Increasing Understanding of the Concept of Logic Gate Material Using the Games Model Learning Model Tournament (TGT) Assisted by Soft Applications Ware Make It True Class XI Science at SMAN 13 Makassar

A. Jusriana[1], Muhammad Amar[2], Muh. Yusuf Hidayat[3]
Author Correspondence Email: a.jusriana@unm.ac.id

ABSTRACT

The aim of this research is to describe students' understanding of physics concepts before using the TGT learning model assisted by Make It True software in Class XI IPA students at SMAN 13 Makassar. To describe students' understanding of physics concepts after being taught using the TGT learning model assisted by Make It True software for Class XI Science students at SMAN 13 Makassar. The type of research used in this research is an experimental method using a research design, namely One Group Pre-Test Post-Test Design. The approach in this research is a quantitative approach. Data processing and data analysis techniques use descriptive statistical analysis, inferential statistical analysis. The results showed that the average value of the results Student learning in the pre-test was 34.71 in the very category low, while for the post-test score the average value was 50.15 is in the low category. Based on the results of non-parametric analysis using the Mann-Whitney test which shows a significant level value, namely Asymp value. Sig (2-tailed) shows the number 0.000. Asymp value. Sig (2-tailed) smaller than the 0.05 significance level so that H0 is rejected and H1 is accepted. Matter This shows that there are differences in understanding the concept of use Application-assisted Teams Games Tournament (TGT) Learning Model Soft Ware Make It True.

Keywords: *Games tournament (TGT) learning model, Logic Gates Understanding concepts*

INTRODUCTION

The role of education in human life is very significant because humans are living creatures who have needs. The level of educational success can be assessed through the achievement of educational goals. The aim of national education is to enrich the life of the nation and develop human potential as a whole. This is in accordance with Republic of Indonesia Law no. 20 of 2003 article 1 concerning the national education system, which explains that education is a deliberate and planned effort to create a learning environment and learning process that allows students to actively develop themselves in terms of religious spiritual strength, self-control, personality, intelligence, noble morals and skills necessary for themselves, society, nation and state.

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Faculty of Teacher Training and Education
Universitas Islam Negeri Alauddin Makassar
South Sulawesi-Indonesia

Regarding the context of implementing learning in schools, the role of an educator is very important, especially in physics learning. This is because learning physics is often considered less liked or liked by students. Learning is basically a process where individuals through interaction with the surrounding environment, a person can obtain information through the knowledge, skills and attitudes they have. In the context of physics learning, this process involves aspects of process, attitude and results. A person's inability to master physics concepts well will have an impact on his inability to develop the concepts he has. This is due to the abstract nature of physics learning, which requires a good understanding of concepts. Therefore, understanding concepts is a very important element in learning physics.

Learning is the process of individuals developing themselves. By interacting with those around them, a person can obtain the necessary information, both in the form of knowledge, abilities and attitudes. Process, attitudes and results are aspects involved in learning physics. If someone does not have adequate abilities in understanding physics concepts, as a result, that person will face difficulties in expanding the concepts they have because of the abstract nature of learning physics. Therefore, the importance of understanding concepts in the physics learning process cannot be ignore.

Many people assume that physics subjects are considered difficult because they contain many complex formulas and concepts to understand. This often causes the learning atmosphere to become boring. Physics material contains formulas and processes that are sometimes beyond human understanding, in short, contains abstract events. Every physics material almost always discusses formulas. However, in fact the formulas used come from simple concepts. The abstract nature arises from the concepts contained in the physical material itself.

Based on an interview with an educator who teaches physics, researchers obtained information that the physics learning process in this school tends to take place conventionally, where learning is more in the teacher center than in the student center. And educators' lack of use of various media available in the laboratory is one of the factors that makes students bored. Meanwhile, according to the students themselves, what makes them less understanding of learning is because teachers focus more on theory alone without appropriate practice for each material taught. They discuss more examples of problems that are problem solving, this makes students focus more on memorizing

formulas rather than understanding existing physics concepts. They also explained that in learning they rarely use practical media as a support for understanding physics lessons.

Based on the results of interviews with physics subject teachers, it indicates that the average score of class XI students in physics subjects is at a sufficient level. Therefore, new innovations are needed in learning to improve students' understanding of concepts, one of which is by using appropriate learning media.

Based on the explanation of the problem above, the researcher suggests carrying out an innovation in learning that makes the learning process more focused in understanding physics concepts by students. One innovation that can be implemented is by using learning media. In this research, researchers used the make it true application media. The make it true application is a puzzle game application about logical elements that challenges players to solve puzzles or problems that require logical thinking regarding logic gate material. The main goal of this game is to hone the player's ability to think logically and develop analytical skills.

Make it true media is a virtual game media about the material concept of logic gates, which can contribute to increasing students' understanding of the concept. Teachers no longer have to bother preparing practical components because the media they plan to use has been packaged as simply as possible to use

Based on this, to increase students' understanding of concepts, the use of learning media can make it easy for students to understand them. Researchers are interested in conducting research with the title "Improving Understanding of the Concept of Logic Gate Material using the TGT learning model assisted by Soft Ware Media Make It True for Class XI Science Students at SMAN 13 Makassar."

METHODS

The type of research that will be carried out in this research is pre-experiment. In this research, a One-Group Pretest-Posttest Design will be used. Where in this research the researcher used a simple Random Sampling Technique based on information from educators that the understanding of concepts in the population was classified as even/balanced, so that in taking samples the researcher would use a random class system. The sample used in this research was class XI IPA III. The research instruments used were concept understanding tests and observation sheets.

The data analysis techniques used are:

a. Descriptive statistical analysis

1. *Means*

$$\bar{X} = \frac{\sum x}{n} \quad (1)$$

Information :

$\bar{X}$ = average score

$\sum x$ = total student scores

n = number of respondents

2. Standard deviation

$$S = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n}} \quad (2)$$

Information :

S = Standard deviation

$\bar{x}$ = average

x_i = value x to i

n = amount of data

3. Varians

$$Varians = S^2 \quad (3)$$

4. Concept understanding category

Table 1 Categorization of Concept understanding

No	Mark	Criteria
1	85,00 – 100	Very Good
2	70,00 – 84,99	Good
3	55,00 – 69,99	Enough
4	40,00 – 54,99	Low
5	0 – 39,99	Very Low

b. Inferential statistical analysis

1. Normality test

$$L\,Max = [F(Z) - s] \quad (4)$$

2. Test the hypothesis

a) Develop a hypothesis in statistical form

Ho : μ1 = μ2

Ha : μ1 ≠ μ2

H0 : There is no difference in understanding the concept before being taught and after being taught using the TGT learning model assisted by the Make It Software application for Class XI students at SMAN 13 MAKASSAR

H1 : There is a difference in understanding the concept before being taught and after being taught using the TGT learning model assisted by the Make It Software application for Class XI students at SMAN 13 MAKASSAR

b) Perform *Mann-Whitney test*

$$U_1 = n_1 n_2 + \frac{n_1(n_1+1)}{2} - R_1 \quad (5)$$

$$U_2 = n_1 n_2 + \frac{n_1(n_1+1)}{2} - R_2 \quad (6)$$

information :

n1 = observations in the first sample

n2 = observations on the second sample

R1 = the number of ranks in the first sample

R2 = the number of rankings in the second sample

c. Analisis *N-Gain*

$$g = \frac{nilai\ posttest - pretest}{nilai\ maksimum - nilai\ pretest} \quad (7)$$

Tabel 2 Kategorisasi Nilai *N-Gain*

Nilai N-Gain	Kategori
g > 0,7	Tinggi
0,3 ≤ g ≤ 0,7	Sedang
g < 0,7	Rendah

RESULTS AND DISCUSSION

A. Research Results Learning Style Variable

The type of research used in this research is an experimental method using a research design, namely One Group Pre-Test Post-Test Design. In this research, 4 meetings were conducted using only one class, namely class The pre-test and post-test each consist of 20 multiple choice questions to measure students' level of understanding of concepts

Based on the results of the research before the treatment was given in the form of the TGT learning model, it showed that of the 34 students who took part in this research, 71% were categorized as very low, 26% were categorized as low and 1% were in the sufficient category. The highest Pre-Test score for students' conceptual understanding was in the range 1-39, which means it was in the very low criteria, namely 24 students.

Frequency	Value	%	Criteria
85,00 – 100	0	0%	Sangat Baik (SB)
70,00 – 84,99	0	0%	Baik (B)
55,00 – 69,99	1	3%	Cukup (C)
40,00 – 54,99	9	26%	Rendah (R)
0 – 39,99	24	71%	Sangat Rendah (SR)
Amount	34	100%	

Based on research after being given treatment in the form of the TGT learning model, it shows that of the 34 students who took part in this research, 18% were categorized as very low, 38% were categorized as low and 44% were categorized as sufficient. The post-test score of students' conceptual understanding was in the sufficient category, namely 15 students, in the low category, namely 13 students, and in the very low category, namely 6 students.

Frequency	Value	%	Criteria
85,00 – 100	0	0%	Sangat Baik (SB)
70,00 – 84,99	0	0%	Baik (B)
55,00 – 69,99	15	44%	Cukup (C)
40,00 – 54,99	13	38%	Rendah (R)
0 – 39,99	6	18%	Sangat Rendah (SR)
Amount	34	100%	

The Normality Test was carried out to determine whether the concept understanding data obtained, both before and after teaching, had a normal distribution or not. In this study, data normality was proposed using the Shapiro Wilk test at a significance rate of $\alpha = 0.05$. The pretest results obtained a significant value of 0.002. Sig value. This is smaller than 0.05 (sig. < 0.05) so it can be concluded that the students' pretest conceptual understanding scores are not normally distributed, whereas the posttest results obtained a significance value of 0.048. The Sig. This is smaller than 0.05 (sig. > 0.05) so it can be concluded that the students' conceptual understanding scores from the posttest are not normally distributed.

To determine the increase in understanding of concepts using the TGT learning model assisted by students' Make it Terue software. When the data is proven to be that one of the data is not normally distributed, the data uses the Wilcoxon Signed Test. used because of the sample used in the research Based on the statistics, the value of Zcount = 4.569 and the value of Asymp. Sig. (2-tailed) = 0.00. Asymp value. Sig. (2-tailed) is smaller than the 0.05 significance level so that Ho is rejected and H1 is accepted. This shows that there is an increase in the use of the TGT learning model assisted by Make it True software in students' understanding of concepts before being taught and after being taught by Class XI students at SMAN 13 Makassar.

CONCLUSION

Students' ability to understand concepts before being taught using the Team Games Tournamnet (TGT) learning model assisted by the Make it True soft ware application for class XI Science at SMAN 13 Makassar is in the very low category. These students still have difficulty working on questions about understanding the concepts given. There are still students who are not able to translate something that is unclear, some students are still less able to interpret an image or graph that is presented, and there are some who are still less able to conclude data. Likewise with students in the medium category who are not much different from other students. However, the level of translating physics concepts, identifying physical principles or laws contained in situations or data provided and the ability to apply physics concepts already shows that the level of understanding of the concepts is above the level of understanding of other students.

This is because students are accustomed to learning using the lecture method or using conventional learning models applied by educators, where these methods tend to make students

passive, even though the class has implemented an independent curriculum. However, without modifications in the learning process such as the use of learning models and the use of media, it will make it difficult for students to improve their learning outcomes.

Conditions like this were also stated in research conducted by (Ulfia & Irwandani, 2019) that conventional learning is less able to develop thinking, in other words understanding and sorting problem solving tends to be slower, this is because during the learning process the teacher only explains the material and conducts questions and answers after the material is finished, then the teacher gives questions and completes the questions created. Learning tends to be more passive, following the sequence of what the educator conveys and in learning both with friends and with educators. This is the reason why it is difficult for students to develop their learning outcomes. From this we can conclude that in learning the role of models and learning media is very important for the growth and development of students.

By the time the Posttest is given, students will have the ability to interpret and conclude data. Even though they are not perfect in answering questions, students have the ability to interpret an image or graph that is presented, only a small percentage of students still have difficulty or are less able to conclude data. The students have experienced an improvement in working on questions of understanding the concepts given, seen from the students' posttest scores and where the results of most students are at the Sufficient level. Where the majority of students were previously given treatment, the students were still in the very low category. At this stage, some students already have a medium level of understanding of the concept, although they still experience a little difficulty, the students are able to translate, interpret and even conclude the data presented.

In its implementation, learning using the Team Games Tournamnet (TGT) learning model assisted by the Make it True soft ware application is interesting for students, because the learning process is packaged with games. However, there are several weaknesses in students' understanding regarding Physics learning, especially in analyzing questions that are relatively long, which causes there to still be some students who get grades in the low category.

Learning like this is one way to make students more enthusiastic and more active in learning. However, there are still some students who do not pay attention to the explanations from educators.

Based on research conducted by (Arrumaisha, 2018) said that by using the TGT learning model, student participation in learning is getting better, students are exchanging opinions to build concepts. Presentation activities are getting better so that students are more active in asking questions and giving opinions. Likewise, research conducted by (Mahardi et al., 2019) revealed that using TGT learning allows students to learn more relaxed while fostering a sense of responsibility, cooperation, healthy competition and orderly learning.

Through group discussions and the use of media, students better understand the material presented in learning. With designated group members, students can respect each other. Students are more active in learning material so they can give maximum points to their group, so that students will better understand the material given. And students are brave and confident in giving or expressing opinions or answers.

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Based on the results of the research that has been carried out, the following conclusions can be drawn:

1. Students' understanding of concepts before being taught using the Teams Games Tournament (TGT) learning model assisted by the Make it True soft ware application. It is in the very low category seen from the average concept understanding test results of class XI Science students at SMAN 13 Makassar with a score of 34.71.
2. Students' understanding of concepts after being taught using the Teams Games Tournament (TGT) learning model assisted by the Make it True soft ware application. It is in the low category seen from the average concept understanding test results of class XI Science students at SMAN 13 Makassar with a score of 50.15.
3. There is a difference in understanding the concept before and after being taught using the Teams Games Tournament (TGT) learning model assisted by the Make it True software application with an average increase of 15.44. And based on the N-Gain Test, the use of the Teams Games Tournament (TGT) learning model assisted by the Make it True software application is in the low category with a score of 0.22.

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