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Improving Student Learning Outcomes Through the Probing Prompting Learning Model on Trigonometric Ratios in Right-Angled Triangles in Class X-MPLB-A at SMK Negeri 1 Suwawa

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Abstract

This classroom action research aims to improve student learning outcomes on trigonometric ratios in right-angled triangles using the probing prompting learning model. This study is a classroom action research conducted at SMK Negeri 1 Suwawa during the even semester of the 2022/2023 academic year. The research involved 20 students and a teacher as subjects. The instruments used included teacher observation sheets, student observation sheets, and learning outcome tests. The research was conducted over 2 cycles. The results showed that the teacher's activity observations, which reached good and very good categories, increased from 80.94% to 80.95%. Similarly, the student observations that reached good and very good categories also increased from 74.99% to 79.16%. Student learning outcomes improved from 80% to 90%. All assessment aspects met the learning success indicators in the second cycle through the application of the probing prompting learning model. Based on this research, there are benefits to applying the probing prompting learning model, as it can enhance students' mathematics learning outcomes and improve their comprehension of mathematics.

Kata Kunci : Learning Outcomes, Probing Prompting Learning Model, Trigonometric Ratios in Right-Angled Triangles

INTRODUCTION

Mathematics is one of the most feared subjects by most students due to the difficulty in solving or working on problems, which are considered complex, making students feel anxious and find it boring to learn when they hear the word mathematics. As a teacher, one surely wants to inspire all their students to have a high desire to learn, especially in mathematics.

Based on observations and interviews at SMK Negeri 1 Suwawa during the even semester of the 2022/2023 academic year, it was found that students' mathematics learning outcomes are still relatively low and below the minimum competency criteria (KKM) set by the school. Many students still struggle to understand the material on trigonometric ratios in right-angled triangles, resulting in low learning outcomes that have not yet reached the KKM.

Table 1. Data on Students' Learning Outcomes on Trigonometric Ratios in Right-Angled Triangles, Academic Year 2022/2023.

	2020/2021			2021/2022			2022/2023		
Kelas	Jumlah Siswa	Nilai rata rata	KKM	Jumlah Siswa	Nilai rata rata	KKM	Jumlah Siswa	Nilai rata rata	KKM
X-A-MPLB SMK Negeri 1 Suwawa	23	51,55	70	26	49,95	70	20	54,55	70

The low achievement in students' mathematics learning cannot be separated from the learning process in understanding the material presented by the teacher. One of the factors causing students' lack of grasp of mathematics lessons is their laziness and minimal practice when the teacher gives exercises with problems that differ from previous examples. This is due to the learning model chosen not being appropriate, making the lessons boring.

One model that can be used in mathematics learning is the Probing Prompting learning model. Probing Prompting learning involves presenting a series of questions that guide and prompt students' ideas, helping to improve their thinking processes by connecting their existing

knowledge and experiences with new information being studied (Suherman, 2008). This model encourages students to actively understand the material or problems presented, enabling them to think critically, participate actively in class, and build confidence in expressing their opinions. In this model, effective communication is achieved between teachers and students, where the teacher, as a messenger and facilitator, guides students toward finding solutions to problems.

According to Suyatno (in Swarjawa, 2013), "Probing Prompting learning is presented through a series of questions that explore students' knowledge and guide their development in the desired direction." In Probing Prompting learning, the teacher randomly selects students to answer questions. Since the question-and-answer process is conducted suddenly and students are chosen at random, all students must remain focused during the lesson. They cannot avoid participating, and at any moment, they might be involved in the question-and-answer process.

Based on the above views, it can be concluded that the Probing Prompting learning process actively engages students in challenging learning, requiring their concentration and participation. Students tend to stay more attentive to the material being studied because they must always prepare answers, knowing they could be called on by the teacher at any time.

Learning outcomes refer to acquiring new knowledge, which also influences behavioral changes from not knowing to knowing. According to Dimyati & Mudjiono (2002: 3-4), learning outcomes result from an interaction between the act of learning and teaching. From the teacher's perspective, teaching ends with an evaluation of learning. From the student's perspective, learning outcomes represent the culmination and peak of the learning process. Learning outcomes are also considered the endpoint or peak of learning activities.

Based on the above concept, learning outcomes can be defined as positive behavioral changes and skills acquired by students through the

interaction between learning and teaching. These outcomes can include intellectual learning, cognitive strategies, attitudes and values, verbal innovations, and motor skills. Such changes indicate improvements and developments compared to previous conditions.

METHODS

This type of research is Classroom Action Research (CAR), and the research design used is the Spiral model formulated by Stephen Kemmis and McTaggart. This model serves as a reference for various classroom action research studies.

The subjects of this research are students of class X-MPLB-A at SMK Negeri 1 Suwawa, totaling 20 students, consisting of 2 males and 18 females. The reason the researcher chose this class is that their mathematics learning outcomes are the lowest compared to other classes.

The learning outcomes assessed include three domains: the Affective Domain, the Psychomotor Domain, and the Cognitive Domain. The Affective and Psychomotor domains are evaluated through observations made while students are receiving lessons using the Probing Prompting learning model, while the Cognitive domain is assessed based on the scores from a written test that will be evaluated after they have received the lessons.

a. Learning Outcomes in the Affective Domain

Assessment of Student Learning Outcomes in the Affective Domain uses observation sheets to collect data or information. The affective domain refers to the assessment of each student's attitude during the learning process, and the instrument used to gather data is in the form of an attitude assessment sheet with a checklist format.

Table 2.1. Blueprint of the Attitude Assessment Instrument

No		Aktivitas
1	Tanggung Jawab	Mengerjakan tugas individu atau kelompok
2	Toleransi	Menghormati Pendapat Teman
3	Gotong Royong	Aktif dalam kerja kelompok
4	Santun	Menggunakan bahasa yang santun saat presentasi/meyampaikan pendapat
5	Percaya Diri	Berani presentasi, berpendapat, bertanya dan menajawab pertanyaan
Jumlah		**5**

b. Learning Outcomes in the Psychomotor Domain

Assessment of Student Learning Outcomes in the Psychomotor Domain is used to collect data or information on each student's skills during the learning process. The instrument used to gather data is a skill assessment sheet in the form of a checklist.

Table 3.1. Blueprint of the Practical Assessment

No		Aktivitas
1	Persiapan Kerja	Menyiapkan alat and bahan sebelum praktik
2	Proses Kerja	Melakukan praktik sesuai prsedur yang ada
3	Hasil Kerja	Mempresentasikan hasil yang diperoleh
4	Waktu Kerja	Menyelesaikan praktik sesuai waktu yang ditentukan
	Jumlah	**4**

c. Learning Outcomes in the Cognitive Domain

In the cognitive domain, learning outcomes can be assessed through written tests. This test is a technique used to measure students' mathematics learning outcomes in the cognitive domain, aiming to determine how well students can master the material provided using the Probing Prompting learning model. The written test consists of essay questions, and the instrument used is in the form of test items. However, before being administered to students, the instruments created by the researcher must first be tested for validity and reliability.

RESULTS AND DISCUSSION

This study consisted of two cycles. Cycle I was conducted over three meetings, with two meetings for learning activities and one meeting for the end-of-cycle test. Cycle II was conducted over two meetings, with one meeting for learning activities and one meeting for the end-of-cycle test.

The data for this study was obtained from the implementation of Classroom Action Research (CAR), applying the Probing Prompting

learning model aimed at improving students' mathematics learning outcomes on the topic of Trigonometric Ratios in right-angled triangles. This was conducted in class X MPLB-A at SMK Negeri 1 Suwawa, with the research subjects consisting of 20 students, including 2 male and 18 female students. The Classroom Action Research (CAR) was carried out in April 2023 during the 2022/2023 academic year.

Based on the analysis of the learning process implementation data from each meeting in Cycle I, the average meeting showed that the learning aspects were implemented at less than 100%. In the teacher's activities during Cycle I, there were six activities that fell into the 'Not Good' category, which affected student activities. The teacher activities that reached the 'Fairly Good' category included the teacher delivering an introduction and motivation, which only reached the 'Fairly Good' category. This resulted in the students' attention to the teacher's introduction and motivation also being categorized as 'Fairly Good.'

Additionally, the teacher's efforts to capture the students' attention to the material being presented, guide students in finding partners to exchange information, provide feedback to students who have presented their work, and give students the opportunity to ask questions about concepts they did not understand related to trigonometric ratios in right-angled triangles also reached the 'Fairly Good' category. Consequently, student activities such as actively discussing with peers or partners, exchanging and receiving information, and mastering the material received from their partners were also categorized as 'Fairly Good.'

However, the teacher's ability to create a pleasant learning environment was categorized as 'Not Good,' which affected student activities, such as actively participating in learning, asking the teacher questions about difficulties encountered in solving problems on the student worksheets (LKPD), and being actively involved in learning. These activities were also categorized as 'Not Good.

Based on the analysis of the learning process implementation using the Probing Prompting learning model overall in Cycle I, the teacher's activities achieved a percentage of 80.94%, which falls under the 'Good' category, while student activities reached the 'Good' category with a percentage of 74.99%. In addition to student activities, the teacher's activities also influenced students' learning outcomes.

Based on the analysis of the learning outcomes data in Cycle I, 16 students achieved the minimum mastery criteria (KKM) of 70, with an average percentage of 80%, while 4 students did not meet the KKM. The overall average percentage was 20%, categorized as 'Good' and 'Very Good.' However, as seen from the results of Cycle I, none of the assessment aspects had yet met the success indicators, so the study continued to Cycle II.

Based on the analysis of the learning process implementation in each meeting of Cycle II, the average meeting showed that the learning aspects were implemented at less than 100%. In Cycle II, the teacher's learning process activities that reached the 'Fairly Good' category amounted to two activities: guiding students to find partners to exchange information and giving students the opportunity to ask questions about concepts they did not understand regarding trigonometric ratios in right-angled triangles. As a result, student activities, such as asking the teacher about difficulties encountered in solving problems on the student worksheets (LKPD), giving feedback to students who presented their work, and summarizing the material for the meeting, also reached the 'Fairly Good' category.

This indicates an improvement by the teacher compared to the previous cycle, leaving only three student activities that had not yet reached the 'Good' category. Several methods were implemented by the teacher to improve the learning process, such as encouraging student engagement by creating competitions between groups to see who could complete the LKPD correctly and within the allotted time, and closely monitoring student

involvement in sharing information with their seat partners. These efforts stimulated student participation in the learning process. The teacher also provided a more thorough explanation of problem-solving methods, allowing students to better conclude the steps for solving problems.

Although two teacher activities remained in the 'Fairly Good' category, overall, both teacher and student activities reached the 'Good' category.

Based on the analysis of the learning process implementation using the Probing Prompting learning model overall in Cycle II, the average percentage of teacher activities reached 80.95%, which falls into the 'Good' category, resulting in student activities also being categorized as 'Good' with an average percentage of 79.16%.

Based on the analysis of the learning outcomes in Cycle II, whereas in the previous cycle only 16 students achieved the minimum mastery criteria (KKM), in Cycle II there was an improvement with 18 students reaching the KKM score of 70, with an average percentage of 90%, and only 2 students failing to meet the KKM.

It can be seen from the results of Cycle II that the activities that did not reach the 'Good' category in Cycle I were able to reach the 'Good' category in Cycle II. Therefore, student learning outcomes improved in Cycle II and met the established success indicators. Based on the results of the classroom action research in Cycle II, the expected success indicators were achieved. Thus, the study was not continued to Cycle III or beyond. Consequently, the research hypothesis—stating that using the Probing Prompting learning model on the topic of trigonometric ratios in right-angled triangles would improve student learning outcomes—was proven and can be scientifically accepted.

CONCLUSION

Based on the research results and discussion, it can be concluded that students' learning outcomes on the topic of trigonometric ratios in right-angled triangles improved after the implementation of the Probing

Prompting learning model, confirming the hypothesis.

This is evidenced by the increase in teacher activity during the application of the Probing Prompting model, with the percentage of 'Good' and 'Very Good' categories in Cycle I at 80.94%, which increased slightly to 80.95% in Cycle II. Meanwhile, the percentage of observed student activities in the 'Good' and 'Very Good' categories in Cycle I was 74.99%, which improved to 79.16% in Cycle II.

This had an impact on learning outcomes in the affective domain, which reached 77%, the psychomotor domain at 85%, and the cognitive domain at 80%. Thus, the average student mathematics learning outcomes on the topic of trigonometric ratios in right-angled triangles met the success indicators of at least 80% for the cognitive domain and 75% for the affective and psychomotor domains.

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