



Profile of Students' Cognitive Learning Outcome Completeness in Biotechnology Learning Through Kahoot-Assisted Game Tournament Teams

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ABSTRACT

Biotechnology material is closely related to the use of biological sciences to support everyday life so the learning process should be implemented in a fun teaching and learning method to enhance students' understanding. The Teams Game Tournament learning model is an appropriate model to create a fun teaching and learning atmosphere for students because based on its implementation the learning is set in the form of a tournament among the students. In terms of its implementation, the Teams Game Tournament that is assisted by Kahoot will further enhance the learning attractiveness. The purpose of the study was to find out the profile of students' cognitive learning outcome completeness in biotechnology learning through the Kahoot-assisted Teams Game Tournament. The research type was a pre-experimental design with a one-shot case study research design. The research subjects involved 36 students of class XII IPA 3 of SMA Islam Sultan Agung 1 Semarang. The research results indicate that students complete biotechnology learning using the Kahoot-assisted Teams Game Tournament model. It is seen from the average score of 84.4, which is above the KKM score of 77. In addition, it is corroborated by data analysis, which indicates that the value of Sig. (2-tailed) is $0.002 < 0.05 = \alpha$, and $t_{count} > t_{table}$.

Keywords: *students' cognitive learning outcomes, biotechnology, teams game tournament, kahoot*

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INTRODUCTION

Education plays an important role in life because education is a vehicle for improving and developing the quality of human resources. Realizing this, the government is very serious in dealing with the education sector to advance Indonesian education in the future. In accordance with the intent of the Law on the National Education System Number 20 of 2003 that national education functions to develop capabilities and shape national character and civilization that are beneficial in educating the nation's life. The aim of national education is to develop students to become human beings who fear God Almighty, have noble character, are healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens. Muhaimin, et al (2019) revealed that in the era of the industrial revolution 4.0 education was based on data, technology and humanity. Education must also be a facility for students to continue to develop their skills so that they will get satisfying learning outcomes.

Learning outcomes are the results obtained by students after participating in the learning process and include three areas of ability, namely cognitive, affective, and psychomotor. The cognitive aspect is closely related to the ability to think, including the ability to memorize, understand, apply, analyze, synthesize and evaluate (Utama and Heldisari, 2021).

Teachers play an important role in the education system, namely implementing and developing curriculum into classroom learning (Santika & Khoiriyah, 2023). The independent curriculum is synonymous with learning the new paradigm, namely learning that is not just a transfer of knowledge but is centered on students or student centered learning and is meaningful for their lives (Murrone, et al. 2023). Good learning must also be able to provide a sense of comfort and fun for students. This refers to the basics of Ki Hajar

Dewantara's thoughts, namely the Student Park. To create fun and student-centered learning, you can use the Teams Game Tournament (TGT) learning model (Zulfira, et al. 2019). Nurhidayah, S. (2018) added that the specialty of this TGT learning model compared to other cooperative models is that students are required to be able to think and be responsible independently and in groups in a pleasant atmosphere by carrying out tournament activities. This learning provides opportunities for students to share ideas and encourages students to increase the spirit of cooperation in completing learning activities. The TGT model can increase student activity and student learning outcomes in biology subjects. Wahyuni, S. (2018) also emphasized that the TGT Model can improve learning outcomes in the cognitive aspects of students in biology subjects. One of the materials in biology subjects is biotechnology.

Biotechnology material in high school has material characteristics that are rich in student creativity development activities. Therefore, biotechnology learning should use a fun learning model in order to foster a sense of enthusiasm for learning and maximum learning outcomes for students (Amalia, 2023).

Based on the results of observations and interviews that were conducted with biology teachers at Sultan Agung 1 Islamic High School Semarang, it was found that the learning process carried out especially on biotechnology material was still using the lecture method only and without using any media or tools. This causes many students to not focus during learning because they feel bored and unenthusiastic, so of course it has an impact on the cognitive learning outcomes that are obtained by students. Referring to these problems, it is appropriate that in carrying out teacher learning it also adapts to the times, especially in the field of technology. As is known, the rapid development of information and communication technology has encouraged educators to integrate technology in the learning process (Riani et al, 2021). The use of technology in the 21st century provides broad opportunities for educators (teachers) and students to interpret learning, technological developments are very useful in improving the quality of education with new innovations. The learning innovation carried out by the teacher is to create a media that can make it easier to understand material that is abstract in nature to be real (Pasaribu & Listiani, 2021). One of the advances in technology in the field of education is the availability of more and more media that can be used by teachers to support the smooth running of the learning process. One of them is Kahoot, besides being able to be used by teachers to facilitate the assessment of students, Kahoot can also be used as an auxiliary media for implementing games which of course is integrated with the Teams Game Tournament (TGT) learning model so that it will add to the attractiveness of the learning process and provide an atmosphere as well as new experiences for students in learning. If the learning process has been carried out in an innovative and interesting way, it will certainly have an impact on the enthusiasm for learning of students which will also increase so that it will be able to minimize students who are not focused during the learning process. Thus the learning outcomes, especially in the cognitive aspects of students will also be maximized.

Previous research regarding the application of the Teams Game Tournament (TGT) learning model in learning has not been supported by the use of interesting media, and only uses conventional media, for example by using cards. Along with the times and advances in technology, the media used should also be adapted to these advances. Therefore, this study aims to fill this void by continuing to prioritize the Teams Game Tournament (TGT) model in learning but supported by the use of modern interactive game media in accordance with the times.

Based on the facts and other supporting data above, it is important to conduct this research in order to determine the completeness profile of students' cognitive learning outcomes in biotechnology learning through the kahoot-assisted Teams Game Tournament.

METHOD

This research was a pre-experimental design, namely a one shot case study, with data analysis using the one sample t test or one sample t test at a significant level of $\alpha = 0.05$. Before the t test is carried out, the data normality test is first carried out to find out whether the data is normally distributed. Liu and Ilyas (2020) explain that a one sample t test is used to test the average value of a single sample with the reference value in this study being the KKM value of 77. The analysis process uses SPSS software assistance. This study used a

random sampling technique in determining the sample and found the results of class XII IPA 3 students totaling 36 students at Sultan Agung 1 Islamic High School Semarang as a sample who received biotechnology material with the Kahoot-assisted Teams Game Tournament (TGT) learning model. The research instrument was a cognitive test question totaling 5 essay questions. The hypothesis used in this study is as follows:
 H₀ = Learning using the Kahoot-assisted TGT model does not affect the cognitive aspects of students.
 H_a = Learning using the Kahoot-assisted TGT model affects the cognitive aspects of students, achieving a minimum score of 77.

With the basis, decision making as follows:

1. Based on the value of Sig. obtained in the t-test of one sample, with the following criteria:
 - a. If the significance is <math>< 0.05</math>, then H₀ is rejected and H_a is accepted.
 - b. If the significance is > 0.05, then H₀ is accepted and H_a is rejected.
2. Based on a comparison of the calculated t value with t table, with the following criteria:
 - a. If the t count > t table, then H₀ is rejected and H_a is accepted.
 - b. If the value of t count < t table, then H₀ is accepted and H_a is rejected.

RESULTS AND DISCUSSION

Data that has been obtained from students' cognitive learning outcomes were analyzed using the one sample t test or one sample t test. One sample t test is part of parametric statistics so that the basic assumption that must be fulfilled is that research data must be normally distributed. The cognitive aspects of the 36 students have a mean of 84.4 with a standard deviation of 4,704. The results of the normality test which is a prerequisite test before conducting the t-test for one sample are presented in table 1 below:

Table 1. Data Normality Test

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	dif.	Sig.	Statistic	dif.	Sig.
Hasil Belajar Kognitif	.123	35	.198	.969	35	.426

Based on Table 1 above, it can be seen that both the Kolmogrov-Smirnov (KS) test and the Shapiro-Wilk (SW) test obtained a Sig. which is greater than $\alpha = 0.05$, that is, for the KS test the value of Sig. = 0.198 > 0.05 = α , and for the SW test the value of Sig. = 0.426 > 0.05 = α . These results indicate that the learning outcomes of students' cognitive aspects are normally distributed and are ready to be analyzed using the one sample t test. Henceforth the results of hypothesis testing using the one sample t test or one sample t test with the help of SPSS software are presented in Table 2 below:

Table 2. One Sample T Test Results

	Test Value = 77					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Hasil Belajar Kognitif	9.306	34	.002	7.40000	5.7841	9.0159

Based on the data presented in Table 2, the Sig. (2-tailed) = 0.002 < 0.05 = α , so the H₀ hypothesis is rejected. In addition, the t count obtained shows data of 9,306 which is based on the distribution list of t table with $\alpha = 0.05$ and df of 34, the results obtained are t count > t table with a t count value of 9,306 and a t table of 2,032. These results also show if the hypothesis H₀ is rejected and H_a is accepted. The data shows that the

average value of students' cognitive learning outcomes is greater than 77 fulfilled or valid. The graph of the average comparison of cognitive learning outcomes of students with KKM scores can be seen in Graph 1 below:

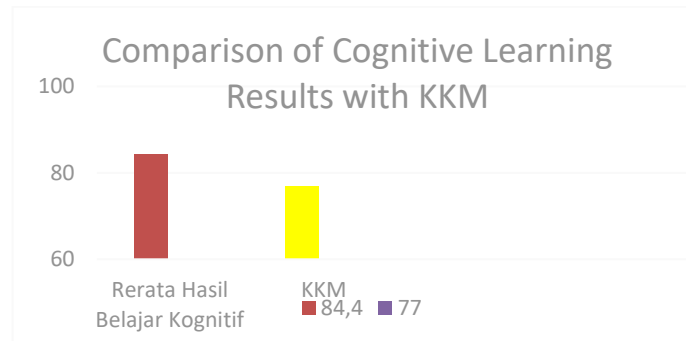


Figure 1. Comparison of Cognitive Learning Outcomes with KKM

In the implementation process, learning biotechnology material using the Kahoot-assisted Teams Games Tournament (TGT) model was carried out in 2 meetings. In these learning activities students will compete between groups to answer questions that are presented in an interesting way using Kahoot. Through these activities it will create a pleasant learning environment and atmosphere for students, so that when students feel comfortable and happy in learning, of course it will affect the enthusiasm for learning and the activeness of students which will have an impact on cognitive learning outcomes that are also maximal. Kristiana, et al (2017) suggested that the TGT learning model can increase learning activities by training students to work together in discussion activities and presentations in front of the class so that the learning atmosphere becomes more enjoyable and will have a good effect on student learning outcomes. The same thing was also expressed by Nurhidayah's research, S. (2018) which showed that the learning activities of students with the TGT learning model had increased, where the TGT learning model made students more enthusiastic in participating in learning and discussing. Students feel a more pleasant learning climate so that the interaction between students and teachers and between students increases. If students' positive attitudes are formed and grow, good learning outcomes will be achieved (Sadikin, A. 2015).

The use of Kahoot technology that is integrated into the Teams Games Tournament (TGT) learning model certainly adds to the attractiveness of students to participate in learning activities. If students already have an interest in the learning process that is carried out, the impact on the focus on the material being taught increases, this of course results in increased cognitive learning outcomes of students as well. Nurhasanah, S., & Sobandi, A. (2016) shows that interest is a strong source of motivation for learning. Someone will do something he likes if there is interest in him, and vice versa. Students who have an interest in the learning process will more easily grasp the material being taught so that they will obtain completeness in learning outcomes.

Based on the results of the study, cognitive learning outcomes in class XII IPA 3 SMA Islam Sultan Agung 1 Semarang in biotechnology material obtained an average score of 84.4 from the KKM reference score of 77, so that it can be said to be complete. Students are no longer passive in receiving and memorizing information provided by the teacher, but are trying to find out how a certain concept can be found. The process of discovery that is packaged in this cooperative learning combined with advances in technology can improve students' cognitive learning outcomes. Wahyuni, S. (2018) found that TGT can improve cognitive learning outcomes in biology subjects. Mora, D. T. (2017) also revealed that TGT can increase student activity and student learning outcomes in biology subjects. Ismah, Z., & Ernawati, T. (2018) also emphasized that the TGT Model in addition to improving student learning outcomes can also improve student collaboration.

The learning outcomes obtained have something to do with the motivation and enthusiasm for learning from students while participating in learning. Efforts that can be made is to apply academic games in the

learning process. So that learning becomes fun and challenges students to master the subject matter. One cooperative learning model that is able to facilitate this is the Teams Games Tournament (TGT) learning model. Teams Games Tournament (TGT) is a type of cooperative learning in which there is a learning component packaged in the form of a game consisting of groups of students conducting academic tournaments or quizzes. (Hakim & Syofyan, 2017).

The steps in Teams Games Tournament (TGT) learning model include forming groups, providing TGT information, making regulatory agreements, conducting tournaments with new groups, and determining the winning group (Wijayanti, 2016). With these steps in learning there are advantages of Teams Games Tournament (TGT) which lies in a fun learning process because it balances the learning process with games or tournaments. According to (Yulia et al., 2020) another advantage of this learning is that students are required to be active in learning through collaborative activities in groups. Thus providing opportunities for students to share knowledge with their group mates. Thus it will increase students' understanding of the material and affect maximum learning outcomes.

The results of this research are also in accordance with the results of previous studies from Hikmah et al. (2019) which in its conclusion states that there is an effect of applying the Team Games Tournament (TGT) learning model to the motivation and learning outcomes of students in Biology material regarding animalia.

CONCLUSIONS AND RECOMMENDATION

Based on the research that has been done, it can be concluded that the cognitive learning outcomes of students in class XII IPA 3 SMA Islam Sultan Agung 1 Semarang in biotechnology material using the Kahoot-assisted Teams Game Tournament (TGT) model obtained completeness, marked by an average score of 84.4 which is above the KKM reference value of 77.

Based on the results of the research conducted, the following suggestions can be put forward:

1. Teachers are expected to strive to apply the kahoot-assisted Teams Games Tournament (TGT) model when carrying out Biology learning in class, because its application can help improve student learning outcomes
2. Researchers who wish to conduct similar research should first understand how to present games through Kahoot so that students can easily understand them and not create confusion.

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