ANALYSIS OF MATHEMATICS LEARNING ACTIVITIES MATERIAL LIMIT FUNCTION ALGEBRA USING QUICK ON THE DRAW STRATEGY

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ABSTRACT

Mathematics learning activities are often considered very boring and abstract, making it difficult to solve problems found in mathematics learning. This results in students being less enthusiastic about mathematics learning activities, especially the material on limits of algebraic functions. The absence of enthusiasm or low student motivation to learn makes it difficult for students to learn mathematics, resulting in poor understanding of the material. To overcome the problems found in student learning activities, use learning strategies. The mathematics learning strategy that can be used to overcome this problem is the quick on the draw strategy which can encourage students to be active and collaborate in groups through games so that students are more active and motivated in solving problems in mathematics. This research aims to analyze mathematics learning activities regarding algebraic function limits using the quick on the draw strategy. Research was conducted at SMAN 2 Dewantara on class XI MIPA students totaling 42 students. This research is descriptive qualitative research. Data collection techniques in this research used teacher observation sheets, student observation sheets, unstructured interviews, and documentation. The data that was obtained during the research was analyzed to see mathematics learning activities with the strategy that was used, namely the quick on the draw strategy, especially in the material on limits of algebra functions which will be carried out in three meetings in class. The results of the research show that student activities in the learning process using the quick on the draw strategy meet the criteria for effectiveness.

Keywords: Activity, Algebraic Function Limits, Quick On The Draw

1. INTRODUCTION

Mathematics is a subject that exists at every level of education so students must understand. Every activity in life is related to mathematics so you are required to understand mathematics (Genc & Erbas, 2019). However, in reality, mathematics learning, especially activities, still does not make students active so that learning does not go well.

Learning activities are a stage in learning activities carried out by students to achieve goals in a material (Patimah et al., 2020). Through various activities in learning, students experience various experiences so that learning becomes more meaningful and easier for students to understand. In mathematics learning, student activities need to be considered so that students are motivated to solve problems in learning (Djafar et al., 2019). Motivation is the heart of learning (Borah, 2021). Apart from that, learning activities must create and provide new experiences for students (Elisyah et al., 2023).

Less interesting learning activities can make students feel bored and unable to participate in learning well, which makes it difficult for students to understand the learning material. One of the mathematics materials that is difficult for students to understand is the limits of algebraic functions. One of the causes of students experiencing conceptual errors in algebra function limits material is students' motivation to learn (Wulan et al., 2020). Apart from that, the problem of students' difficulties in algebra function limits material is influenced by environmental factors, one of which is the learning strategy or model used by the teacher

(Dewi et al., 2020). So to overcome students' difficulties, learning strategies are needed. One learning strategy that can be used is the quick on the draw strategy.

The quick on the draw strategy is a learning strategy that is student-centered while the teacher is only a facilitator or provider of information in the learning implementation process (Amin & Sumendap, 2022). The quick on the draw strategy is also defined as a strategy that can encourage cooperation in groups and speed in solving problems given by the teacher (Daniati et al., 2020). Several studies related to the quick on the draw strategy explain that this strategy can help students understand the material being studied and can make students more motivated to participate in learning.

Previous research related to the application of the quick on the draw strategy carried out by Wirahmat explained that the quick on the draw strategy can increase student learning activities and improve student learning outcomes (Wirahmad et al., 2021). This is also found in Aini's research which states that the quick on the draw strategy can increase self-confidence in solving mathematical problems so that you don't depend on other people (Aini & Irawati, 2019). Apart from that, research conducted by Putra et al shows that students can answer questions quickly and accurately and teachers allow students to correct wrong answers so that students are motivated to solve the questions given (Putra et al., 2020). Based on the description above, researchers are interested in analyzing mathematics learning activities regarding algebraic function limits using the quick on the draw strategy.

2. LITERATURE REVIEW AND HYPOTHESIS

Mathematics Learning Activities

Learning activities are a stage in learning activities to achieve a goal in learning (Patimah et al., 2020). The stages in learning need to be considered so that learning activities run well and effectively. The activities in the activity consist of activities carried out by teachers and students in learning algebra function limits material.

Limits of Algebraic Functions

The concept of factoring and rationalizing root forms is prerequisite material before studying algebraic function limits (Ria et al., 2023). This shows that before studying the material on limits of algebraic functions, students must first master the prerequisite material so that when studying the material, students do not experience difficulties.

If the number $f(x)$ approaches a real number for x approaches a but x≠a then L is the limit value of the function $f(x)$ at $x = a$, written $\lim_{x \to a} f(x) = L$. If n is a positive integer, c is a constant, $f(x)$ and $g(x)$ are functions that have a limit at $x = b$ then (Indriani, 2007):

- $\lim_{x \to a} c = c$
- $\lim_{x \to a} x = a$
- $\lim_{x \to a} c.f(x) = c.\lim_{x \to a} f(x)$
- $\lim_{x \to a} [f(x) \pm g(x)] = \lim_{x \to a} f(x) \pm \lim_{x \to a} f(x)$
- $\lim_{x \to a} [f(x).g(x)] = \lim_{x \to a} f(x) . \lim_{x \to a} f(x)$
- $\lim_{x \to a} \frac{f(x)}{g(x)} = \frac{\lim_{x \to a} f(x)}{\lim_{x \to a} g(x)}$, $with\ g(x) \neq 0$
- $\lim_{x \to a}[f(x)]^n = \left[\lim_{x \to a} f(x)\right]^n$
- $\lim_{x \to a} \sqrt[n]{f(x)} = \sqrt[n]{\lim_{x \to a} f(x)}$ $with\ \lim_{x \to a} f(x) > 0\ and\ n\ even$

Quick on the Draw Strategy

The quick on the draw strategy is a strategy that prioritizes activities in the learning process in working together to solve problems given by the teacher through games that refer to teamwork and group speed (Ekawati et al., 2020). The steps for learning the quick on the draw strategy are (Atmah, 2011): 1) a set of questions has been prepared by the teacher; 2) the teacher divides students into several groups; 3) the teacher distributes learning resources to each group to help answer questions; 4) when there is the word "start", representatives from each group "run" to take the questions in front of the class and then return to the group to work on the questions they have taken; 5) groups complete questions on the LKPD; 6) The second student brings the answer, the teacher checks the student's answer. If the student's answer is correct then the second student is invited to take the next question, but if the answer is wrong then the student returns to their group to correct the answer; 7) The winning group is the first group to solve all the questions.

The quick on draw strategy has advantages, namely (Aini & Irawati, 2019): 1) makes students realize the importance of group work by dividing tasks in working on questions and being active in groups; 2) students will get used to answering questions quickly and accurately; 3) students can distinguish the priority of the material that must be studied; 4) able to increase student activity so that they do not remain silent during the learning process. So the quick on the draw strategy is seen as effective in increasing student learning activities.

Action Hypothesis

The quick on the draw strategy in learning mathematics regarding algebraic function limits meets the criteria for effectiveness.

3. RESEARCH AND METHOD

The approach used in this research is a descriptive qualitative approach. The descriptive research method is a research method used for research that focuses on natural conditions (Sugiyono, 2019) . It is hoped that the qualitative research method used by the author will be able to obtain detailed information in research related to mathematics learning activities regarding algebraic function limits using the quick on the draw strategy. The research was carried out at SMAN 2 Dewantara in class XI MIPA.

Data collection techniques in this research were teacher observation sheets, student observation sheets, and documentation. Teacher and student observation sheets are used to assess mathematics learning activities during class. In the observation sheet, teachers and students each have indicators that meet the effective criteria. Observation sheets are also used to assess students during the learning process, both in terms of attitudes and skills (Sani, 2016). During the learning process, the observer was asked to give a checklist ($\checkmark$) with the scale used, namely 4 (very good), 3 (good), 2 (fairly good), 1 (not good) on the activity sheet provided by the researcher. The data obtained from the observer was then analyzed using the following formula.

$$P = \frac{x}{N} x\ 100\%$$

Information:
P = Percent value to be searched for
x = Total teacher and student activity scores
N = Maximum score of teacher and student activities

Then the scores that have been obtained will be classified using the criteria presented in the table below.

Table 1 Classification of Activity Scale Score Data

Score Percentage	Classification
$80 \leq P \leq 100$	Very good
$60 \leq P < 80$	Good
$40 \leq P < 60$	Passably
$20 \leq P < 40$	Deficient
$0 \leq P < 20$	Not good

Sumber: modifikasi (Randi & Pali, 2023)

Apart from that, the observation sheet is supported by documentation. Documentation data collection techniques are data collected to support observation data. Documentation consists of activity reports, photographs, and documentary films of relevant research data obtained during mathematics learning activities regarding the limits of algebraic functions.

4. DISCUSSION

The research was conducted at SMAN 2 Dewantara on class XI MIPA students totaling 42 students. In planning mathematics learning activities, the material on algebraic function limits using the quick on the draw strategy is the lesson plans and teaching materials which have previously been discussed with the teacher and will be presented to students during class. The RPP that has been prepared contains the characteristic values for when teaching and learning activities take place.

During mathematics learning activities, the material on limits of algebraic functions is carried out by the stages by the quick on the draw strategy. Based on the observation data carried out by the observer according to the observation sheet, the teacher activity score was 183 and the student activity score was 133. Based on the number of activities, the teacher had 17 activities and the students had 13 activities, with each activity having aspects assessed with the lowest score of 1 and the highest. 4. Then the scores obtained from the teacher and student observation sheets will be calculated in percentage form by dividing the number of activities (teachers or students) by the number of maximum scores (teachers or students) and then multiplying by 100%. The score from the calculation of teacher activity in percent is as follows:

$$p = \frac{x}{N} \, x100\%$$

$$p = \frac{183}{204} \, x100\%$$

$$p = 89,7\%$$

Apart from that, the score from the calculation of student activity in percent is as follows:

$$p = \frac{x}{N} x100\%$$

$$p = \frac{133}{156} \, x100\%$$

$$p = 85\%$$

Based on the data classification criteria, the teacher and student activity scale scores in implementing the quick on the draw strategy fall into the very good category with a teacher activity percentage of 89.7% and a student activity percentage of 85%.

This research aims to analyze mathematics learning activities regarding functional limits using the quick on the draw strategy. After analyzing mathematics learning activities

on algebra function limits using the quick on the draw strategy, it can be seen that the learning activities fulfill the effective category through a series of activities.

The teacher's initial activity opens the lesson by saying hello and greeting the students by asking how the students are and continuing by reading prayers together. The teacher attends to students and ensures that students are ready to take part in today's learning. The teacher provides apperception by linking previous material or prerequisite material before studying algebraic function limits, namely factoring and rationalizing roots. The teacher asks stimulating questions while explaining the learning objectives and conveying information regarding the strategy that will be used during the lesson, namely the quick on the draw strategy.

The teacher's core activity is to explain the material through power points to explain the material and provide examples of problems related to the material on limits of algebraic functions. Then the teacher divides groups heterogeneously based on the students' initial scores. Each group consists of 4 or 5 students and each student will be given a hat of a different color. The teacher distributes LKPD which contains problems and is accompanied by a set of questions that have different colors. Where each set of questions consists of 2 or 3 statements presented on cards of different colors. Next, the teacher demonstrates and explains the rules for working on the questions. If there is an instruction "start" then each representative in each group will run to the question card and choose a question card according to the color of each group. The group representative who has received the question card brings the card to his group to work on as a group. After finishing the work, the second student in the group brings the questions and answers back to the teacher for checking. If the answer is correct then the student may take the next question card, but if it is wrong then the student may bring the question back to the group to correct it until it is correct. The group that wins is the group that can answer the questions correctly and quickly. Group 1 in learning mathematics regarding limits of algebraic functions was the winner.

The final activity is the closing stage which gives students from the winning group the opportunity to present a percentage of their group's answers. The teacher gave appreciation to the students who won and did not forget to motivate the students who did not win. Then the students and the teacher conclude the material they have studied.

During implementation, there were still a few difficulties experienced, namely students were still embarrassed to come forward the first time, but this could be overcome when the teacher encouraged the students. Apart from that, teachers must also be active in making students active in group work so that discussions run well.

The quick on the draw strategy in this research shows that it is effectively used in the learning process, thereby encouraging students to be more active in solving problems and understanding the material. The quick on the draw learning strategy is a collaborative research activity, quick in solving problems, and can give students the opportunity to come up with new ideas (Daniati et al., 2020). This is also in line with the advantages of the quick on the draw strategy, namely training students to solve problems quickly and accurately, training students to work in teams, and improving the skills of each student (Amin & Sumendap, 2022).

5. CONCLUSION

Based on the results obtained from the research, it can be concluded that mathematics learning activities on algebraic function limits using the quick on the draw strategy meet the effective criteria. This is proven by the teacher and student activity percentage scores which were respectively obtained at 89.7% and 85% in the very good category. This can also be seen from the documents obtained showing that students are enthusiastic about participating in learning with games through the quick on the draw strategy. Apart from that, students are also

enthusiastic about solving the problems that the teacher has given, as proven by ongoing group discussions and students can solve problems on the question cards quickly and accurately.

In this research, there are still shortcomings, namely conditioning students to be active in learning. For future research, it is hoped that the quick on the draw strategy will not only be used in algebra function limits material but can be used in related material so that learning is more interesting and students are motivated to solve problems in the material presented.

6. ACKNOWLEDGEMENT

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