



Implementation of Differentiated Learning Using Canva and Quipper to Improve Learning Outcomes in Trigonometry Material

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Abstract

This classroom action research focused on accommodating visual, auditory, and kinesthetic learning styles to improve student outcomes in trigonometry. Conducted from September to October 2023, it implemented differentiated learning using Canva and Quipper media in two cycles. In Cycle I, 75% of students actively participated, with test results showing a completion rate of 58.62% and an average score of 80.82. As this fell short of the success criteria, adjustments were made in Cycle II, particularly in strategies for the kinesthetic and visual groups. In Cycle II, student activity increased to 87.5%, and test results improved significantly, with a completion rate of 88.23% and an average score of 89.67. These results met the class success criteria, demonstrating that differentiated learning supported by Canva and Quipper effectively enhanced learning outcomes in trigonometry for class XI IPA 4. This approach is thus a viable strategy for addressing diverse learning styles in mathematics education.

Keywords: Canva; Differentiated Learning; Learning Styles; Quipper; Trigonometry

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1. Introduction

Mathematics is necessary as the queen of knowledge and a companion to every subject. On the other hand, mathematics is considered a difficult and scary subject, so it tends to be disliked because many subjects are abstract. As a science related to abstract concepts, mathematics requires a presentation of learning students can accept. A presentation of learning in mathematics

is often not accepted because it is felt that mathematics is complicated to learn. The presentation of learning should be adjusted to the characteristics of students.

Each student's characteristics can vary. Each student also has different abilities in dealing with abstractions and solving problems in learning, especially Mathematics. One of the characteristics of students can be seen in their learning style. Each student has a different learning style, so receiving, processing, and remembering the information obtained is also different.

The role of teachers in knowing the characteristics of students is necessary because if the teacher already knows their characteristics, the teacher will educate, teach, guide, and direct according to their characteristics to create optimal learning activities. (Hafizha et al., 2022). Therefore, teachers must strive to help students follow learning well according to their needs. One of the efforts that teachers can use in facilitating learning activities that are by learning needs is implementing varied learning, such as using appropriate models, strategies, methods and learning media. (Hartati, 2015). Learning with varied strategies and by students' learning styles can have a positive impact that causes increased learning outcomes and makes it easier to understand the subject matter given by the teacher (Widayanti, 2013). Thus, learning that pays attention to student characteristics with models, media, and learning strategies can influence increased learning outcomes.

One strategy for designing and implementing the learning process based on student characteristics is a differentiated learning strategy (Maulidia & Prafitasari, 2023). Differentiated learning accommodates students' learning needs. Teachers facilitate according to students' needs because each student has different characteristics, which means they cannot be given the same treatment (MS, 2023). Differentiated treatment can be adjusted to learning styles, namely visual, auditory, and kinesthetic learning styles.

Learning with a visual style helps optimize their vision abilities. They are also more likely to remember information by witnessing the source directly (Wahyuni, 2017). Canva is one of the websites or applications that can facilitate interesting visual content. Canva is considered suitable for facilitating learning with a visual style. The auditory learning style requires an environment that supports their hearing abilities. One way is to listen to videos, allow them to discuss in groups and present the results (Wahyuni, 2017). One of the learning videos that can be accessed at MA Sagalaherang is from the Quipper media.

Quipper facilitates complete learning videos and sample questions that auditory students can listen to independently and allows them to discuss and present them in front of the class. Meanwhile, learning with a kinesthetic style allows for easier absorption of information by touching, doing, and moving something that provides certain information so that students can remember it (Wahyuni, 2017). The provision of LKPD that facilitates students' movement and touch is needed for this learning style.

The fact that Mathematics is still not popular also occurs in class 11 IPA 4 MA Assyifa Sagalaherang. In the mid-semester assessment in this class, student learning achievement in Mathematics was only 57.89% or 11 out of 19 who could meet the KKM criteria. It shows that there are still many who still need to understand mathematics fully. On the other hand, the results of the diagnostic test show that the learning styles of students in this class vary, including visual, auditory, and kinesthetic learning styles. So far, teachers have never paid attention to student learning styles. Teachers only teach through Power Point screens or explanations on the board with lecture and discussion methods, which, of course, only benefit students with auditory learning styles. Therefore, the low learning achievement of students can be caused by teachers who have yet to facilitate the characteristics of each student's learning style.

Moreover, the following material must be studied: trigonometry, which is often considered very difficult, so the right learning strategy is needed. Based on this problem, learning is needed to

facilitate students' learning styles in class 11 IPA 4 to improve their learning achievement. In this study, students in class 11 IPA 4 will be facilitated with differentiated learning based on learning styles assisted by Canva and Quipper media on Trigonometry material.

2. Methods

The type of research used in this study is the Classroom Action Research (CAR) Kemmis McTaggart Model. This study involved 19 students in class XI IPA 4 MA Assyifa Sagalaherang, carried out in September-October 2023. The procedure for implementing this research was carried out in two cycles. Each cycle has four stages, namely (1) planning, (2) implementation, (3) observation, and (4) reflection. Data collection techniques in this study were observation to determine the implementation of differentiated learning carried out by the observer teacher, tests to determine learning outcomes after the implementation of learning, and interviews to reflect on the learning that had been carried out. The research instruments were evaluation sheets, student activity observation sheets, and interview guidelines. Data analysis in this study included qualitative descriptive techniques carried out through several stages, namely 1) data reduction in the form of a simplification process through selecting results, focusing, and abstracting data into meaningful information, 2) data presentation, and 3) concluding. The benchmark for the success of this research is the completeness of student learning outcomes, as seen from individual completeness, which is said to be complete if it reaches the Minimum Completeness Criteria (KKM) of 75 or above 75. At the same time, classical completeness is if 85% of students a score of 75 or more. Therefore, if classical completeness is achieved, the research is stopped.

3. Results and Discussion

The results of this study will be explained in detail in the implementation of the planned research activities with two cycles of action. Each cycle will begin with several stages that must be carried out. These stages include several things, namely planning before action, implementing actions or actions, continuing with observations including teacher activities, student activities, student learning outcomes and interview results, and the last step is a reflection.

3.1. Cycle I

The cycle I learning plan is focused on overcoming problems found during pre-action observations. At the pre-action observation stage, it was found that many students still needed to the KKM completion, stage. The teacher had never facilitated all students' learning styles, and only a few students were active in learning. so the learning objectives that had been set could not be achieved. Starting from the problems above, the teacher and researcher made an action plan, namely 1) Compiling learning devices related to learning with differentiated learning styles on trigonometric ratio material; 2) Creating groups adjusted to the results of the diagnostic test; 3) Preparing teaching materials and teaching resources. The teaching resources used were the Mathematics X ALC book and Quipper media. 4) Preparing Canva learning media for groups with visual learning styles; 5) Preparing Quipper learning media for groups with auditory learning styles; 6) Preparing special LKPD for kinesthetic learning styles. 7) Prepare evaluation tests that will be given to students at the end of learning; 8) Prepare observation sheet instruments for teacher and student activities in differentiated learning.

Cycle I actions implemented to overcome problems described in the planning before the action. Cycle I intends to help students find the concept of trigonometric comparisons and explain the definition of trigonometric comparisons in right triangles by connecting them with the concept of Pythagoras. Cycle I was carried out in one meeting on October 11, 2023. The researcher carried

out the stages that had been planned in this PTK according to the teaching module that had been made. The results of the tests carried out at the end of learning in cycle I are as follows.

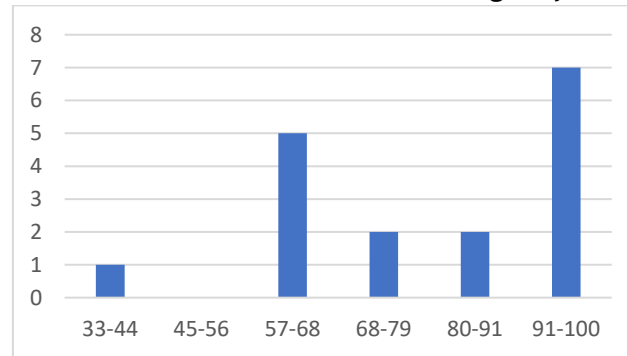


Figure 1. Student Learning Outcomes in Cycle I

From the data, the learning outcomes were 58.94%, with a class average of 80.82. From the data, classical completeness has yet to be met because the percentage of classical completeness is still less than 85%. After implementing cycle I learning, the researcher interviewed students in each group. The interview result from one of the members of the auditory group stated that learning became more accessible and enjoyable because they could understand directly and could repeat what they did not understand. In addition, they became more aware of the material by discussing and presenting what was understood. As for the visual group, they were happy because the images were diverse, but they felt that the explanation still needed to be improved and found it challenging to understand if it was not explained further. As for the auditory group, they were happy because they could express themselves more, but it would be more enjoyable if it were carried out outside the classroom. After completing the research in cycle I, the researcher reflected on the test results, observation sheets, student interviews, and evaluations with the observer teacher. The problems found include the following: 1) The teacher has implemented differentiated learning assisted by Canva and Quipper on trigonometry material, but the teacher still needs to work on facilitating each group. 2) There are still some students who still need to be active in learning. 3) The visual group need more explanation of the visual content provided in more detail. 4) The kinesthetic group has not moved using all of its senses. 5) The student test result have yet to reach classical completeness.

The test results in cycle I were 58.82%, with an average of 80.82 failing to meet the benchmark for learning outcome completeness of 85%. Thus, the data from the observation and test results, and the indicators of success in this study have yet to be fully achieved, so the research needs to be improved in cycle II.

Based on these problems, improvements are needed in the next cycle so that the teacher who is also a researcher and the observer teacher, reflects that the improvements in cycle II are as follows: 1) Teachers can improve differentiated learning by providing more detailed instructions to each group. Teachers can also pay more attention to groups that need more help. 2) Students are given motivation to be more active in learning and are given more appropriate LKPD. 3) Teachers create activities for kinesthetic groups outdoors so that students can move more freely. And 4) Teachers can also facilitate visual groups with deeper explanations and make visual groups into two groups.

3.2. Cycle II

The Cycle II learning plan focuses on overcoming the problems in Cycle I. At the cycle stage, it was found that: (1) Groups still need to be facilitated to be assisted with explanations. (2) The visual group cannot only get material from visual content in the form of Canva but also needs

explanations. (3) The kinesthetic group needs activities involving all their senses. Starting from the problems above, the teacher and researcher made an action plan for cycle II as follows: 1) The teacher divides the visual group into two groups only 2) The teacher prepares a more interesting media strategy for the kinesthetic group, namely the kinesthetic group makes observations of the surrounding environment. 3) The teacher explains to the visual group and provides the visual content. 4) Prepare teaching materials and teaching resources. The teaching resources used are the Mathematics X ALC book and Quipper media. 5) Prepare Canva learning media for groups with a visual learning style 6) Prepare Quipper learning media for groups with an auditory learning style. 7) Preparing LKPD for students' kinesthetic learning styles 8) Preparing observation sheet instruments for teacher and student activities in differentiation learning.

Cycle II actions were implemented to overcome the problems described in the planning before the action. The meeting was held on October 12, 2023, and was allocated to 2 x 35 minutes. The researcher carried out the stages that had been planned in this PTK. The test results were carried out at the end of learning in cycle II.

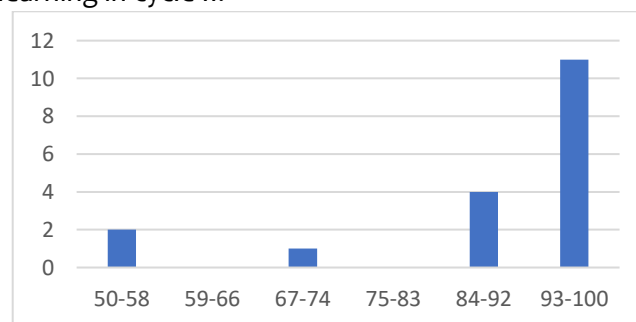


Figure 2. Student Learning Outcomes in Cycle II

From the data, the learning outcomes were 88.23%, with a class average of 89.67. Thus, the classical completion has met the classical completion percentage of 85%, and the average value exceeds the KKM value. In cycle II learning, the researcher interviewed students in each group. The results of interviews with the auditory group showed that they still felt comfortable with this learning model: auditory learners felt very happy and understood more easily. As for the visual group, they felt there was an improvement in cycle II because they received additional explanations from the teacher. The kinesthetic group was happy because they could learn outside the classroom even though the material still needed to be understood with guidance. After completing differentiated learning assisted by Quipper and Canva in cycle II, the researcher reflected on the observations, test results, interview results, and evaluations with the observer teacher. The activeness of students in learning has emerged as better, although yet to be optimal. The interview results also showed that students felt that learning in cycle II was better than before. The test results in cycle II increased from the previous cycle. The test results showed classical learning completion of 88.23%, which met the benchmark for learning outcome completion of 85%. The average value of students was 89.67, exceeding the KKM value of 75. Thus, data from observation and test results, indicated that success in the study has been achieved in full so that the study can be said to be successful. The study was stopped until cycle II.

The implementation of differentiated learning assisted by Quipper and Canva can be improved with the following steps;

1. Providing action in cycle I by differentiating content and processing for each group of different learning styles. The kinesthetic group uses LKPD, which involves movement; the visual group uses Canva media; and the auditory group uses Quipper media.

2. Providing corrective action in cycle II in the form of dividing fewer groups, making LKPD for the kinesthetic group that involves more movement of all senses, providing additional explanations to the visual group.

The results of the implementation of learning and the results of reflection carried out during cycle I to cycle II showed that the application of differentiated learning assisted by Canva and Quipper on trigonometry material can improve learning outcomes. This is proven by the data obtained which shows an increase during the learning process. Through differentiated learning, information can be obtained according to the characteristics of each learning style so that it is easier to accept trigonometry material. Differentiated learning allows students to like the activities given because they are based on their characteristics. The learning involves content differentiation because the content of the material given to each group is different. This content differentiation also uses media that involve technology, namely Canva and Quipper. Process differentiation occurs because there are differences in activities in each group.

Meanwhile, product differentiation occurs from the results of student presentations. With these details, differentiated learning assisted by Canva and Quipper on trigonometry material in class XI IPA 4 has been implemented. It has increased so that it can be said to be successful. This is in line with Meria's research, which states that differentiated learning can be used in Mathematics learning because it can accommodate students' learning needs that are adjusted to their interests, learning styles, profiles and learning readiness (Gusteti & Neviyarni, 2022).

4. Conclusions

The results of the action research carried out in the form of differentiated learning with the help of Canva and Quipper media in class XI IPA 4 MA Assyifa Sagalaherang on trigonometry material with trigonometric comparison sub-material showed an increase in scores. The increase in learning outcomes can be seen from the test results from cycle I to cycle II. The test results met the classical completeness criteria, namely 85%, getting a score above 75 after completing cycle II. Thus, differentiated learning assisted by Canva and Quipper can be an alternative strategy for learning.

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