



## Scaffolding Technique to overcome Students' Mathematics Learning Anxiety

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### Abstract

Mathematics is a subject at school that is in-depth and very important in the world of education. However, Mathematics is often used by students as Mathematics Anxiety. This is often associated with fear and lack of confidence in Mathematics. So an alternative is needed as a solution, which can be tried using the Scaffolding Technique with a combination of Social Arithmetic material. The aim of this research is to evaluate the extent to which the application of scaffolding techniques can increase the effectiveness of overcoming students' mathematics anxiety in understanding Social Arithmetic material. This type of research is PTK with a focus on learning strategies in the classroom. Direct assessment techniques with notes using observation guides and field notes to summarize everything that happened. In an ongoing program, it is necessary to achieve 75-100% of the set goals in order to be considered successful. From the research results, it can be confirmed that there has been an increase in both the average value and percentage, indicating that the research objectives have achieved the expected level of effectiveness. This improvement is measured by looking at the results of student learning scores, where a score of  $\geq 75$  or  $> 75$  is considered an indicator of significant improvement. The use of the Scaffolding Technique in Social Arithmetic material, through the use of Games, is a prominent factor in achieving positive results. So, it can be concluded that the application of the Scaffolding Technique strategy is able to increase students' understanding of Social Arithmetic material.

**Keywords:** anxiety; mathematics; scaffolding.

## INTRODUCTION

Learning is said to be an element in the implementation of education, so that the quality of education is closely related to the quality of learning (Zagoto & Dhaki, 2018). In learning, many problems arise from several sides. It can be caused by teachers and students, but teachers still play an important role in problem solving with students as a supporting role. Things that arise a lot in educational circles today are about Mathematics. The role of mathematics in various aspects of life is strongly tied to mathematics learning (Ikhsan, 2019). For example, information and ideas are often conveyed in mathematical language.

Mathematics is a subject in school that is said to be in-depth and very important in the field of education, but this subject is often faced by students with varying levels of anxiety. Therefore, in learning mathematics, the class should not only focus on mastering the material to solve problems mathematically (Buyung & Dwijanto, 2017). Mathematics is characterized by logical and axiomatic reasoning known as a deductive process (Mariyani et al, 2021). Meanwhile, in line with the competencies that students should have today, namely mathematics learning which is required to develop 21st century skills, namely developing student competencies to be better than before (Badri et al, 2019). Mathematics anxiety, which is often related to fear and lack of confidence in understanding mathematical concepts. This math anxiety can also be a serious obstacle to students' learning and academic achievement. This is

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a well-known challenge among educators and Education researchers. The main focus of much research in the field of education in recent years has been anxiety towards mathematics (Auliya, 2016).

In the world of education there is an important process in it, namely learning. At all levels of education, learning mathematics is one of the prominent forms of learning and contains many uses (Kurniawati & Ekayanti, 2020). Meanwhile, based on the results of observations made by researchers on November 8 2023 on teachers and students of class VII B SMP Sabiluth Thoyyib Pasuruan, it shows that the majority of students experience anxiety in mathematics. This anxiety arises because students do not understand the basics of Mathematics. The Mathematics teacher at Sabiluth Thoyyib Middle School previously used a solution by providing a special approach such as continuous assistance to students who had Mathematics Anxiety. This solution is carried out one by one for several students. However, it is believed that previous solutions are still not effective in the long term.

Based on observations of class VII B students at Sabiluth Thoyyib Middle School, it can be said that all students tend to experience mathematics anxiety for different causes. Even though previous solutions have been implemented, this does not fully solve the problem from the student's point of view. It cannot be denied that using solutions such as focusing on students one by one is less effective because it is not only teachers who will feel tired of dealing with students one by one. However, when this solution is implemented, students who were not previously accompanied by teachers may be able to act as they wish. This results in the problem of students' mathematics anxiety not being resolved and the class becoming uncondusive.

From any point of view of Mathematics, problems are usually solved from the basics. The basic problem of Mathematics in the world of education is Mathematics Anxiety in Students. With this, students need an alternative that can be used as a tool to overcome Mathematics Anxiety. There are many things that can be used as alternative solutions to this problem, one of which is designing good and interesting learning strategies. Unusual methods used to improve students' understanding and learning outcomes are said to be learning strategies (Qothrunnada, 2023). These learning strategies can be designed by teachers which can then be applied to students.

The student's situation and condition, learning resources, needs and characteristics are considered in selecting learning strategies (Siswondo & Agustina, 2021). So, a learning strategy is designed that can be used to overcome students' Mathematics Anxiety, namely by using the Scaffolding Technique. If students experience certain and uncontrollable conditions, such as experiencing learning obstacles, they can be given the Scaffolding Technique (Kusmaryono, 2021). In implementing learning strategies using this scaffolding approach, students not only receive guidance and support from the teacher, but can also access information through discussions and exchanging ideas with fellow students in the context of group learning (Agustiani et al, 2021). Engineering in the world of Indonesian education is very rare for teachers to initiate ideas and create students' character and thinking by applying the scaffolding technique as an alternative solution to the problem of mathematics anxiety in students. Meanwhile, the scaffolding technique can be used as an intermediary for teachers and students to overcome students' mathematics anxiety. Scaffolding is a technique in learning that focuses on the teacher's closest assistance or support to students to help them understand material that is difficult to understand. Scaffolding is a significant teaching strategy that can be traced back to Vygotsky's sociocultural ideas and his ZPD concept (Isrokatun et al., 2019). Scaffolding can also be said to be a learning technique or method with an effective approach that can balance students' understanding in general. Students can gain a lot of understanding of the brain that is not just at one point. In other words, this scaffolding technique can expand students'

understanding of any matter that has been determined and can overcome several students' brain problems, especially in learning at school. Learning through a scaffolding approach produces optimal learning effects that can reduce students' workload (Pratama and Saregar, 2019). Scaffolding has its own characteristics and is related to understanding how to overcome obstacles in learning mathematics with different approaches. This technique cannot be applied without auxiliary material that is relevant to students' mathematics anxiety problems. One area of mathematics that can be used as a helpful object in dealing with students' mathematics anxiety is social arithmetic.

Social arithmetic includes the application of mathematical concepts in the context of social and practical situations, such as personal finance, statistics, social problem solving, and public policy. This is an area of mathematics that is relevant in everyday life and often involves understanding and analyzing numbers in a social context. Solving problems in everyday life in the future is the main benefit of discussing social arithmetic for students (Nuraeni et al, 2020). Real experiences in everyday life are needed to create enjoyable Mathematics learning (Utami, 2017). In simple language, students can easily understand things that are relevant to their daily lives, such as shopping which is currently popular among generation Z, whether online or offline. Therefore, in the long term, the scaffolding technique in Social Arithmetic helps students develop mathematical skills that can be applied in their daily lives.

Students' understanding in learning and understanding new material, with the help of easy material experience that supports it is a successful mathematics learning process (Marta, 2018). Therefore, a learning approach is needed with the hope that students can also learn mathematics with a sense of joy and feel the wonder of the world of numbers in mathematics (Cahaya, 2023). A learning approach that includes scaffolding techniques can help students overcome mathematics anxiety and improve their understanding of mathematics material. Scaffolding is very urgent and relevant in improving students' education and academic achievement, as well as helping them overcome the obstacles of mathematics anxiety which often hinder learning progress. The scaffolding technique involves tiered mentoring that provides support to students according to their level of understanding, helping them understand mathematical concepts in depth.

However, in an article a study is presented which explains that the problem of students' mathematics anxiety requires efforts to improve aspects related to learning activities, assessment, as well as teacher qualifications and competencies. It is also said that one method that can be used is a scaffolding strategy which will help students if applied in the problem solving process. Meanwhile, in the world of education, it is currently necessary to explore and understand further the effectiveness of scaffolding techniques in overcoming mathematics anxiety, namely by strengthening it, as in this research, using the context of social arithmetic as relevant material that strengthens the application of scaffolding techniques. How this technique can be applied effectively according to the specified context and to what extent teachers can help students feel more confident and understand social arithmetic material, remain relevant research questions.

Within this framework, this research aims to investigate the effectiveness of applying scaffolding techniques on students' mathematics anxiety in social arithmetic material. I will explore the effectiveness of scaffolding techniques in improving mathematical understanding and reducing student anxiety, especially in Social Arithmetic. It is hoped that the results of this research will provide valuable guidance for teaching practice and help students overcome the barriers of mathematics anxiety that often become a challenge in learning social arithmetic in general.

**METHODS**

This type of research is Classroom Action Research (PTK) with a focus on learning strategies in the classroom. The subjects of this research were students in class VII B of Sabiluth Thoyyib Middle School, consisting of 20 students. The object of the research is the effectiveness of students' learning at the junior high school level. Data collection techniques use observation, interviews, classroom actions through Teaching Modules, and questionnaires as research evaluation. Data will be collected both during the implementation of teaching and learning activities and after completion. Direct formative assessment techniques during activities in this research use techniques in the form of teacher and student observations. Teacher and student observations were also recorded using an observation guide and field notes to summarize everything that happened. In an ongoing program, it is necessary to achieve at least 75-100% of the set goals in order to be considered successful. Data were analyzed descriptively, quantitatively, qualitatively and presented in the form of tables and graphs. Numerical data analysis in this research was carried out using quantitative descriptions. The aim is to use qualitative descriptive language to describe the results of researchers' observations of the scaffolding approach used by teachers with students.

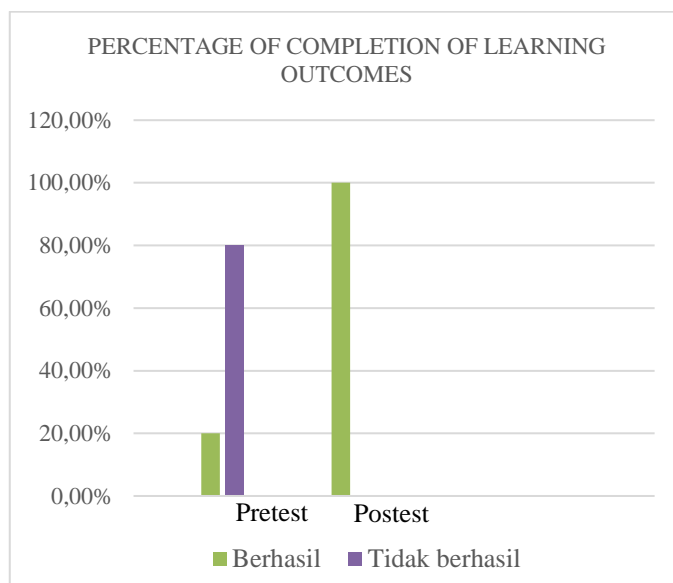
**RESULTS AND DISCUSSION**

Basically, research in this research method is carried out in II cycles. However, this research was carried out in only one cycle in 1 meeting on Social Arithmetic material and this research was carried out with a total of 20 students. This research was carried out by observing the teacher first. From the results of these observations, it has been detected that there is mathematics anxiety in students, especially in Class VII B of Sabiluth Thoyyib Middle School and efforts have been made to overcome it, but this has not been effective in the long term. There is also a questionnaire used to see Mathematics Anxiety in Students. With this, classroom action research was carried out as a teacher by acting as a teacher as usual, as well as providing different combinations by applying scaffolding techniques to overcome mathematics anxiety in class VII B students. This technique was linked to relevant material, namely Social Arithmetic. This is done not only to measure the effectiveness of the scaffolding technique but also to increase students' interest in mathematics, as well as reduce students' mathematics anxiety. In this research, a pre-test and post-test were used using the Teaching Module bridge. The results obtained from this research action can be seen in Table 1 as follows:

**Table 1. Student Learning Result Scores Performing Pre-test and Post-test on Social Arithmetic Material**

Intervals	Category	Pretest		Post-test	
		F	%	F	%
81-100	Very good	4	20%	20	10%
61-80	Good	0	0%	0	0%
41-60	Enough	8	40%	0	0%
21-40	Not Enough	8	40%	0	0%
0-20	Very Less	0	0%	0	0%
Amount		20	10%	20	10%

From Table 1. Shows a rapid increase in students. It can be analyzed by calculating the percentage, there are 20% who fulfill and 80% who do not fulfill this Pre-test, while going to the Post-test percentage it can be seen that 100% fulfill the targeted success category. If described using a diagram, the percentage score of student learning outcomes using the scaffolding technique in Social Arithmetic material can be described as follows:



**Figure 1. Percentage of Complete Learning Outcomes**

From Figure 1, you can see the results of the students' pre-test and post-test scores which were carried out by applying the Scaffolding Technique to the Social Arithmetic material. In the pre-test, there was an average score of 39.4 with a percentage of 20%, which then increased by looking at the post-test score. Students got an average score of 98.8 with a percentage of 100%. An increase in the results of the average value and percentage can be shown that the target of this research has been effective. The increase in class VII B students can be said to be valid, because the average score and percentage after the action has been taken has exceeded the set KKM value, namely 75. Meanwhile, whether it is said to have increased or not can be measured whether the student's learning score is  $\geq 75$  or  $< 75$ . With the help of the Teaching Module in it which highlights the Scaffolding Technique in Social Arithmetic material, namely in the form of a Game. The game is called "Group Business" and is organized in groups too.

Social arithmetic is said to be relevant to the scaffolding technique in this research because it uses situations that are currently popular in the current era. The scaffolding technique is believed to be explicit because it supports students' critical thinking abilities in mathematics learning with various practical contributions related to everyday life (Nugroho, 2017). Online and offline spending is currently increasing, so this can be used as a reference for class VII B students at Sabiluth Thoyyib Middle School to increase their interest in Mathematics. In the "Group Business" game, students can apply the daily life they enjoy and can also improve their mathematics skills.

In this research, only 1 cycle was used because the first cycle was very successful, so this action could be developed by teachers at Sabiluth Thoyyib Middle School so that the effectiveness of this technique does not collapse.

## CONCLUSIONS

Based on this research, the pre-test and post-test scores of students who applied the Scaffolding Technique in Social Arithmetic material showed a significant increase. The pre-test has an average score of 39.4 (category does not meet) with a percentage of 20% (category is not successful), which increases to an average post-test score of 98.8 (category meets) with a percentage of 100% (category succeed). This increase indicates the success of the research in achieving the desired effectiveness, with better understanding of the material by students. This

increase is also visible in student learning scores, measured by a score limit of  $\geq 75$ . With the help of Learning Strategies that highlight the Scaffolding Technique, especially through educational games such as "Group Business", students can apply mathematical concepts in the context of everyday life in groups. This game not only piques students' interest in learning, but also improves their math skills. The relevance of games with the Scaffolding Technique is strengthened by the widespread use of online and offline shopping situations, creating a learning experience that is fun and easy for students to understand.

Several recommendations can be drawn from this research: (1) School: The school implements a coaching program for all teachers, especially mathematics teachers, to introduce variations in learning methods. Implement the Scaffolding Technique as the main strategy to create an interesting and enjoyable learning experience, so that it can increase student motivation and learning outcomes. (2) Mathematics Teacher: Actively applies the Scaffolding Technique in the teaching process. It is hoped that this application can reduce students' anxiety levels towards mathematics, create a more interesting and enjoyable learning atmosphere, thereby increasing students' interest and understanding of mathematics lessons. (3) Further Researchers: Recommendations for further research are to carry out more in-depth research regarding the application of the Scaffolding Technique, by combining it with material other than Social Arithmetic. In addition, research should be focused on further development so that it can make a more significant contribution to improving students' abilities in mathematics as a whole.

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