Improving Engineering Students' Learning Outcomes through Strategies *Learning Start with a Question*

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Abstract

This study began with a situation where the teaching of Basic Physics to Engineering students, Universitas Muhammadiyah Tegal was carried out using a monotonous lecture method, making it difficult for students to understand the material presented. The problem identified in this study is how to describe the improvement in learning outcomes of Engineering students through the application of the Learning Start with a Question strategy. The purpose of this study was to improve the learning outcomes of basic Physics of engineering students by implementing the Learning Start with a Question strategy. This study is a type of classroom action research, with 16 Engineering students in semester 2 as research subjects. The instruments used included learning achievement tests and observation sheets. The indicator of success was determined by achieving a minimum of 75% of students achieving a score of at least 65, which received a good score. The results of the study showed that in cycle I, 7 students or 43.7% had achieved completeness, in cycle II as many as 11 students or 68.7%, and in cycle III as many as 14 students or 87.5% had achieved completeness. The conclusion of this study is that the application of the Learning Start with a Question strategy can improve the learning of basic Physics of Engineering students.

Keywords: *Learning Start With a Question, Achievemen*

INTRODUCTION

The reality that often occurs in a classroom atmosphere, when teaching and learning activities are taking place, the involvement of most students is not visible when in front of the lecturer giving an explanation. Some students look sleepy, while others are involved in their own conversations when the lecturer is explaining the material. On the other hand, there are classes that look quiet and there is no sound, even feeling tense because the lecturer is angry. According to [1] , this situation often occurs in the classroom context. On the other hand, [2] stated that the application of innovative and fun learning methods can increase students' interest in learning, which will ultimately have a positive impact on their learning outcomes. Unfortunately, at present many educators still apply learning methods with characteristics that are different from the learning material.

The importance of Basic Physics for engineering students lies in its function as a foundation that enables them to communicate effectively in everyday life [3]. Through the understanding and knowledge gained from the subject Basic Physics lectures, it is expected that students can develop a noble personality and responsibility in community life. The main objective of the Physics course in the engineering study program is to teach students knowledge and provide guidance on the world of community and overcome various problems that students may face in everyday life.

The initial action taken by the researcher was observation and found that the achievement of engineering students in the 2024/2025 academic year had not reached the good achievement standard. The results of initial interviews in the field showed that many students got below the minimum scores in basic physics courses because lecturers generally use traditional teaching methods. This approach does not encourage active participation and joy in the classroom due to limited opportunities for students to express their creativity and lack of support from lecturers. As a result, the learning process feels monotonous for students, causing low understanding of the material, and resulting in decreased learning achievement.

The findings obtained from observations and interviews then concluded that the low learning achievement of Engineering students was caused by several factors. First, the lecturer's learning strategy was not optimal, causing students to have difficulty in understanding the material.

Second, the use of conventional methods by lecturers without variation. Third, the lack of student motivation because learning was held during the day. Fourth, the approach to learning Basic Physics which tends to be centered on lecturers is considered less effective by students, so they consider the subject difficult. This condition is different from the desired expectations. Challenges arise due to the minimal involvement of students in the learning process and the low achievement of learning outcomes.

Based on these findings, it is necessary to develop learning strategies that can arouse student interest, such as implementing strategies. Learning Start with a Question(LSQ). The LSQ strategy is a learning method that stimulates full student involvement by inviting them to examine the material being taught, thus encouraging them to ask questions about the material. The use of this strategy also helps students understand the material before receiving an explanation from the lecturer. In this context, the concepts to be taught are then studied and the questions they ask through discussion are discussed together [4].

Strategy Learning Start with a Question(LSQ) is a learning method that encourages students to actively ask questions. This strategy is expected to require students to first read the concept to be taught. Through the activity of reading the material, students can understand the content before taking further learning. If there are conceptual errors that arise when reading or discussing the material, students can identify them and discuss and correct their mistakes together in class [5].

According to [6] , the LSQ learning method is a variant of the cooperative learning strategy. This method begins with presenting questions as an initial approach to learning. To encourage student involvement in asking questions, students are directed to first translate the concept to be taught before the lecturer provides an explanation. Meanwhile, as explained by [7] , the LSQ learning strategy aims to present interactive learning and involve students more actively in asking questions or expressing things they do not yet know or understand.

Relevant research has been conducted by [8] where the results of this study illustrate an increase in student learning outcomes. In cycle I, the level of student learning success reached 38%, which was in the complete category, while 62% of students were in the incomplete category. However, in cycle II, the percentage of students who reached the complete category increased to 95.24%, while the percentage of students who were in the incomplete category decreased to 4.76%. This increase in student learning outcomes can be distributed through student activities that include asking, answering, and understanding the readings given. Referring to previous studies that showed that the application of the LSQ strategy was effective in helping students develop their learning achievements, researchers were challenged to conduct research with the title: "Improving the Learning Achievement of Basic Physics of Engineering Students at Muhammadiyah University of Tegal Through the Strategy Learning Start With a Question".

METHOD

The research subjects assigned to improve learning amounted to 16 people who were Engineering students. The Electrical Engineering study program, Muhammadiyah University of Tegal is the location of this research and it took place in the odd semester of the 2024/2025 academic year. The course that is the focus of improvement is the Basic Physics course. The type of research chosen is Classroom Action Research, which is a contemplative research method because it involves certain actions in a more professional manner, classroom learning practices can be improved and enhanced [9]. Each stage in this research can be repeated and each stage can consist of several steps or be preceded by them, so that the cycle can be illustrated as shown in the following figure.

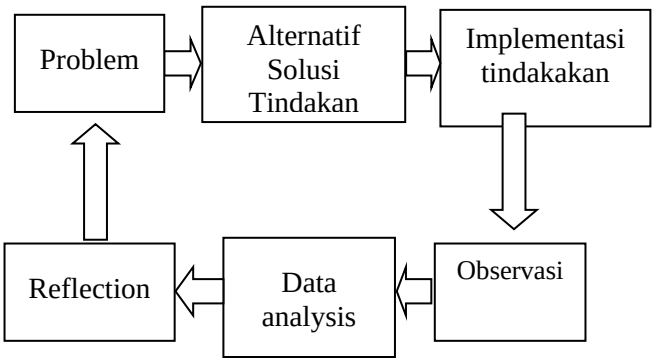

Figure 1. Classroom Action Research Cycle.

Two types of collection instruments used in this research are:

1. Observation Sheet

   According to [10], observation is a technique or method of data collection carried out by observing ongoing activities. The observation sheet is used as a guide to observe lecturer activities during learning, with the main focus on implementing the LSQ strategy.

2. Learning achievement test

   Measurement of students' basic physics learning outcomes after using the strategy*Learning Start with a Question Conducted* through exams in Cycle I, Cycle II, and Cycle III. This test is in the form of essay questions consisting of 5 items, designed to assess students' understanding of the subject matter.

   The data collected in this research was analyzed with the aim of drawing conclusions regarding strategy implementation of Learning Start with a Question. The analysis includes evaluating students' learning outcomes and identifying the problems they face. Researchers use various data analysis techniques to achieve these goals:

   1. Data Reduction

      After conducting the learning outcome test, the test is then checked and evaluated with the intention of grouping, analyzing, and organizing student data and answers according to the questions. This action is taken to facilitate writing data in the prepared table.

   2. Data Exposure

      Data presentation in PTK involves the presentation of graphs, tables, narratives, or various other forms of data visualization. The data presented usually includes student development, participation levels, behavioral changes, or other performance indicators relevant to the research objectives. This data presentation helps lecturers or researchers to evaluate the impact of learning actions or strategies that have been implemented and provides a basis for making decisions for further improvement or refinement.

   3. Conclusion Draw

      Drawing conclusions involves evaluating the impact of the actions or changes implemented in the classroom. This includes understanding how new instructional strategies or changes in teaching methods affected student participation rates, learning outcomes, or other aspects measured in the study. The conclusions provide insight into the success or failure of the actions tested.

The formula used in data processing is:

1. Calculating Student Mastery Level

   To determine the level of individual student learning achievement, calculations can be made using the following formula:

$$student\ mastery\ level = \frac{total\ student\ score}{maximum\ total\ score}$$ [11]

Each student is considered to have achieved learning completion if the proportion of individual correct answers reaches or exceeds 65.

2. Determining Classical Learning Completion

To determine learning completion classically, the percentage of students who successfully achieve completion in learning can be observed, calculated using the formula:

$$classical\ completion\ percentage = \frac{\sum students\ who\ have\ completed\ their\ studies}{\sum siswa}$$

[11]

In the context of this study, the improvement in learning outcomes is measured by looking at the increase in the percentage of individual and classical learning completion from the initial test to each cycle, with a minimum requirement of 80% of students obtaining a test score of ≥65.

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RESULTS AND DISCUSSION

Strategy *Learning Start with a Question*, or known as guided notes, is a teaching strategy where the lecturer is involved in providing various visuals such as charts, concept maps, or schemes (handouts) that function as aids to make it easier for students to take notes while the material is being presented by the lecturer. LSQ Strategy is a learning approach in which students make notes or summaries during the learning process with the guidance and direction of lecturers [12]. This model encourages students to contribute and be involved in capturing information and formulating it into the form of notes that they make themselves.

The implementation of PTK with the implementation of the LSQ strategy took place over three cycles. The LSQ strategy in implementing learning always reflects the characteristics of each cycle. Together with colleagues, researchers discussed the implementation of actions that had been carried out with results showing progress, this is in accordance with the purpose of this research, namely that the achievement of Basic Physics learning of Engineering students can be increased through the application of the strategyLearning Start with a Question.

The progress of learning can be seen from the courage of students in answering questions, even some students have dared to ask questions. In addition, when the lecturer asks questions, students are no longer appointed directly by the lecturer to answer questions but there is an initiative from students who answer by raising their hands when they can answer. The opinion of [13] supports this, who wrote in his book that the strategy of Learning Start with a Question Aims to develop students' comprehension, information processing, and note-taking skills. This LSQ strategy provides a guided structure to help students organize information and improve retention of learning materials [14]. The results of the data analysis can be seen in Table 1 below.

Table 1. Description of Student Learning Completeness in Cycle I

No.	Types of Evaluation	Completed		Not yet finished	
		Amount	Percentage (%)	Amount	Percentage (%)
1	Cycle I	9	56,3	7	43,7
2	Cycle II	11	68,75	5	31,25
3	Cycle III	14	87,5	2	12,5

Descriptive analysis in cycle I shows that there are 9 students or 56.3% of students whose completion is still below the standard, namely ≥ 65, and 7 students or 43.7% of students have completed it because they received a passing grade ≥ 65. After processing and reflecting on the data in cycle I, researchers found several weaknesses or deficiencies in the learning mechanism, both in student and lecturer activities. From the results

of the reflection, the procedures carried out to improve the deficiencies in cycle I include: (1) Emphasis and motivation are given to students, especially regarding the importance of being active in a discussion and asking students to tell their friends or lecturers about things that are considered not yet understood or understood, both; (2) When learning activities are running, educators need to have skills in managing time effectively. Researchers can work together with lecturers to prepare a schedule by sharing instructions when each phase of the strategy*Learning Start with a Question* It's finished.

From the steps to improve weaknesses/deficiencies in cycle I, it is expected to increase student activity and student learning achievement in cycle II and cycle III. In cycle II, 5 students were in this situation or 31.3% of students who had not completed because they got a score below the Completion Standard. ≥ 65, and 11 students or 68.7% of students have completed it because they got a score ≥ 65. In cycle II, the percentage of student learning completion has not yet reached completion, so the lecturer pays attention to and re-understands the deficiencies and weaknesses to be improved and applied in cycle III.

From the results of descriptive analysis in cycle III, there were 2 students or 12.5% who had not achieved learning success because they got grades below the standard set by the campus. Meanwhile, 14 students or 87.5% had achieved learning success because they got grades according to the standard. In the context of observer observations in cycle III, it was seen that the lecturer succeeded in managing learning activities by referring to the results of analysis and reflection from the previous meeting, so that the results were in accordance with expectations.

For more details, please see the following profile.

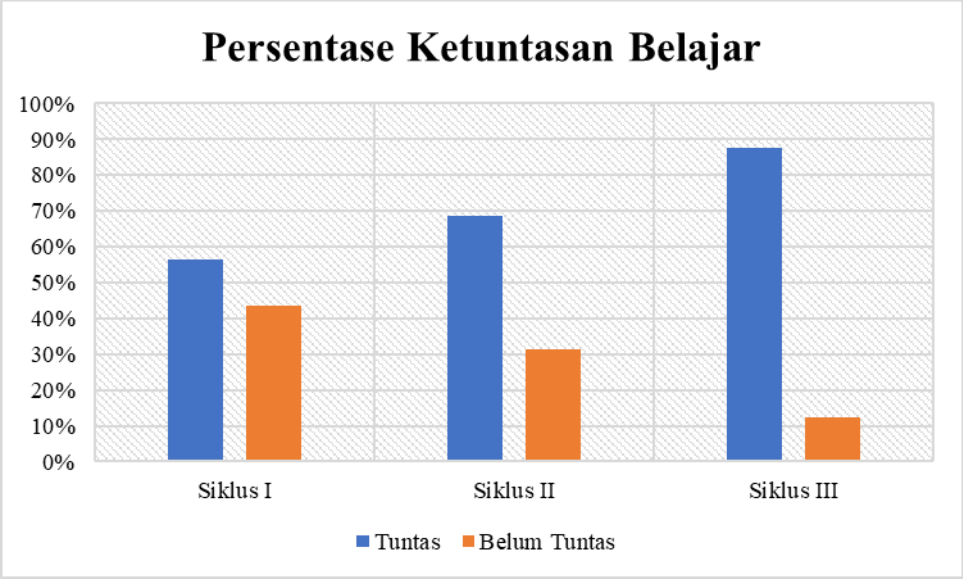

Figure 2. Student Learning Completion Profile

This finding also supports previous research on the effectiveness of strategies of *Learning Start With a Question*in learning, namely research conducted by [15], which states that a learning approach that focuses on active student involvement during the learning process provides students with opportunities to interpret essential concepts through knowledge episodes. This makes it easier for students to test, modify, and change their initial concepts, and adopt new concepts. In addition, there are additional benefits such as the development of student activity and creativity in group learning, increasing teacher abilities when applying strategies of *Learning Start With a Question Which* has an impact
positive in a conducive learning atmosphere, as well as a decrease in student behavior

which is less compatible with the learning process

CONCLUSION

Based on the data obtained during the improvements, it can be concluded that the learning achievement of Engineering students can be improved through the use of strategies of *Learning Start with a Question*. Reviewing the results of research that has been carried out, there are several recommendations that are considered fundamental to consider and implement, namely: (1) For lecturers, it is recommended to adopt a strategy of *Learning Start with a Question As* one of the options to improve student learning achievement. This method can be a source of inspiration and motivation for lecturers to develop new knowledge so that learning becomes more interesting; (2) For students, it is hoped that the application of the strategy of *Learning Start with a Question Can* be a learning process that allows the development of potential and talent, as well as improving communication skills and the ability to appear in front of the class; and (3) For future researchers, it is recommended that the results of this study can be a new reference in developing strategies of *Learning Start with a Question* which is more interesting and effective in various learning contexts.

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