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The Implementation of Scaffolding in Team Games Tournament (TGT) to Improve Students' Participation and Learning Performance on Reproduction System Topics

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Abstract

Background: This study aims to describe the usage of scaffolding methods in the activeness and learning performance of students with Teams Games Tournament (TGT) learning at SMA Negeri 5 Madiun. The type of analysis used is class action research (PTK). The subjects of this study are students of class XI MIPA 6 at SMA Negeri 5 Madiun. **Methods:** The method of data collection uses observation sheets to understand students' activeness and pre-tests and post-tests to assess students' learning performance. The technique used for data analysis is descriptive-quantitative. **Results:** The results of students' activeness in Cycle I and Cycle II are 94% and 95%, respectively. There is also an improvement in students' learning performance, as seen from the pre-tests and post-test results. The post-test results in Cycle I and Cycle II are 86% and 97%, respectively. The data analysis shows that applying the scaffolding method in Teams Games Tournament (TGT) learning can improve students' activeness and learning performance in class XI MIPA 6 at SMA Negeri 5 Madiun. **Conclusions:** Applying the scaffolding learning method to team games and tournament learning can increase the activeness and performance of students in the reproductive system material.

Keywords: Learning performance; scaffolding; student activity; TGT (Teams Gamses Tournament)

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Introduction

Education is an effort to develop student's talents and abilities by encouraging and facilitating the learning process to shape their behavior through the experience of interacting with the environment. According to Lukitasari et al. (2015), the success of the learning process is influenced by two factors, which include psychology and physiology, as well as factors outside the learning process, which can be divided into social and non-social factors (Khodijah, 2014; Hamzah, 2022). According to those facts, teachers must have the ability to supervise learning so students can learn and improve their performance (Salsabila & Puspitasari, 2020).

The characteristics of the students participating must use models, methods, approaches, and learning strategies. Wibowo & Farnisa (2018) explained that properly using the appropriate learning method can interest students in following the whole learning process. On the contrary, Juleha et al. (2014) stated that students can fail to understand the concept being taught if the learning method does not align with them. This can be assessed from one of the

indicators when the student's performance has not reached the minimum passing standard. One of the recommended learning models to increase the effectiveness of the learning process is the Teams Games Tournament (TGT).

Lestari & Widayati (2022) and Sunarti et al. (2019) show that TGT implementation makes students confident when following the learning process. According to Slavin (2005), TGT generally has the following steps: 1) material orientation, 2) group formation, 3) doing games, 4) each team sends a representative to compete with members of other groups and gain a score, and 5) team recognition. The implementation of the TGT learning model to increase learning performance and student participation, according to Safitri & Soesatyo (2017), shows that it can increase class X students' activeness and performance. Erlinda (2017) also supports this finding, which shows that the TGT model can increase the activeness and performance of students in class X on physics. The TGT learning model can relate to the scaffolding learning method, where students are trained to answer graded questions during the learning process.

Vygotsky (1978) states that scaffolding is the assistance provided by the teacher to students to help them solve problems and reach the learning objective. Scaffolding is an idea rooted in constructivism theory (Kurniati et al., 2022), applying the zone of proximal development (ZPD) concept. This zone refers to the area between the actual development level, where a student needs help from the teacher or other classmates to solve a problem. Teachers can help give directions, warnings, and motivations or make the student understand the problem differently so the student can solve it independently.

Studies about scaffolding method application to increase student performance have been done previously. One of them is by Nursanti (2022), which shows that the performance of class XI IPA 2 SMA Negeri 1 Bungkal students can be improved using the Scaffolding method. Jaenudin's (2019) research also shows that scaffolding effectively increases students' performance in physical education.

This study aims to determine the application of the scaffolding method in Teams – Games – Tournament (TGT) in cooperative learning to increase the activeness and learning performance in high schools' reproduction system study material.

Methods

This Classroom Action Research study uses the Kemmis and Taggart models (Kunandar, 2010), which involve four stages: planning, implementation of action, observation, and reflection. This study is held in 2 learning cycles with students of class XI MIPA 6 SMA Negeri 5 Madiun from the academic year 2023/2024 as the subject. There are 29 students as the subject of this study, with 16 female students and 13 male students.

The study's data and instruments are collected as follows: 1) interviewing the subjects with an open interview technique, 2) observation with the use of an observation sheet, and 3) holding tests with pre-test and post-tests to find out students' learning performance.

This study uses Biology subject on base competence 3.12: Analyzing the connection between the structure of reproductive organs tissue and its function in human's reproduction system and 4.12: To serve the analysis result about the effect of free sex, diseases and abnormalities in the organ structure and function that cause the disturbance of human's reproduction system as well as technology regarding reproduction system.

The learning process uses the TGT model with scaffolding in the form of LKPD with designs from the Canva application. The researchers developed LKPD, which contains realistic and complex tasks for students, and then gave appropriate assistance to help them finish the given task.

The research data are 1) students' activeness, 2) students' response to learning activities, and 3) completeness of students' learning performance. The data regarding activeness and student response to the learning process is categorized with Guttman criteria through multiple choice answers yes (1) and no (0). The qualitative analysis is in the form of calculated percentages with the formula below:

$$\textit{Activeness score (\%)} = \frac{\textit{Total score obtained x 100\%}}{\textit{Maximum score}}$$

Table 1. Students' Activeness and Response During Learning Process

Score (%)	Category
0 – 20	Very inactive
21 – 40	Inactive
41 – 60	Quite active
61 – 80	Active
81 – 100	Very active

(Riduwan, 2018)

Based on the table, students' activeness can be determined if the percentage is ≥ 61%. For pre-test and post-test result, it is analyzed using this formula:

$$\textit{Score} = \frac{\textit{Score obtained x 100}}{\textit{Maximum score}}$$

The indicator of study completeness is if the pre-test and post-test scores reached ≥ 72 (SKM). The classical cognitive study performance percentage is counted using the following formula:

$$\textit{Learning Performance percentage (\%)} = \frac{\textit{Total of Students who comleted the learning}}{\textit{Total amount of students}} \times 100\%$$

The classic completeness of study performance can be stated as achieved if the percentage is ≥ 61% (Table 2)

Table 2. Completeness of study performance criteria

Score (%)	Category
0 – 20	Very incomplete
21 – 40	Incomplete
41 – 60	Quite complete
61 – 80	Complete
81 – 100	Very complete

(Riduwan, 2018)

The gain-score used to find out the increase between pre-test and post-test scores is calculated with this formula:

$$\langle g \rangle = \frac{\textit{Posttest score – pre-test score}}{\textit{Maximum score – pre-test score}}$$

Table 3. *N-gain category*

Score	Category
g ≥ 0,7	High
0,3 ≤ g < 0,7	Average
g < 0,3	Low

(Hake, 1999)

Result and Discussion

This study is a Classroom Action Research aimed at determining the students' activeness and learning performance on the reproductive system for grade XI using the Scaffolding method in the Teams Games Tournament learning approach. The researcher observed students' activities and learning performance in the first cycle and analyzed them to identify deficiencies and unmet needs. Based on the analysis results, several

improvements were made to the actions taken and will be implemented in the second cycle to enhance student activeness and the learning performance attained. The implemented improvements impacted the increased average percentage of students' activeness and learning performance compared to the first cycle.

Students' activeness

Students' activeness during the learning process is assessed according to 8 aspects, adapted from Safitri (2017):

Table 4. Students' Activeness during TGT Learning

No.	Observed aspects	Average score	
		Cycle I	Cycle II
1.	Paying attention to the study material	86	90
2.	Asking and answering questions	90	100
3.	Taking notes of study material	86	100
4.	Forming a group	100	100
5.	Answering questions correctly	86	72
6.	Discussions with other students	100	100
7.	Solving *tournament* questions	100	100
8.	Listening to the explanations	100	100
	Total average score	**94%**	**95%**

Table 4 shows increased student activity during learning cycles I and II. Using the scaffolding model in LKPD form with the application of TGT learning confirms that it can encourage students' activeness well enough. They are competing with TGT, learning and understanding the system reproduction material with the help of LKPD. The activity Sheet also directs students to learn actively and improves their social skills through cooperating with their group. This result is supported by Chan (2020), who stated that students can find information confidently and clarify misunderstandings when cooperating.

Based on the TGT learning with Scaffolding method applied through LKPD, the study environment and learning activities become more conditioned. Students are enthusiastic about following the teacher's directions, so they feel the time flies so fast during learning. This finding is supported by Yildiz & Celik (2020), who stated that teachers must ensure a safe and supportive learning environment so students can finish their tasks on time, free from fear and anxiety.

Cognitive learning performance

Based on students' learning performance, Cycle II shows an improvement. This is according to the gain score value obtained from I and II. This test intends to determine the effectiveness of the scaffolding method application with the TGT learning model on reproduction system material. The gain score value shows that the result falls in the 'high' category, which means that students' learning performance is significantly improved during the pre-test and post-test.

This is because students learned how to learn with games and tournaments from cycle I. The more active involvement from students during the learning process can also factor into the cause of learning performance improvement. Students are more active with asking and answering questions in cycle II compared to cycle I. The percentage of post-test results of cycles I and II are 86% and 97%, respectively. The improvement shows that applying the scaffolding method in TGT learning on the reproduction system material does have an effect. This is in line with the findings of Faris et al. (2018), who stated the success of TGT implementation in learning because students can cooperate in

discussion, compete in tournaments, and confidently ask questions and give opinions during learning.

Table 5. Students' Learning Performance

Aspect	Cycle I		Cycle I	
	Pre-test	***Post-test***	***Pre-test***	***Post-test***
Students who completed the learning	0	25	0	28
Completeness percentage	0%	86%	0%	97%
Category	Incomplete	Complete	Incomplete	Complete
Average score	33	91	31	95
Gain Score value	0,86		0,93	
Category	High		High	

Students' response

Students' responses during the learning process are crucial for further learning plans and implementations. The researchers gave the XI MIPA 6 class students a questionnaire to determine their opinion on the reproduction system material using the scaffolding method in TGT learning.

Table 6. Student's response to the learning process

No.	Aspects assessed	Score
1.	The learning process is fun due to using an appropriate learning method.	100
2.	*Teams Games Tournament* (TGT) can help students with Biology subject tasks.	86
3.	TGT learning is challenging, so I am excited to follow the lesson.	100
4.	TGT learning helps me understand the material delivered by my teacher better.	97
5.	TGT learning helps me organize the material delivered by my teacher better.	100
6.	This learning process encouraged me to engage in classroom activities.	100
7.	This learning process helps me to cooperate and interact with other people.	100
8.	This learning process helps me to value my friends' opinions more.	100
9.	This learning process helps me become more confident while asking or answering questions.	100
10.	This learning process makes me more active in class.	100
	Average score (%)	**98%**

Based on the questionnaire result above, it can be seen that students positively respond to the application of the scaffolding method in TGT learning. Students improve their involvement in the learning process more actively because the games and tournaments held can make students feel challenged to get rewards.

Conclusions

Based on the analysis and discussion above, it can be concluded that applying the scaffolding learning method to team games and tournament learning can increase the activeness and performance of students in the reproductive system material. The activeness of students in cycle I and cycle II results is 94% and 95%, respectively. This increase also occurs in students' learning performance, as seen from pre-test and post-test results. The post-test results of cycles I and II are 86% and 97%, respectively.

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Declaration statement

The authors reported no potential conflict of interest.

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