of interactive science modules based on *Problem Based Learning* can have an impact on increasing student learning activity. This research was conducted in the form of observation of teacher actions in class IV as the subject of research, with the researcher acting as an observer who focuses on the dynamics of the process and changes in student learning behavior.

Literature Review

Interactive Module

Interactive modules form designed teaching materials in a way systematic, interesting, and can be used independently by students. This module generally digital based or electronics (e- modules), and equipped with various feature interactive like animation, video, audio, hyperlinks, quizzes, and exercise possible questions student Study in a way active and inactive boring. (Widayanti et al. 2025) , module is a form compiled teaching materials in a way systematic and interesting, which contains materials, methods, limitations, and method designed evaluation For used in a way independently by students. Interactive modules own superiority compared to module print conventional Because can adapt with various style Study students and able give experience fun and dynamic learning.

Problem Based Learning Model

The application of various learning models aims to support the achievement of success in the learning process. Achievement in classroom learning can be reflected from various aspects of the development of the ongoing teaching process. A teacher who can manage the class effectively, understand the teaching material in depth, and utilize learning media as a support for learning in the classroom. It is necessary to determine a suitable learning model concluded in the context of learning activities in the classroom. A learning model can be adequate in the learning process that can guide students to gain knowledge and broaden their understanding of learning materials. One of the current learning methods is the problem-based learning method (Mubarokati et al. nd) .

Problem-based learning model is a learning method that involves students in solving authentic problems so that they can develop their own knowledge, improve skills, develop student independence, and increase their self-confidence. The *Problem Based Learning learning model* is recognized as one of the models that can grow students' absorption of material and also encourage students to participate more in the learning process. (Muhammad Nawir, Aini Nurpratiwi, and Dimas Mulyadin 2025) .

Student Learning Activity

(Azwah, Hidayat, and Aini 2025) learning activity is a condition or thing where students can be active in learning. Forms of student activity can be seen from their involvement in the

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learning process, such as discussions, listening to explanations, solving problems, actively working on assignments, compiling reports and presenting the results of the report.

(Private and Hasanah 2025) activities that involve students' physical and mental can be indicators of student activity. Speaking ability, interest in listening, reading comprehension, writing skills, accuracy of body language expression, and so on are physical activities. Meanwhile, the implementation of knowledge to hone problem-solving skills, skills in seeing different concepts and being able to compare them, the ability to provide a conclusion from a result obtained, and various other thinking activities are part of activities that involve mental activity.

Science Learning

IPAS is an integration of Natural Sciences (IPA) and Social Sciences (IPS) subjects taught at elementary school level in the Independent Curriculum. This subject aims to develop students' scientific and social thinking skills through an understanding of the natural and social environment and their interactions in everyday life. (Asmaliyah, Keriyan, and Nugroho 2025).

This is based on elementary school students who still see everything as a whole, simple, holistic, and comprehensive although not detailed. The combination of two subjects, namely Science and natural sciences, has the hope that students will be able to manage the natural and social environment as a whole. The combination of the two subjects is called the science and natural sciences subject, and it begins to be taught at level III of elementary school (Moonik, Lihang, and Rompas 2025).

Research Method

Study action class (PTK) is a form studies of a nature reflective by the perpetrator (teacher) actions in a situation social (class) with objective repair or increase quality practice learning. In research this, the researcher is an observer, while the class teacher acts as executor action. Research this also uses approach qualitative with quantitative data support simple. (Fadilah et al. 2025) , approach qualitative intended For understand phenomenon in a way holistic and contextual based on view subject, while quantitative data used For strengthen conclusion through calculation statistics descriptive. In other words, the approach allows researcher To describe in detail the learning process that occurs in class and analyze change activity student from cycle to cycle.

Result

Implementation study This observe implementation learning use module interactive based on *Problem Based Learning* (PBL) carried out by class IV teachers. The study is in progress for two cycles, each consisting of over two meetings. On every cycle, the teacher presents module interactive loading scenario problem real, guide activity discussion, as well as task breakdown problem. The module is arranged with The PBL structure is:

- a. Orientation problem,
- b. Identification need study,
- c. Information gathering,
- d. Compilation solutions, and
- e. Presentation solution.

Activity data Study student obtained from instrument observation covering five aspects activity, namely:

- a. Courage ask,
- b. Participation in discussion,
- c. Ability solve problem,
- d. Initiative in study independent,
- e. Work The same in group.

As an observer, researcher take notes every activity students and teachers during the learning process in progress based on sheet observations that have been arranged Previously. Semi-structured interviews were conducted with class teachers and several students to deepen the observation results. As for the teacher, he said that *“After using this interactive module, I saw that the children became more active. They started to dare to ask questions, and group discussions became more lively. Usually they passively wait for the teacher’s explanation.”* And the expression from student regarding the learning process this time *“I like it because there is a problem story at the beginning, the pictures clear and interesting. We asked to find a solution together. So it’s fun, and we can work together with friends.”* Based on Several interview results showed positive changes in students’ learning behavior. Teachers felt helped by the module as a guide, while students felt more interested because learning was challenging and collaborative.

Discussion

The use of interactive modules of Science based on *Problem Based Learning* (PBL) is a very effective tool for teachers in the learning process. With this interactive module, students do not only receive material passively, but are invited to actively solve problems that are relevant to everyday life, so that learning becomes more interesting and meaningful. The PBL approach in this module encourages students to think critically, improve creativity, and problem-solving skills independently and in groups. This ultimately increases students’ learning motivation and achievement significantly. The interactive PBL-based module is also equipped with illustrations and questions that facilitate understanding of the material, so that students can more easily master the concepts taught. Based on research, this module has been proven valid, practical, and effective in improving students’ learning outcomes and critical thinking skills. (Masyuha and others) .

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Research results show that implementation module interactive based on Problem Based Learning (PBL) impacts activity Study student class IV SDN 09 Bungku. Improvements occurred significantly from cycle I to cycle II throughout the observed activity. This matter in line with opinion (Princess Marfhadella, Nurwanti Fatnah, and Adiyanti (2025) who stated that PBL encourages student For become breaker problem active, increase collaboration, as well as develop skills Study independent. Interactive modules designed based on PBL principles can create an atmosphere of challenging and contextual learning, which further motivates students to be more actively involved in the learning process. From the side theory learning, approach This support view constructivist where students build Alone knowledge through interaction with environment and experience Study meaningful (Dwiyanti and Rizal nd) . The module presents problems that make students feel that they are relevant and useful, increasing initiative and intrinsic motivation.

Study This also strengthens previous results, such as research by (Tritjahjo Danny Soesilo et al. 2025) which shows that using the PBL module can increase activity and understanding students in class science material base. The obstacles that had appeared in cycle I is Not yet accustomed to it student with learning format based on problem. However, after assistance and adjustment in module, in cycle II students start show improvement real participation. Thus, it can be concluded that use module interactive based on PBL consistent and systematic can become solution alternative For increase activity Study student school base.

Conclusion

Implementing interactive PBL-based modules in class IV of SDN 09 Bungku went well despite several obstacles, such as limited tools and time. This module encourages students to actively participate in learning through relevant problem-solving, group discussions, and interactive features. The teacher acts as a facilitator who provides conceptual reinforcement before students use the module so that students receive information passively and are actively involved in building their knowledge. This makes learning more interesting, meaningful, and systematic, increasing student learning activity significantly.

After implementing the PBL-based interactive module, student learning activity increased significantly. Students became more enthusiastic, focused, and involved in learning activities, such as discussing, asking questions, and solving problems independently or in groups. This positively impacted student learning outcomes, which showed a significant increase with increasing average scores and all students achieving the Minimum Completion Criteria (KKM). The learning process that was previously passive and monotonous changed to become more dynamic and interactive, thus spurring student motivation and learning achievement.

The implementation of PBL-based interactive modules has a wide range of positive impacts, including:

1. Increasing students' motivation and active involvement in learning through contextual and problem-solving approaches.

2. Helping students develop critical thinking skills, creativity, and problem-solving abilities both independently and collaboratively.
3. It makes it easier for teachers to manage learning efficiently and in a structured manner and create an interactive and enjoyable classroom atmosphere.
4. Providing communicative and varied learning media with illustrations, videos, and interesting activities makes it easier to understand the material.
5. Being a flexible, independent learning resource, it allows students to learn anytime and anywhere and facilitates effective evaluation and reflection of learning.

Overall, the interactive IPAS module based on *Problem Based Learning* has proven to be valid, practical, and effective in increasing student learning activity and achievement at SDN 09 Bungku, so it is worthy of being an alternative, innovative learning that supports the development of students' competencies as a whole.

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