EFFECTIVENESS OF TEAM GAME TOURNAMENT MODEL ASSISTED WORDWALL ON SCIENCE LEARNING OUTCOMES

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Article Info	ABSTRACT
	Based on the results of observations revealed that the science learning outcomes in class V SDN Leuwinanggung 2 have not been maximized, the teacher has not fully used interesting and innovative learning models and media, resulting in low science learning outcomes. The goals of this study was to assess evaluate the efectivity of science learning outcomes by Team Games Tournament learning model assisted Wordwall for V grade students. This kind of study has a nonequivalent control group design especially quasi-experimental. In this study, the entire population of 2 classes was used as a research sample with saturated sample technique, Using the team game tournament concept in the experimental class was treated using an assisted wordwall, the control group used a traditional model. Multiple-choice questions based on pretest-posttest learning outcomes are used to collect data. The experimental class scored an average of 53.26 on the pretest, while the control class scored 49.52. Next, the experimental class scored 82.17 on the posttest, while the control class scored 61.90. based on the findings of a hypothesis test run with the SPSS V25 application, it produces sig (2-tailed) 0.000 < 0.05, which means Ho is rejected and Ha is accepted, the results of increasing scores using the N-Gain percentage = 67%, meaning that the Team Game Tournament model assisted by Wordwall in the experimental class is effective with the "quite effective" category. In using the Team Game Tournament model, it can be collaborated with learning media to make it more interesting for students to learn. *This is an open access article under the [CC BY-SA](#) license.*

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1. INTRODUCTION

Education is a very important activity for children to prepare their lives in the future (Citriadin, 2019). Education has the aim of maturing children so that children can be independent in the midst of community life. It is undeniable that education is an activity experienced by every tribe and nation and can be a benchmark for the progress of the nation. The National Education System Law (UU SISDIKNAS) No.20 of 2003's definition of education, which says that creating a planned, intentional learning environment and learning process is what education is all about so that students can actively gain the abilities they need, intelligence, noble character, self-control,

and religious and spiritual fortitude required for the state, the country, and society, supports this (Alpian et al., 2019).

In realizing quality education, the existence of educators is very important and becomes the spearhead of education. Because quality and professional educators are an absolute requirement for the creation of quality education (Efferi, 2015) Along with professional responsibilities as a teacher, When implementing educational activities, teachers need to always have everything associated with the lesson plan ready. (Ulfa & Saifuddin, 2018). By paying attention, building communication and collaboration between teachers and students, between students and fun students can create a meaningful and deep learning process.

Student learning outcomes provide one indicator of how well the process of learning went. Learning outcomes for students are achieved through the process of learning activities that have been completed (Susanto in Triana Sari & Baadilla, 2024). If it can achieve learning objectives, then student learning outcomes are said to be successful (Nuridayanti in Sonia & Arifin, 2023). In Bloom's taxonomy, learning outcomes are covered in 3 domains of ability: (1) cognitive domain, related to learning objectives on thinking ability, (2) affective domain related to feelings, emotions, value systems, and attitudes, and (3) psychomotor domain oriented to motor skills (Magdalena et al., 2020).

Based on the findings of preliminary observations undertaken at SDN Leuwinanggung 2 with the instructor of grades VA and VB, it was found that all students had difficulty in understanding questions and learning in science material, besides that learning was often only done with a conventional model, so that student learning outcomes had not been able to achieve KKTP (Criteria for Achieving Learning Objectives) which is 77. This can be seen through the SAS (End of Semester Summative) scores in the following table:

Table 1. End of Semester Summative Results of Science Class V SDN Leuwinanggung 2

No.	Class	KKTP	Score		Number of Student
			<77	>77	
1.	VA	77	21	-	21
2.	VB	77	23	-	23
	Number of Student		44	-	44

The fact the outcomes of the table above, data was acquired stating that all grade V students totaled 44 students, with the number of students in class VA there were 21 students and class VB there were 23 students. There are no students who reach KKTP, As a result, it can be said that student learning results are not 50% complete. To achieve the expected completeness, In order to encourage learners to actively participate in their education, teachers have to utilize alternative models. One of the issues resulting in poor scientific learning outcomes for students is the ones mentioned above.is the absence of the use of innovative learning models. In previous research, discussions about learning models that can improve learning outcomes have been carried out. Still, there are variations in the findings from earlier research. In the research of Saputra et al. (2023) concluded that Applying a cooperative learning strategy related to the Teams Games Tournament (TGT) can enhance student learning outcomes, this is inversely proportional to the research of Mukminah et al. (2020) determined that the cooperative learning model of the TGT type learning model was not effective in improving learning outcomes. In addition, there are differences in the population and media assistance used.

In overcoming the problems at SDN Leuwinanggung 2, researchers will use a cooperative model. This is based on the fact that playing or games is something that children really like (Delima et al., 2015). Male and female students at SDN Leuwinanggung 02 often utilize their break time to play games, be it games that involve physical activity (hide and seek, running around, etc) or playing games that they bring from home.

The TGT learning model is one cooperative paradigm that can be utilized that will improve student learning results (Kurniawan, 2019). Because this model can increase activity in the teaching and learning process, foster an attitude of responsibility, be able to compete fairly, and can provide opportunities for students to interact / cooperate with each other by implementing group learning (Ernanda et al., 2021). According to (Octavia, 2020) the advantages of this model are: (1) prioritizes acceptance of individual differences, (2) with a little time can master the material in depth, (3) the KBM process takes place with activeness from students, (4) higher learning motivation, (5) better learning outcomes.

Considering the findings of preliminary observations by Amri et al., (2021) with the title "Analysis of the Application of the TGT Model to Mathematics Learning Outcomes in Elementary Schools", It was discovered that implementing the TGT approach could enhance primary school students' math learning outcomes, and could also improve teacher activities, student activities and student collaboration. Further research has been conducted by Suardin & Andriani (2021) with the title "Comparative Study of Problem Solving Model with TGT Model on Mathematics Learning Outcomes of Elementary School Students" showed that implementing the TGT concept can enhance the academic performance of students, compared to the problem solving model. There are similarities in the learning models used and focus on student learning outcomes, the difference is in learning materials, research methods, and researchers will use Wordwall media assistance.

In maximizing the Team Game Tournament model, it can be collaborated with learning media. Learning media has a function to smooth the way towards achieving learning objectives. The practical and suitable media for group learning is web-based online media, namely Wordwall (Sari & Yarza, 2021). It was proven by research Hidayaty et al., (2022) with the title "The Influence of Wordwall on Students Interests and Learning Outcomes" that there are differences as does Wordwall media's impact on students' interests and Learning Outcomes.

The distinctive feature of this application is that it is fun for students because there are 18 choices of games that are very diverse, and can be used free of charge. By using Wordwall, students can engage in learning interactively, increase the attractiveness of the material, and facilitate the process of understanding concepts more dynamically. This application is very easy to access and use by both teachers and students as it can be accessed through a browser. Wordwall web makes it easy for new users because Wordwall provides very diverse features. (Khairunisa, 2021).

Therefore, researchers are interested in using the Team Game Tournament learning model assisted by Wordwall media, which focuses on cognitive domain learning outcomes, with the aim of knowing the effectiveness of the Team Games Tournament learning model assisted Wordwall media on grade V science learning outcomes. This research is important because it can provide alternative solutions to learning problems, especially in this digital era where the use of technology in learning is becoming increasingly important. This research combines the proven effective Team Game Tournament learning model with modern technology, namely Wordwall. This combination is an interesting innovation to be studied further and can inspire teachers to try more varied learning approaches that can be applied in various learning contexts.

2. METHOD

This research uses a type of experimental quantitative research, this research was conducted at SDN Leuwinanggung 2. This investigation using a nonequivalent control group design. The experimental group and control group in this design were not chosen at random (Sugiyono, 2022), but because of the recommendation from the homeroom teacher. The reason is because researchers cannot change the pre-existing class. experimental class will receive special treatment in the form of learning using the Team Game Tournament learning model assisted Wordwall, and the control class is only given traditional learning.

Table 2. The Design of Research Non-Equivalent Control Group Design

Pretest	Treatment	Posttest
O_1	X_1	O_3
O_2	-	O_4

(Sugiyono, 2022)

Information: O_1 dan O_2 = Initial test (Pretest), X_1 = Experiment class treatment,
$\qquad$ O_3 dan O_4 = Final test (Posttest)

There were 44 students in grade V at SDN Leuwinanggung 2 that made up the study's population in 2023–2024 school year. In this study, the entire population was used as a research sample (using the saturated sample technique). Class VB, totaling 23 students, will serve as the experimental class, and class VA will serve as the control class.

Test is an instrument used in this study, as multiple-choice questions with topics related to the respiratory system. This test is used to determine the learning outcomes of VA and VB class students. This test was conducted before applying the Team Game Tournament learning model assisted Wordwall (pretest) and after treatment (posttest). Before the questions were used on the sample, they were first tested in order to figure out the validity and reliability of the questions.

At that point, the research sample can receive the instrument. The hypothesis was then evaluated using the t-test on the post-study data to detect if it was accepted or rejected. The necessary analysis was completed using the homogeneity and normality tests earlier than hypothesis testing. An independent sample t test was employed in this study's hypothesis testing, using the decision requirements as follows:
 a) If the significant value (2-tailed) < 0.05 then Ha is accepted and Ho is rejected
 b) If the significant value (2-tailed) > 0.05 then Ha is rejected and Ho is accepted

Then to check the increase in scores in this study using the N-Gain score criterion (g) in the table is:

Table 3. Criteria for Determining the Effectiveness Level

Percentage (%)	Interpretation
> 40	Not Effective
40 – 55	Less Effective
56 – 75	Quite Effective
> 76	Effective

(Sukarelawan et al., 2024)

3. RESULTS AND DISCUSSION

3.1. Result of Validity and Reliability

Before being used in research, this instrument has been validated by expert validators, specifically science lecturers at University Muhaamadiyah Prof. Dr. HAMKA, After that, check out initially to ascertain the instrument's validity and reliability on a sample other than the research sample, namely the VA class at SDN Bojong 02. The formula used to test the validity of multiple choice questions is bisereal point correlation. If $r_{count} > r_{table}$ means the question is valid, and if $r_{count} < r_{table}$ means the question is invalid (drop) (Hadjar, 2019)

Table 4. Validation Result Data

Classification	Total	Item Number
Valid	20	2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 16, 17, 18, 19, 23, 24, 25, 26, 28, 29
Drop	10	1, 11, 13, 14, 15, 20, 21, 22, 27, 30

Looking at the outcomes of the trial data computation, 20 valid questions were obtained from the 30 questions tested, meaning that there were 10 questions that were dropped. The question instrument is said to be valid because it has met the validity requirements of $r_{count} > r_{table}$ with a level of $\alpha = 0.05$ for n = 44, which is 0.297. After the validity of the question, continued with the reliability test with the KR-20 formula. If $r_{count} > r_{table}$ means the instrument is reliable, and if $r_{count} < r_{table}$ means the instrument is not reliable (Sugiyono, 2022)

Table 5. Reliability Result Data

r_{count}	r_{table}
0,707	0,297

Based on the reliability test results described above, $r_{count} = 0,707$ dan $r_{table} = 0,297$. So it can be summarized that the instrument is reliable, because $r_{count} > r_{table}$ (0,707 > 0,297)

3.2. Description of Science Learning Outcome Data
Table 6 below reveals the findings from the pretest and posttest for the SDN Leuwinanggung 2:

Table 6. Pretest Result

Pretest Result	Experiment Class	Control Class
N	23	21
Max	75	70
Min	25	30
Mean	53,26	49,52
Standard Deviation	12,58	12,13
Variance	153,35	147,26

According to the pretest results, the experimental class consisting of 23 students had a highest score of 75 and a lowest score of 25. 53,26 was the average value, 12,58 was the standard deviation, and 153,35 was the variance. In the 21 student control group, the highest score was 70, and the lowest was 30. The average value was 49,52, the standard deviation was 12,13, and the variance was 147,26.

Table 7. Posttest Result

Posttest Result	Experiment Class	Control Class
N	23	21
Max	100	85
Min	60	40
Mean	82,17	61,90
Standard Deviation	11,56	14,27
Variance	133,69	203,69

According to the posttest results, the experimental class consisting of 23 students had a highest score of 100 and a lowest score of 60. 82,17 was the average value, 11,56 was the standard deviation, and 133,69 was the variance. In the 21 student control group, the highest score was 85, and the lowest was 40. The average value was 61,90, the standard deviation was 14,27, and the variance was 203,69.

3.3 Hypothesis Testing

It was is known from the outcomes of the prerequisite analytical testing, which comprises homogeneity and normality tests, that both classes have a normal and homogeneous distribution, allowing the study hypothesis test to proceed. Using the SPSS V25 software, the independent sample t-test was applied in this study for testing the hypothesis. This hypothesis testing is used to test the effectiveness between groups that are given treatment and groups that are not given treatment using the following hypothesis:

Ho: TGT model assisted Wordwall is not effective on science learning outcomes in class V
Ha: TGT model assisted Wordwall is effective on science learning outcomes in class V

Table 8. The Result of Independent Sample T-Test

		Sig. (2-*tailed*)
Learning Outcomes	*Equal variances assumed*	0,000
	Equal variences	0,000

It is known from the preceding table that the two-tailed sig value result is 0.000 < 0.05. In summary, Ho gets turned down while Ha is accepted (Husnun Nazibah, 2023). So, the Team Game Tournament model assisted Wordwall is effective on science learning outcomes in class V SDN Leuwinanggung 2.

3.4.1. N-Gain Test

N-Gain is a test that researchers use to measure how much a sample class's scores have improved. The average pretest and posttest scores for the N-Gain test will be compared to the predetermined criteria. The N-Gain computation results for this research are shown down below:

Table 9. The Result of N-Gain Test

Class	Mean Pretest	Mean Posttest	N-Gain Score	N-Gain (%)	Category
Experiment	49,78	82,17	0,6	67,0	Quite Effective
Control	49,52	61.90	0,2	24,9	Not Effective

According to the analysis results based on the table at the top show that the experimental class has N-Gain = 0.6 so that it is categorized as an increase in learning outcomes is moderate. While the control class has N-Gain = 0.2 which is categorized as low learning outcomes. With the percentage result of N-Gain = 67%, in accordance with the criteria for determining the level of effectiveness, which is in the range of 56 - 75 with a quite effective interpretation. So from these results Using the Team Game Tournament (TGT) assisted by Wordwall learning approach, it can be concluded in the experimental class is effective with the category "quite effective" in contrast to the control group utilizing the traditional paradigm.

Based on the research that has been conducted, it shows that in using the Team Game Tournament model assisted by Wordwall in science learning in experimental classes can make students more actively involved in learning because it contains elements of the game, and can change the learning style of students and teachers who are always fixated on textbooks only. This can be proven during the learning process, the positive activities of students are seen. Each student in their group is actively involved in their group so that their group can be the best group. Learners are also seen helping each other group members, so that each group formed interacts and cooperates well. In contrast to the control class which only used the conventional model, learning was only centered on the teacher. Students in learning only listen and do assignments so that students are less interested and less enthusiastic in learning, and there are still many students who chat which ultimately affects their learning outcomes. In this condition, student learning outcomes tend to be lower than the experimental class.

This is in line with Vgotsky's theory which assumes "What children do or learn today by working together (group) they can do independently in the future". So it is necessary to collaborate between teachers and students and facilitate them to build knowledge with discussions, questions and answers, learning together with peers. Challenging tasks or activities are also needed to help their cognitive development (Suci, 2020). Based on Vgotsky's opinion, it can be concluded that students can gain knowledge if they are conditioned in a learning process that involves heterogeneous group interaction or better known as cooperative learning. By applying the Team Game Tournament, it can require all students to understand the material because the game tourament is carried out in turns (Fauzi & Masrupah, 2024).

In line with research that has been conducted (Astuti & Kristin, 2017; Bandaso et al., 2023; Tenimar, 2019) that the stages of games and tournaments in the Team Game Tournament model can create a fun atmosphere and generate learning activities, so as to improve science learning outcomes. Because learning will be more interesting and fun if students are involved in a game (Aini & Wathon, 2018). This model can assist in the development of students' social skills, such as communication skills, teamwork, and joint problem solving (Handayani et al., 2020). These skills are essential not only in academic contexts but also in daily life and future careers. In addition, it can also encourage a sense of solidarity and collaboration between team members, so that it can increase student motivation because they feel responsible to their team in order to contribute and learn well to achieve the awards or rewards they expect (Fauziyah et al., 2019).

The game used in this study uses Wordwall web assistance, this has been done by previous researchers (Agusti & Aslam, 2022; Dwi Puspa & Suniasih, 2022; Hidayaty et al., 2022) stated that this media can effectively increase student interest in learning and learning outcomes. Because in addition to being easily accessible, Wordwall offers a variety of interactive activities such as quizzes, word puzzles, picture matching, and other games that make learning more interesting and teachers can create game content that can be tailored to learning objectives and student needs. In addition teachers can provide immediate feedback to students after they have completed the game, this can help students to know the extent to which they understand the lesson and which areas they need to improve.

Based on the description that has been presented through theory and supported by relevant research, this can make it clear that student learning outcomes with the ttudent learning outcomes using the Wordwall for Team Games Tournaments are superior to those using traditional learning methods, and are effective on the science learning outcomes of grade V students at SDN Leuwinanggung 2. The results of this study can offer alternative learning models that can be applied in the classroom to improve the effectiveness of learning and can be the basis for developing teacher professional development programs related to the use of technology in learning. In addition, This study may be used as a guide for future analysis that wants to conduct similar further research, especially in developing learning models that are more effective and interesting or can develop this research using other variables.

4. CONCLUSION

The study's findings support the notion that It could say that the science learning outcomes of grade V SDN Leuwinanggung 2 are well handled with the TGT model, with support from Wordwall. According to the study's findings, students in the experimental class had an average science learning outcome of 82.17, while those in the control group had an average learning outcome of 61.90. The results of the hypothesis test were calculated using the independent sample t-test, and the sig 2-tailed value was 0.000. These results show that where $0.000 < 0.05$, Ho is rejected and Ha is approved. With an effectiveness of 67% determined by the N-Gain test, it falls into the "quite effective" group. It can be said that the scientific learning outcomes of grade V SDN Leuwinanggung 2 can be analyzed to be "quite effective" while using the TGT model assisted Wordwall. This research can encourage teachers to further utilize technology in learning, especially in finding and developing interactive learning media.

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