



The Effectiveness of Using a Discovery Learning Model Based on Wordwall in Improving Students' Learning Outcomes

Nida Mutiara Misbah

UIN Sunan Gunung Djati Bandung, Indonesia

nidamutiara78@gmail.com

Article history: Received: 02, 2025; Accepted: 07, 2025; Published: 08, 2025

DOI: <https://doi.org/10.15575/jkgk.v3i2.2329>

Abstract. The results of interviews and initial observations found that low learning outcomes in Islamic Religious Education subjects. This condition is caused by various factors, including factors from the environment, teachers and students themselves. This monotonous and less varied learning process makes students quickly feel bored. The lecture and question and answer model that has been used only makes a small proportion of students active. As a result, student learning outcomes are not optimal. The purpose of the study was to determine the effectiveness of the Discovery Learning model based on the Wordwall application on student learning outcomes in Islamic Religious Education subjects. The background of this research is based on the low student learning outcomes due to monotonous conventional learning methods, as well as the lack of student focus during the learning process. This research uses a quantitative approach with a quasi-experimental method with a non-equivalent control group design. The results of the analysis showed that there was a significant increase in the learning outcomes of experimental class students with an average posttest of 78.53 compared to the control class of 68.50. As well as the average N-Gain of the experimental class of 61.2% with the category "quite effective" compared to the control class of 40.1% with the category "less effective".

Keywords: Discovery Learning; Learning Model; Wordwall; Learning Outcomes

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INTRODUCTION

Success in education No off from achievement results Study students, who become indicator important in evaluate the effectiveness of the process. The learning process has a very big influence to results Study students in class.

Learning outcomes are closely related to students' ability to manage information in the cognitive domain. This cognitive domain encompasses various mental processes, from remembering to creating something. The learning process is still ongoing. teacher- oriented and method - dominated conventional, such as lecture, become one of reason low results Study student. Teachers are more Lots talking, while student tend passive as listener. Even though the learning process should capable push student For develop ability think critical and creative learning moment This Still too focus on memorization information without notice understanding and relevance information with life daily.

A major problem in today's education system is the persistent paradigm that knowledge is simply facts to be memorized. As a result, students tend to feel bored, unmotivated, and less active in their lessons. This is especially true when it comes to Islamic Religious Education (PAI), which students often find boring. However, successful learning depends heavily on teachers' ability to select and implement learning models that foster active student engagement.

One of the teacher's roles in managing learning is selecting the right learning model. Learning models are systematic steps teachers use to help students achieve learning objectives. However, in reality, many teachers still haven't utilized innovative learning models or media, resulting in students being more passive and less interested in learning.

Based on initial observations conducted in class XI of SMK Muhammadiyah 2 Cibiru Bandung, it was found that many students experienced difficulties in understanding the material, mainly because the learning method was still dominated by monotonous lectures and questions and answers. This model tends to make them passive and less actively involved in the learning process, which has an impact on their low academic achievement. It was seen that some students were not focused during the lesson, some were even busy playing with gadgets, talking with their deskmates, and even opening social media while the teacher was delivering the material. This was also supported by the statement of the Islamic Religious Education teacher who said that many daily scores for Islamic Religious Education subjects in class XI had not even reached the Minimum Competency (KKM) of 78. This phenomenon shows a lack of student involvement in learning activities that should be meaningful and interactive.

Given these conditions, innovation in learning strategies is needed that can encourage active and enjoyable student engagement. To make it more engaging, this model is combined with the Wordwall application, an interactive digital medium that offers various forms of educational games, such as quizzes, matching pairs, and crosswords, to help students learn both independently and collaboratively.

One learning model deemed capable of achieving this is Discovery Learning. This model is part of the scientific approach recommended in the 2013 curriculum through Permendikbud No. 103 of 2014. The Discovery Learning model is

considered capable of fostering scientific character, increasing curiosity, and making students more independent and active in learning.

Discovery Learning was developed by Jerome Bruner, who believed that learning would be more meaningful if students were actively involved in discovering concepts and principles directly through experience and experimentation. This statement was further stated by (Hosnan, 2014) that learning outcomes from the discovery process would be more durable in memory because students directly experienced the process of analytical thinking and problem solving.

In addition to learning models, learning media also plays a crucial role in creating meaningful learning experiences. The right media can enhance student interaction and participation in learning. Edgar Dale and his "*Cone of Experience*" theory suggest that authentic learning experiences through media will have a stronger impact on learning outcomes. Furthermore, media selection must consider accessibility, type of evaluation, design, budget, and available features.

One interactive media that can support learning is the *Wordwall application*. This application has proven effective in evaluation processes such as mathematics and geography learning, and can improve student activity and learning outcomes. Although there has been much research on the use of *Wordwall*, most focus on fields other than Islamic Religious Education and emphasize learning activities rather than learning outcomes. However, Gusman's and previous research have shown that the *Wordwall* application can improve student learning outcomes with various attractive features.

Based on the background supported by several theories, the hypothesis proposed in this study is "There is a significant influence between the use of the *Wordwall* -based *Discovery Learning model* on improving student learning outcomes in Islamic Religious Education subjects in class XI of SMK Muhammadiyah 2 Cibiru, Bandung City". This study aims to find out: 1) how the use of the wordwall-based discovery learning model in Islamic Religious Education learning in class XI of SMK Muhammadiyah 2 Cibiru, Bandung City. 2) how effective the use of the wordwall-based discovery learning model is in improving the learning outcomes of Islamic Religious Education of class XI students at SMK Muhammadiyah 2 Cibiru, Bandung. This hypothesis will be proven through a quantitative approach with the *Quasy Experiment method*.

METHODOLOGY

According to Sugiyono, a quantitative approach is a method used to research a specific population or sample that is generally selected randomly. The data collection process uses a prepared instrument, and the data obtained are then analyzed using statistical techniques. The purpose of this approach is to test a previously designed hypothesis. This study uses an experimental method with a *Quasy Experiment design* as an approach to determine the impact of an action on the observed variables, with implementation in a controlled situation. This method is part of the quantitative approach, which is characterized by the presence of a comparison group or control group. Experiments are carried out with a deductive logical approach, seeking to identify certain patterns in human behavior. In the

process, social reality is broken down into measurable elements called variables, then expressed in numerical form and analyzed using statistical methods to find significant relationships or influences.

This study applies the *Purposive Sampling technique*, which is a selective sampling method based on special considerations and input related to the research objectives. The selection was made through input from the Islamic Religious Education teacher himself based on the level of academic achievement of students who were considered balanced. So that class XI TJKT 2 (Computer Network and Telecommunication Engineering) was chosen, totaling 23 people as an experimental class using the Wardwall-Based Discovery Learning model in its learning, and class XI TJKT 1, totaling 22 people as a control class using conventional methods in its learning process.

Data collection techniques were carried out through three main methods, namely observation, interviews, and tests. Observations were carried out to obtain data regarding the progress of the learning process by implementing the *Wardwall-based Discovery Learning model* in class XI of SMK Muhammadiyah 2 Cibiru Bandung. Interviews were used because this method allows researchers to obtain information directly, in-depth and comprehensively from the resource person. Meanwhile, tests were given to students twice, namely in the form of *pretest* and *posttest*. The *pretest* was used to determine the results of Islamic Religious Education learning before using the *Wardwall-based Discovery Learning model*, while the *posttest* was used to determine the effect of learning outcomes after using the *Wardwall-based Discovery Learning model*.

Data analysis techniques were conducted using quantitative descriptive and parametric analysis. Descriptive statistics were used to describe student learning activity data before and after treatment. The data presented include the average value (mean), median, mode, standard deviation, and range of values. Test result data were analyzed using *an independent sample t-test* to determine the significance of the difference between the *pretest* and *posttest*, and N-Gain calculations to measure the effectiveness of improving learning outcomes. The analysis was carried out with the help of SPSS version 16 statistical software.

RESULTS AND DISCUSSION

Result

The results of this study aimed to determine the effect of the treatment given to the experimental class on student learning outcomes. The study subjects consisted of two groups: an experimental group of 17 students and a control group of 20 students. Data were obtained from pretest and posttest results.

Wordwall -Based Discovery Learning Model

This model aligns with the spirit of the 2013 Curriculum, which emphasizes character building, critical thinking skills development, and active and enjoyable learning. Implementing this model requires students to actively seek, explore, and construct their own understanding of the material through a process of asking, observing, experimenting, and drawing conclusions. Therefore, this strategy is highly relevant to addressing current challenges in education, particularly in

improving the quality of learning outcomes and student engagement in the classroom. This model is recommended in the 2013 Curriculum through the Minister of Education and Culture's Regulation (Permendikbud) in its findings.

Table 1. Observation Results Implementation Learning

No	<i>Discovery Learning Learning Model</i>	Score			
		1	2	3	4
1.	The teacher prepares students to start the learning process by praying.				✓
2.	The teacher checks students' attendance before starting the lesson.				✓
3.	The teacher gives apperception to the students.			✓	
4.	Teachers provide motivation for students to learn contextually according to the benefits and applications of teaching materials in everyday life.				✓
5.	The teacher provides an outline of the scope of the material and an explanation of the activities that will be carried out during the learning process.				✓
6.	The teacher instructs students to do a pre-test via <i>the Wordwall link</i> provided.			✓	
7.	The teacher presents problems or phenomena to stimulate students' curiosity.				✓
8.	Teachers ask students questions about the picture or video.			✓	
9.	The teacher guides students to formulate questions/identify problems.			✓	
10.	The teacher groups students into 5 groups.				✓
11.	The teacher asks students to collect information about related material.			✓	
12.	The teacher guides students to write down the information/data obtained				✓
13.	The teacher guides students to interpret or interpret the data/information obtained.			✓	
14.	The teacher guides students to compare the results of data processing with other relevant sources.				✓
15.	The teacher directs students to draw conclusions from the data obtained.				✓
16.	The teacher asks students to present their results in front of the class.			✓	

No	Discovery Learning Learning Model	Score			
		1	2	3	4
17.	The teacher confirms/responds to students' presentations.			✓	
18.	The teacher instructs each group to work on <i>review questions</i> via a link connected to <i>the wordwall website</i> .			✓	
19	The teacher reviews the material together.			✓	
20	The teacher informs the learning activity plan for the next meeting.			✓	
21	The teacher instructed students to do <i>the post-test</i> .			✓	
22	The teacher closes the activity with prayer and greetings.				✓
23	Teachers can use <i>Wordwall/well</i>			✓	
Amount		82			
Average		3.57			

Table 2. Categories Implementation Learning

Average Score	Category
3.51 – 4.00	Very good
2.51 – 3.50	Good
1.51 – 2.50	Enough
1.00 – 1.50	Not enough

Based on Table 1, it can be said that during the implementation of learning with the *Wordwall*-Based *Discovery Learning model*, a score of 82 was obtained from 23 indicators with an average score of 3.57. Thus, the implementation of the learning model as a whole is in the "very good" category.

The Effectiveness of Using a Wordwall-Based Discovery Learning Model on Student Learning Outcomes

After conducting normality and homogeneity tests, the next stage in data analysis is hypothesis testing. This test aims to determine whether there are significant differences between the treatment class and the control class. In this study, hypothesis testing is a crucial step in assessing the effectiveness of the applied learning model.

Using posttest data from both groups, statistical testing was conducted to determine whether the improvement in learning outcomes was due to the treatment or simply a coincidence. Hypothesis testing also helps researchers decide whether to reject or accept the null hypothesis (H_0) based on the significance value generated by the test.

To test these differences, a hypothesis test was conducted on the posttest results given to students. The hypothesis test used in this study was an independent sample t-test, calculated using SPSS 16. The results of the hypothesis test can be seen in the table.

Table 3. Results of the Independent Sample t-Test

	Levene's Test for Equality of Variance s		t-test for Equality of Means						95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper	
Hasil Belajar										
Equal variances assumed	1.640	.209	2.286	35	.028	10.029	4.388	1.121	18.938	
Equal variances not assumed			2.333	34.756	.026	10,029	4,299	1,300	18,759	

Based on Table 3, it can be seen that the significance value (Sig.) of Levene's Test for Equality of Variances is 0.209. Because this value is greater than 0.05, it can be concluded that both groups have homogeneous or equal variances, so the analysis is continued using the first row, namely the assumption of equal variances assumed.

From the t-test results in that row, the calculated t-value was 2.286 with df=35 and a significance value (2-tailed) of 0.028. This value is smaller than 0.05, so it can be concluded that there is a significant difference between student learning outcomes in the experimental class and the control class after the treatment was given.

Table 4. N-Gain Test Results

		N	Minimu m	Maximu m	Mean	Standard Deviation
NGain_percent	Experiment	17	33.33	92.86	61.1869	1.84979E1
	Control	20	18.18	66.67	40.0607	1.59202E1

Based on the results of descriptive analysis of the N-Gain value (percentage increase in learning outcomes) between the experimental class and the control class, a significant difference was found.

Table 4. N-Gain Effectiveness Categories

Percentage (%)	Interpretation
< 40	Ineffective
40 – 55	Less Effective
56 – 75	Enough Effective
> 76	Effective

Hake, 1999 in (Raharjo, 2017)

For the experimental class, the mean N-Gain score was 61.1869 or 61.2%, with a standard deviation of 18.49. The minimum N-Gain score was 33.33 and the maximum was 92.86. Meanwhile, the median score was 57.14, indicating that more than half of the students achieved learning outcomes above that figure.

In contrast, in the control class, the average N-Gain score was lower, at 40.0607 or 40.1%, with a standard deviation of 15.92. The minimum score obtained was 18.18, while the maximum score was only 66.67. The median score in the control class was 36.39, indicating that most students experienced lower improvement compared to the experimental class.

Thus, the use of the Wordwall-Based Discovery Learning model falls into the "quite effective" category with an average score of 61.2%. Meanwhile, the control class falls into the "less effective" category with an average score of 40.1%.

Discussion

Choosing the right strategy No only impact on increasing understanding students, but also on improving motivation Study as well as atmosphere higher class conducive. In addition, the strategy designed in a way contextual will make it easier for teachers to manage class, convey material with more systematically, and evaluate results Study student in a way more accurate.

Relevant learning strategies support achievement objective learning optimally. In this case This educator need adjust the model to device supportive learning student in understand material presented. With Thus, the activity process learning can walk in a way effective, attractive, and give experience meaningful learning for participant educate. With Thus, the activity process learning can walk with effective and attractive, as well as make it easier task a teacher in convey material.

One of business that can done is with elaborating the *Discovery Learning* model with application *Wordwall* in learning. This is in accordance with condition

difficult students concentration during the learning process at a time interesting interest student For Study. Discovery Learning's own learning model is one of the recommended models in 2013 Curriculum, as pourred out in Minister of Education and Culture Regulation related approach scientific approach and learning based discovery. This model in line with Spirit The 2013 curriculum emphasizes strengthening character development ability think critical, and active and enjoyable learning. The application of this model demand student For active searching, digging, and constructing Alone his understanding to material through the process of asking, observing, trying, and concluding. With Thus, this strategy is very relevant For overcome challenge in the world of education moment this, in particular in increase quality results Study as well as involvement students inside class. This model recommended in 2013 curriculum through Minister of Education and Culture in findings.

Effective learning can seen from existence improvement results Study student after done something treatment or intervention. In the research This is a Wordwall - based *Discovery Learning* model used in class experiment For increase results Study students, meanwhile class control use method conventional. Result data Study obtained from mark *pretest* and *posttest* later analyzed For see effectiveness treatment This model chosen Because own superiority in push participation active and thinking critical students. Wordwall as supporting media facilitate presentation interesting and easy material understood. Combination both of them expected capable give experience learn more fun and meaningful.

Independent Sample t-Test Results strengthen existence difference between class experiment with class control. This test produce mark significance (Sig. 2-tailed) of $0.028 < 0.05$, which means there is significant difference between results Study students in class experiments and classes control. This means that the learning model *Discovery Learning Based Wordwall* in a way statistics influential to results Study students. Findings This show that approach designed learning in a way systematic can give results real in improvement academic student.

Analysis more deep done through N-Gain calculation for measure effectiveness learning. Average N-Gain in class experiment is 61.19%, while in class control only by 40.06%. This is show that improvement results study in class experiment is at in category currently or Enough effective, whereas in class control only categorized low or not enough effective. In addition, the value maximum N-Gain in class experiment reached 92.86, far more tall compared to class control that only reached 66.67. Comparison This show that the *Discovery Learning* model based *Wordwall*/No only effective on average, but also potentially give improvement maximum for student certain. This indicates that approach the adaptive to various level ability student.

Based on results overall, can concluded that use of the *Discovery Learning* model Based *Wordwall* give influence positive to improvement results Study students. Approach This push student For more active in find draft Alone through interactive, fun and stimulating media involvement learn. With Thus, this model

recommended as alternative effective learning strategies, especially in context Islamic Religious Education learning.

This model is also in line with need 21st century which emphasizes skills think critical, creativity, and utilization technology. Implementation sustainable with competent teacher support can strengthen its effectiveness. Therefore that, this model worthy For applied more wide in various level education.

CONCLUSION AND IMPLICATION

Conclusion

Conclusion load description short in the form of answer to the problem being raised and not in pointer form or number. Writing in conclusion, 1 page. Based on research results and data analysis at SMK Muhammadiyah 2 Cibiru, specifically in class XI TJKT 2, the use of the Wordwall-Based Discovery Learning model can be said to be effective in improving student learning outcomes. based on *Independent Sample t*- Test results show that there is significant difference between results Study students in class experiments and classes control (Sig. 0.028 < 0.05). This indicates that the *Discovery Learning* model Based *Wordwall* influential in a way positive to results Study students. Effectiveness improvement results learning is also visible from results N-Gain calculation. Average N-Gain in class experiment of 61.1869 or 61.2% are in the category currently or Enough effective, while in class control amounting to 40.0607 or 40.1% which is in the category low or not enough effective. This is strengthen findings that learning using the *Discovery Learning* model Based Wordwall more effective in increase results Study.

Implications

Research result This show that use of the Discovery Learning- based learning model application Wordwall implications positive to results Study students who are improving. Integrity between approach learning constructivism and interactive digital media are very important in the learning process teaching. Teachers are expected utilise results study This as reference in create atmosphere active and creative learning. For institutions education, research This push innovation digital learning as well teacher training in usage technology educational. In addition, research This expected become base foothold For study furthermore For strengthen effectiveness of learning models this is in various context.

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