Journal of Architectural Research and Education
Journal homepage:https://ejournal.upi.edu/index.php/jare


# The Effect of Educational Game-Based Team Games Tournament (TGT) Learning Model on Student Learning Outcomes of Class X Building Modeling and Information Design (DPIB) 3 Public Vocational High School (SMK) 1 Balongan Indramayu, West Java

*Ridwan Sepriadi[1], Nuryanto[2], Restu Minggra[3]*

[1,2,3] Education University of Indonesia Indonesia Bandung, Indonesia

*Correspondence: E-mail: ridwansepriadi9a@upi.edu

## ABSTRACT

This research is motivated by the low level of learning outcomes of students who do not meet the Minimum Completeness Criteria (KKM). The results of the pre-research found that students felt bored with expository learning techniques, had uneven motivation, interest, and enthusiasm for learning, tended to be passive during learning, and lacked the creation of mutually constructive relationships between high-achieving students and those who did not. Therefore, it is necessary to research "The Influence of Educational Game-Based Team Games Tournament Learning Models on Learning Outcomes in the Basics of Modeling and Building Information Subjects". This study aims to determine the application of the Team Games Tournament learning model with Wordwall media and its effect on improving student learning outcomes in the Basics of Modeling and Building Information Design subjects. This research is useful for solving problems by applying appropriate learning models according to the learning objectives and characteristics of students. This research used an experimental method in the form of a Quasi-Experimental with a randomized Control Group Design conducted at SMKN 1 Balongan, Indramayu. The population used was all class X DPIB expertise program students. The sample was determined using purposive sampling techniques. The samples to be studied were class X DPIB 2 and X DPIB 3. The data collection technique used was test instruments and observation sheets. The results of this study showed an increase in learning outcomes in class X DPIB 3 by 47%, while the average increase in learning outcomes through the use of expository models in class X DPIB 2 was only 16%. Thus, it can be seen that the experimental class X DPIB 3 experienced an average increase in learning outcomes which was higher than the control class X DPIB 2.



## ARTICLE INFO

***Article History:***
*Submitted/Received 12 September 2023*
*First Revised 30 October 2023*
*Accepted 30 October 2023*
*First Available online 30 October 2023*
*Publication Date 1 November 2023*

***Keywords:***
*Team Games Tournament,*
*Wordwall,*
*Student learning outcomes*

## 1. INTRODUCTION

Pre-research was carried out at SMK Negeri 1 Balongan on the Basics of Modeling Design and Building Information subjects through direct observation of the learning process and conducting interviews with the subject teachers. As a result, an issue emerged, namely the low learning achievement of students. This is shownin the low level of learning outcomes of students who meet the Minimum

Completeness Criteria (KKM) score of 70, namely only 16.6% of the class population. Based on the attached Mid-Semester Assessment (PTS) score list, it isknown that only 6 students met the KKM. So the percentage that meets the KKM is16.6% of the entire population of class Low interest in learning is shown by students with an indifferent attitude during learning, learning becomes a heavy burden, and quickly getting bored while learning. Meanwhile, students' low motivation is shown by low attendance, often delaying work, and not focusing their attention on learning.This happens because learning is predominantly one-way centered on the teacher.Another issue found after conducting pre-research was the low level of student activity in participating in learning. This is shown by the attitude of students who tendto be passive if they experience difficulties in understanding the material, the lack of active interaction when teachers test by asking students about a concept, and the lack of mutually constructive relationships between students who excel and those who do not.

Based on the characteristics of students described previously, an effective learning process can be achieved through the application of the cooperative learning model. By implementing a cooperative model, the learning process allows the formation of study groups with students who have different abilities, so that studentswho excel in achievement provide influence and motivation to less superior students. The type of cooperative learning model that is suitable to be applied basedon the character of the students in the previous explanation is the Team Games Tournament (TGT) type cooperative learning model. This type of learning invites students to play while learning so that students do not get bored. The implementation of this model can be collaborated with interactive learning media, one of which can be educational game-based games to provide a fun learning experience. One learning media that offers various interactive activities to enrich students' learning experiences is Wordwall. The Wordwall platform is generally used as a means to increase student involvement and participation during the learning process. With interesting interactive activities, students will be more captivated, thereby fostering a sense of interest in participating in learning, motivated inlearning, and improving learning achievement in both cognitive and affective domains.

## 2. RESEARCH METHOD

This research uses a quantitative descriptive approach. Quantitative descriptive research is a type of research that describes, examines and explains a phenomenon using numerical data obtained objectively and accurately (Sulistyawati & Trinuryono, 2022). This study also applies the experimental method as anapproach in quantitative research. The experimental method is an attempt to test the cause-and-effect relationship between two or more variables through careful experiments (Sugiyono, 2017).

The research method used in this study uses an experimental method in theform of Quasi-Experimental. This method involves a control group that is not fully used to control all variables that affect the research. This research was carried out in the experimental and control groups which were not randomly selected. The experimental group or experimental

DOI:https://doi.org/10.17509/jare.v5i1.62912
p- ISSN2776-9909e- ISSN2580-1279

class that has been selected is treated using the Team Games Tournament learning model.

The research design uses a Non Randomized Control Group Design,namely a research design that involves a pretest before the treatment is given and a posttest after the treatment is applied to each group but the treatment only appliesto the experimental class. The aim is as a comparison to see the effect of using theTGT learning model in the experimental class on learning outcomes compared to the control class which was not given treatment.

## A. Data Collection Technique

In this research, several data collection techniques were used, including tests and observation of students' activity to obtain data and information that supports and complements the research, including:

1) Test

In this research, the test was carried out twice, namely pretest and posttest. The pretest aims to measure students' level of understanding of the material to be taught. Meanwhile, a posttest is given after learning is completed to measure the level of students' understanding of the material that has been provided. In this test, the cognitive domain assessment is measured through four levels, including:

- C1: Knowledge
- C2: Understanding
- C3: Application
- C4: Analysis

2) Observation of Student Activity

Observations were made using student activity observation sheets. The student activity observation sheet is a useful instrument for recording student activities and behavior during the learning process. The purpose of using the studentactivity observation sheet is to monitor student activity and to get a clearer picture of the student's ability to understand the subjects that have been presented previously. The student activity observation sheet contains a list of indicators of student activity such as participating in group discussions, skills in working togetherin groups, and so on. In this observation sheet, a Likert Scale is used to get a clear answer. Likert scale with alternative answers 1-4 for example never, rarely, often, and always. The author uses four indicators of the activeness of students in learning.The indicators used to determine students' learning activeness are students' enthusiasm in participating in learning, understanding of the material, students' interaction with the teacher, and completion of assignments in groups (Mardiyan, 2012).

## B. Research Sites

The author conducted this research at SMKN 1 Balongan, also known as SMK NESABA, a vocational education located in Balongan District, Indramayu. Thecomplete address of this school is Jl. Raya sukaurip no. 35, Sukaurip, Balongan, Balongan District, Indramayu Regency, West Java 45217.

DOI:https://doi.org/10.17509/jare.v5i1.62912
p- ISSN2776-9909e- ISSN2580-1279

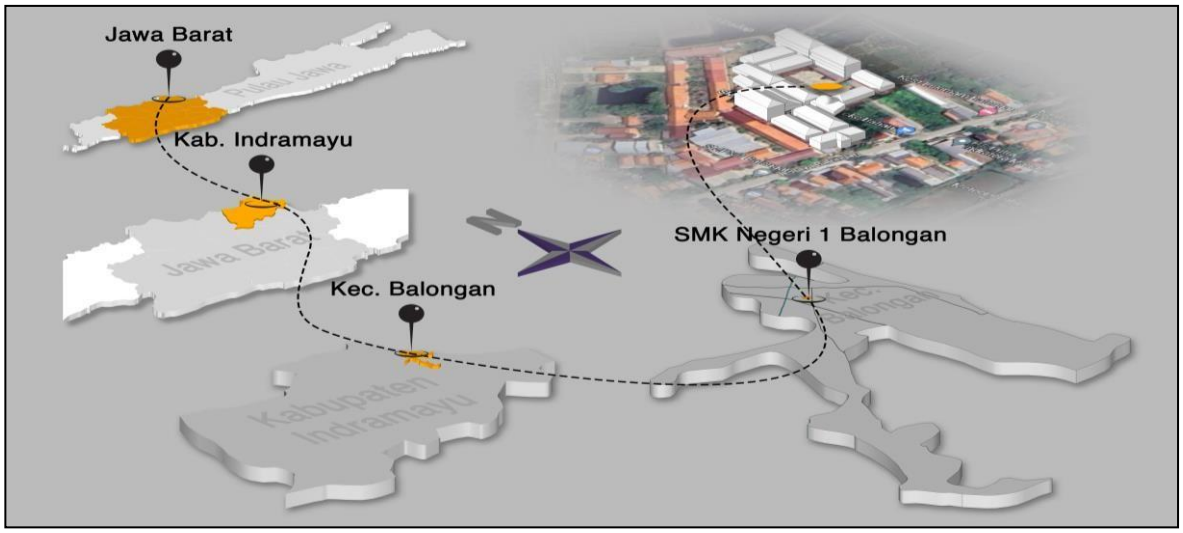



**Figure 1** Location of SMK Negeri 1 BalonganSource:
Autor, 2023

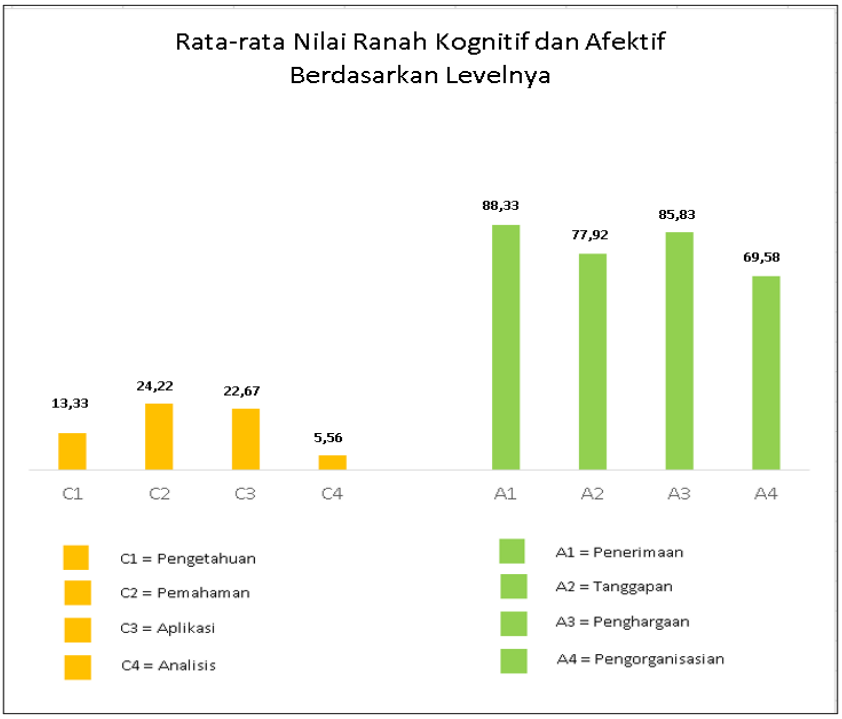
**Figure 2** SMK Negeri 1 Balongan
Source: Author, 2023

This research location was chosen because this is the only school that hasa Building Modeling and Information Design (DPIB) expertise program in IndramayuRegency. Apart from that, there has been no similar research at this research location.

## 3. RESULTS AND DISCUSSION

This research uses data collection techniques in the form of tests and observations of student activity. The test was carried out twice consisting of a pretestand a posttest. Before the test instrument is applied to the experimental class and control class, the question instrument needs to be tested for the validity and reliability of each question item. Through analysis of this instrument, the author canevaluate the reliability and effectiveness of the measurement instrument in collectingrelevant and valid data for the research being conducted.

DOI:https://doi.org/10.17509/jare.v5i1.62912
p- ISSN2776-9909e- ISSN2580-1279




**Fugure 1.** Diagram The average value of the cognitive and affective domains by levelSource: Research data, 2023

Based on the diagram above, learning outcomes in the affective domain aresuperior to learning outcomes in the cognitive domain. So it can be concluded that students' activeness is more prominent during learning using the educational game-based TGT learning model, while material or cognitive mastery abilities do not appear to significantly increase learning outcomes. Learning outcomes in thecognitive domain with the highest average learning outcomes were found at level C2 while the lowest were at level C4. This means that students more often answeredquestions correctly on questions at level C2, while many students were found to answer questions incorrectly on questions at level C4. In the affective domain, the average score obtained with the highest score was at level A1 while the lowest wasat level A4. This means that students show high enthusiasm during learning, whichis shown by always paying attention when the teacher explains the material and showing enjoyment during learning. Meanwhile, the low A4 score obtained means that group completion of assignments implemented by group organizing activities and playing a role in group discussions needs to be improved.

**Table 1** N-Gain test results

| Kelas | $S_{pre}$ | $S_{post}$ | Gain | kriteria |
|---|---|---|---|---|
| Eksperimen | 42,22 | 70,03 | 0,47 | Sedang |
| Kontrol | 32,01 | 43,84 | 0,16 | Rendah |

Source: Resarch data, 2023

**Table 2** N-Gain Interpretation

| Besar Nilai N-*Gain* | Implementasi |
|---|---|
| g>0,7 | Tinggi |
| 0,3<g<0,7 | Sedang |

DOI:https://doi.org/10.17509/jare.v5i1.62912
p- ISSN2776-9909e- ISSN2580-1279

| | |
|---|---|
| g<0,3 | Rendah |

Source: Hake, 1999

Based on the results of calculating the N-gain test score above, it shows that the average N-Gain score for the experimental class (Team Games Tournament model based on educational games) is 0.38, if you refer to table of category index then it is 0.47 > 0.3 and 0.38 < 0.7 so it is in the medium category. Meanwhile, the control group's N-Gain score (expository model) was 0.16, so it was 0.16 < 0.3, so it was classified as low. Therefore, it can be concluded that the use of the Team Games Tournament model based on educational games has a significant influence compared to the expository model in improving learning outcomes in the Basics of Modeling Design and Building Information at SMKN 1 Balongan, Indramayu.

The N-Gain test is then tested at each level of the cognitive domain which consists of C1 – C4 levels. The results of the N-Gain test at each level of the cognitive domain are presented in the table 3.

**Table 3** N-Gain test results for each level in the cognitive domain

| Level Ranah Kognitif | Kelas | $S_{pre}$ | $S_{post}$ | *Gain* | Kategori |
|---|---|---|---|---|---|
| **Pengetahuan (C1)** | Eksperimen | 8,44 | 13,33 | 0,18 | Rendah |
| | Kontrol | 10,22 | 10,44 | 0,01 | Rendah |
| **Pemahaman (C2)** | Eksperimen | 8,00 | 24,22 | 0,61 | Sedang |
| | Kontrol | 4,00 | 11,56 | 0,28 | Rendah |
| **Aplikasi (C3)** | Eksperimen | 14,67 | 22,67 | 0,30 | Rendah |
| | Kontrol | 10,67 | 12,44 | 0,07 | Rendah |
| **Analisis (C4)** | Eksperimen | 11,11 | 5,56 | -0,28 | Sangat Rendah |
| | Kontrol | 7,11 | 10,00 | 0,14 | Rendah |

Source: Resarch data, 2023

Based on the table above, it is known that level C2 has the highest increase value, followed by levels C3, C1, and C4. That is, the educational game-based TGTlearning model has an effect on improving student learning outcomes as indicated by the development of aspects of understanding, knowledge, and application of thematerial provided. Meanwhile, level C4 has the lowest N-Gain value, meaning that the educational game-based TGT learning model is less influential in improving students' analytical skills.

### A. Student Learning Outcomes in the Cognitive Domain

Before evaluating the increase in student learning outcomes, the learning outcome data is first tested with normality and homogeneity tests. The results of theanalysis showed that the pretest and posttest data were normally distributed, with values in the experimental class of 0.119 for the pretest and 0.086 for the posttest.Whereas in the control class a significance value of 0.200 was obtained for the pretest and 0.081 for the posttest. In this case, it can be concluded that the significance value is greater than the α value which is set at 0.05. Based on the results of the normality test, it can be stated that the pretest and posttest data were normally distributed. Whereas in the homogeneity test the two data obtained resultsbased on a mean of 0.081. This value is greater than the standard decision makingsignificance value of α which is set at 0.05. So it can be concluded that both data are homogeneous.

In the independent sample t test results obtained a significant value of 0.00 <0.05 which

DOI:https://doi.org/10.17509/jare.v5i1.62912
p- ISSN2776-9909e- ISSN2580-1279

indicates the influence of the educational game-based TGT learning model on student learning outcomes in the Basics of Design Modeling and BuildingInformation at SMKN 1 Balongan. So it can be concluded that H0 is rejected and H1is accepted. Based on the average learning outcomes, it can be concluded that there is a significant difference between learning outcomes in the experimental classthat applies the educational game-based TGT learning model and the control classthat applies the expository learning model. The average increase in learning outcomes based on the N-gain test achieved through the use of the educational game-based TGT model is 47%, while the average increase in learning outcomes through the use of the expository model is only 16%. Thus, it can be seen that the experimental class X DPIB 3 experienced an average increase in learning outcomeswhich was higher than the control class X DPIB 2.

The increase in student learning outcomes occurred due to the implementationof the TGT learning model based on educational games. Slavin (2015) defines a learning model as a collection of techniques or strategies used by teachers to organize the learning process. Vries (1980) stated that in the TGT learning model, students work in groups consisting of four members with different academic abilities,backgrounds, such as race and gender. Each team member is tasked with discussing and helping each other. Team scores are obtained by adding up the individual scores of team members in the tournament. This learning model has a positive impact on student participation in the learning process, creates a pleasant atmosphere, and encourages student motivation to study more diligently. Apart fromthat, the TGT model based on educational games can also increase the sense of tolerance in learning in the classroom as well as improve learning achievement, asstated by Yulisa et al (2023), that the TGT learning model has a parallel influence on the development of attitudes of tolerance and student learning achievement on an ongoing basis. This happens because in this model students who excel in achievement are distributed into small groups that have heterogeneity in terms of learning achievement, race, ethnicity, and so on. According to Taniredja et al (2011), the TGT model is useful in creating classes that are not boring, because collaboration makes learning interactions come alive, can increase a deeper understanding of a subject matter, besides increasing student motivation. Therefore, this model can train students to be able to accept heterogeneous peers andstimulate the formation of quality study groups and is not limited to just research, but in the future it is hoped that the study groups that have been formed through this research will continue to survive. All of these factors contribute to improving studentlearning outcomes.

### B. Student Learning Outcomes in the Affective Domain

The percentage given by observers at meetings in the experimental class was 54%, this figure was obtained from the criteria for activeness values which wereclassified as very active, namely 18 students divided by the class population, namely33 students, so the figure was 54%. Meanwhile, in the control class, the percentagegiven by observers at class meetings was 25%. This figure was obtained from the criteria for activity scores which were classified as very active, namely 8 students divided by the class population, namely 32 students, so the figure was 25%. Basedon observations of student activity by observers during the learning process using the educational game-based TGT model in class difference in the average value of student activity assessed by observers.

Before evaluating the improvement in student learning outcomes, the learning outcome data is first tested using normality and homogeneity tests. The results of the analysis show

DOI:https://doi.org/10.17509/jare.v5i1.62912
p- ISSN2776-9909e- ISSN2580-1279

that the observation data on student activity is normally distributed, with scores in the experimental class of 0.200 for and 0.200 for the control class. It can be concluded that the significance value is greater than the α value which is set at 0.05. Based on the results of the normality test, it can be statedthat the pretest and posttest data were normally distributed. Whereas in the homogeneity test the two data obtained results based on a mean of 0.901. This value is greater than the standard decision making significance value of α which isset at 0.05. So it can be concluded that both data are homogeneous.

The independent sample t test results obtained a significant value of 0.00 <0.05 which indicates the influence of the educational game-based TGT learning model on the activeness of students in the Basics of Design Modeling and BuildingInformation at SMKN 1 Balongan. Based on the results of the average activeness score, it can be concluded that there is no significant difference between the activeness scores in the experimental class that applies the educational game- based TGT learning model and the control class that applies the expository learningmodel. The average score obtained is that the experimental class obtained an average value of 80.47 while the control class was 71.83. Thus, it can be seen thatthe experimental class X DPIB 3 experienced an average increase in learning outcomes higher than the control class X DPIB 2. According to Gagné (1970), learning is an observable change in behavior caused by experience. Learning outcomes include patterns of behavior, values, understanding, attitudes, appreciation, and skills (Widodo and Widayanti, 2013). This is shown based on observations, the experimental class with the educational game-based TGT learning model plays a role in increasing the activity of students as a whole in other words students who tend to be passive are carried away by the flow of learning to becomeactive. This is based on the sense of responsibility they feel to jointly achieve the highest score in the tournaments that are conducted during learning. This statementis in accordance with the theory put forward by Shoimin (2019), which states that the Team Games Tournament learning model not only encourages students with superior academic abilities to become more active in the learning process but alsoencourages students with higher academic abilities. low to be active because they feel responsible for their group.

## 4. CONCLUSION

The achievement of student learning outcomes in the Basics of Design Modeling and Building Information before the implementation of the educational game-based Team Games Tournament (TGT) learning model was very low. This isshown in the percentage of mastery learning that is able to meet the Minimum Mastery Criteria (KKM) of only 16.6% of the total class population. The low achievement of learning outcomes is caused by the low interest and motivation of students in participating in learning. The application of the educational game-basedTGT learning model has an influence on improving student learning outcomes in the Fundamentals of Modeling Design and Building Information subjects, as seen fromthe N-Gain test. The results of the N-Gain test showed an increase belonging to themoderate category in the experimental class. The existence of giving treatment to the experimental class has a positive influence on the interest and motivation of students to participate in learning. This is shown in the activeness of students in the experimental class which is superior to the control class. The activeness of students during learning is shown by enthusiasm, interaction, skills in explaining concepts, and skills in organizing good groups during learning. This proves that the treatment given is able to create a fun and not boring learning atmosphere, and develop an attitude of tolerance in accepting heterogeneity in terms of academic achievement in a

DOI:https://doi.org/10.17509/jare.v5i1.62912
p- ISSN2776-9909e- ISSN2580-1279

group.

The educational game-based TGT learning model was able to improve student learning outcomes with a significant percentage increase of 47% when compared to the control class which used the expository model which had not beenable to significantly improve student learning outcomes with a percentage of 16%. So the use of the educational game-based TGT model has a significant influence inimproving student learning outcomes compared to the use of the expository model.

**REFERENCES**

Ahmadiyanto. (2016). Improving Student Activities and Learning Outcomes using Word Square-Based Ko-Ruf-Si (Educational Letter Box) Learning Media in the Material of Popular Sovereignty and Government Systems in Indonesia Class VIIIC SMP Negeri 1 Lampihong for the 2014/2015 Academic Year. Journal of Civic Education, 6(2), 980–993.

Arikunto, S. (2009). Basics of Educational Evaluation. Literary Earth.

Aryani, N., & Wahyuni, M. (2021). Learning Theory and Its Implications in Learning. Bintang Pustaka Madani.

Gagné, R. M. (1970). The Conditions of Learning. Holt, Rinehart and Winston.

Hake, R. (1999). Analyzing Change/Gain Scores. AREA-D American Education Research Association's.

Huda, M. (2011). Cooperative learning, methods, techniques, structures and applied models. Student Library.

Johnson, E. B. (2011). CTL (Contextual Teaching & Learning). Kaifa.

Mahmudi, I., Athoillah, Muh. Z., Wicaksono, E. B., & Kusuma, A. R. (2022). Taxonomy of Learning Outcomes According to Benjamin S. Bloom. Civil Multidisciplinary Journal, 2(9), 3507–3514. Doi: https://doi.org/10.55927/mudima.v2i9.1132

Majid, M., Azizurahman, A., & Rahman, A. (2022). Factors that Influence Learning Outcomes in Islamic Religious Education Subjects. Journal of Islamic Religion and Education, 14(1), 12–20.

Mardiyan, R. (2012). Increasing Student Activity and Learning Outcomes in Accounting Learning Adjusted Journal Material for Class XI IPS 3 Students at SMA Negeri 3 Bukittinggi using the Role Playing Method. Education Specialist, 10(2), 151–162.

Nafiati, D. A. (2021). Revised Bloom's taxonomy: Cognitive, affective, and psychomotor. Humanics, 21(2), 151–172. Doi: https://doi.org/10.21831/hum.v21i2.29252

Nurhasanah, S., & Sobandi, A. (2016). Interest in Learning as a Determinant of Student Learning Outcomes. Journal of Office Management Education, 1(1), 128–135.

Permana, A. Y., Aprilia, D. I., & Teniola, N. Q. I. (2019). Teacher Skills Through the Development of Design a nd Develop Learning Program Taedes 401 ( gov . au ) for Building Core Skill a nd Employability Skills for Vocational High School. Advances in Social Science, Education and Humanities Research, 379(Veic), 385–395. https://www.atlantis-press.com/proceedings/veic-19/125927437

Permana, A. Y., Mardiana, R., Dewi, N. I. K., Sumanta, R. V. V., Ezzaty, F. M., & Nareswari, P. A. (2022). Evaluation of Classroom Performance in The Post-Covid- 19 New Normal Era at The Building Program Vocational High School. Journal of Southwest Jiaotong University, 15(2), 126–145.

Pondaag, R., Pardanus, R., & Togas, P. (2021). The Influence of Learning Interest and Motivation

on VOCATIONAL STUDENT KKPI Learning Outcomes. Journal of Information and Communication Technology Education, 1(3), 284–296.

Purnamasari, S., Rahmanita, F., Soffiatun, S., Kurniawan, W., & Afriliani, F. (2021). Playing with Students' Knowledge through Online Word Wall Game-Based Learning Media. Accessed from www.wordwall.net

Purwanto, N. (2007). Educational Psychology. Rosdakarya Teenager.

Sari, P. M., & Yarza, H. N. (2021). Training on the use of the Quizizz and Wordwall applications in science learning for SDIT Al-Kahfi teachers. Selaparang Journal of Progressive Community Service, 4(2), 195–199.

Shoimin, A. (2019). 68 innovative learning models in the 2013 curriculum. Ar- Ruzz Media.

Slavin, R. E. (2015). Cooperative learning. Nusamedia.

Sugiyono. (2017). RESEARCH METHODS: Quantitative, Qualitative, and R&D. ALPHABET.

Sulistio, H., & Haryanti, N. (2022). Cooperative Learning Model (Cooperative Learning Model). Eureka Media Literacy.

Sulistyawati, W., & Trinuryono, S. (2022). Analysis (Quantitative Descriptive) of Student Learning Motivation Using the Blended Learning Model During the Covid-19 Pandemic.

Sumardi. (2020). Techniques for measuring and assessing learning outcomes. Deepublish.

Taniredja, T., Faridli, E. F., & Harminatro, S. (2011). Innovative Learning Models. ALPHABET.

Vries, D. D. L. (1980). Team games tournament: The Team Learning Approach Educational Technology.

Widhiarso, & Wahyu. (2017). Accommodating Method Effects in Testing Construct Validity Through Confirmatory Factor Analysis.

Widiyanto, J. (2010). SPSS For Windows for statistical data analysis and research. BP-FKIP UMS.

Widodo, & Widayanti, L. (2013). Increasing Learning Activities and Student Learning Outcomes using the Problem Based Learning Method for Class VIIA Students at MTs Negeri Donomulyo Kulon Progo 2012/2013 Academic Year. Indonesian Journal of Physics, 17(49), 32–35.

Yahya, A., & Wahidah Bakri, N. (2020). Rotating trio exchange type cooperative learning to increase students' activities and mathematics learning outcomes. Journal of Analysis, 6(1), 69–79. Doi: http://journal.uinsgd.ac.id/index.php/analisa/index

Yulisa, B., Setyaningtyas, N., Hartutik, H., & Wuriningsih. (2023). Effectiveness of the Module-Assisted Teams Games Tournament (TGT) Method on Students' Tolerance Attitudes 2(2).

Yusup, F. (2018). Validity and Reliability Test of Quantitative Research Instruments. June, 7(1), 17–23.

DOI:https://doi.org/10.17509/jare.v5i1.62912
p- ISSN2776-9909e- ISSN2580-1279