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# The Impact of Window-Shopping Strategy towards Students' Score on the Topic of Linear Equations of Two Variables

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**Abstract-** This research is motivated by the low scores of students in learning mathematics. The purpose of this study was to determine the effect of applying the window-shopping learning model to the learning outcomes of class VIII students of SMP Negeri 29 Sijunjung. This type of research is experimental research with a quantitative approach. As a result, the class with the window-shopping learning model has an average of 61.14 and the class with the conventional learning model has an average of 43.04. The results of testing the hypothesis obtained t count = 2.3569 and t table = 1.7056, where t count > t table, so the hypothesis is accepted. It can be concluded that the application of the window-shopping learning model affects the learning outcomes of Class VIII students of SMP Negeri 29 Sijunjung

## 1. Introduction

Mathematics is a lesson that has an important role in improving the progress of science and technology (IPTEK). This has caused mathematics to become a subject that is taught from elementary school to the tertiary level (Haryono & Ramadoni, 2022). The learning process of mathematics is a process of teacher-student interaction to achieve a learning goal, and students are simultaneously instructed as students and become a learning process. Whether or not learning objectives are successful is reflected in student learning outcomes. Learning outcomes are the primary metric used to determine student success. Learning outcomes can be influenced by two factors, namely internal and external (Hasanah, 2021).

The reality found by the school was that the mathematics learning outcomes achieved by students did not match expectations. This can be seen from the level of completion of mathematics learning outcomes

for grade VIII students of SMPN 29 Sijunjung for the 2022/2023 school year shown in Table 1.

**Table 1.** An Example of a Table

| No | Class | Number of Students | Student's Daily Math Test Scores | | | |
|---|---|---|---|---|---|---|
| | | | Complete | Sum (%) | Incomplete | Sum (%) |
| 1 | VIII 1 | 29 | 8 | 27.59 | 21 | 72.41 |
| 2 | VIII 2 | 29 | 10 | 34.48 | 19 | 65.52 |
| 3 | VIII 3 | 28 | 13 | 46.43 | 15 | 53.57 |
| Sum | | 86 | 31 | 36.05 | 55 | 63.95 |

Source: Mathematics Subject Teacher

Table 1 shows that the mathematics learning outcomes of grade VIII students of SMPN 29 Sijunjung are still below the minimum completion standard (KKM) set by the school, which is 71 with more students graduating than those who did not graduate. Based on observations made in Class VIII of SMP Negeri 29 Sijunjung on September 16, 2022, students are less active in studying, feel bored, often ask for permission to leave the classroom, and students are left alone, busy, and uninterested. Expected responsibilities in groups, friends who are just smart, some students who like to wander around while studying, students do not pay attention to the information of the teacher and the learning models used are not very diverse.

A joint interview with a mathematics teacher at SMPN 29 Sijunjung revealed that they use conventional learning in the learning process in the classroom, so students are not active in learning and some students are involved in the learning process, this becomes clear. Teachers should be able to make learning more interesting for students because they do it when they like to go for a walk. Interviews with students reveal that mathematics is a very difficult and difficult subject to understand, according to students, with many very complex formulas. Learning math is boring and makes me sleepy and afraid to ask questions that I don't understand.

Despite the above problems, it is desirable that teachers must be creative in the learning process. This makes learning fun for students, stimulates their interest, keeps them active, and reduces boredom. One is to introduce different approaches, methods, or use models. There is one learning model available. It is a collaborative learning model. This model is a learning model where students learn in groups of different abilities. One model that encourages the active participation of students in groups is the window shopping learning model. The window-shopping learning model is a group work-based learning model that involves looking around and broadening one's horizons by looking at the results of other group work (Revianto, 2021).

This window shopping learning model has one activity, namely taking students for a walk and displaying the results of other group work on the wall. In this visitation activity, students are not only invited to look around but also observe and record the learning outcomes of other groups. In this activity, students are required to communicate with their friends, and peer tutor learning activities are carried out (Istianingsih & Mir'anina, 2017). According to Suprapto (2017), the application of the window-shopping learning model can improve student learning outcomes, and provide opportunities for students to develop math skills, and share knowledge with their peers. Based on the above problems, this study aims to determine the influence of window shopping strategies on student scores on the topic of two-variable linear equations. This research is titled "The Effect of Window Shopping Strategies on Student Scores on the Topic of Two-Variable Linear Equations".

## 2. Methods

This research was conducted at SMP Negeri 29 Sijunjung. This research was conducted in class VIII of SMP Negeri 29 Sijunjung in the odd semester of the 2022/2023 school year. This research is experimental research with a quantitative approach. The research design used in this study was a post-test-only control group design. The study involved two groups, an experimental group, and a control group. In the design of the post-test-only control group, there are two groups, namely the experimental group and the control group. The experimental group was treated using the window shopping learning model, while the control group did not use the window shopping learning model. After the treatment in the experimental group, a post-test was given to the experimental and control group to determine the


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student's learning outcomes.
The population of this study is all grade 8 students of SMP Negeri 29 Sijunjung for the 2022/2023 school year, totaling 86 students consisting of grades VIII 1, VIII 2, and VIII 3. The sample is a portion of the population under study. Therefore, the sample should be considered as an estimate of a population that has the same traits and traits to represent the study population. Depending on the problem being investigated, it requires two sample classes, an experimental class, and a control class. The sampling technique in this study was carried out by simple random sampling. The research variables used in this study are independent variables and dependent variables. The independent variable in this study is the window shopping learning model while the dependent variable in this study is learning outcomes.
The research instrument uses a post-test in the form of a description. The post-test questions have been validated and tested as item analysis. Data collection techniques can be carried out in three stages, namely the preparation stage, the implementation stage, and the final stage. Data analysis techniques are to conduct normality tests using Liliefors tests, homogeneity tests using F tests, and hypothesis tests using t-tests. Before the three stages above are carried out, first calculate the student's learning outcome score. Calculating the assessment score of students' mathematics learning outcomes requires an assessment rubric. Iryanti (2004: 13) states that a "Rubric is a scoring guideline". To measure student mathematics learning outcomes in this study, a rubric for assessing learning outcomes with a scale of 0-3 can be seen in Table 2.

**Table 2.** Holistic Rubric with a Scale of 0-3

| Scale | | | |
|---|---|---|---|
| 0 | 1 | 2 | 3 |
| No answers and incorrect answers | The answer is a lot of shortcomings and relates to the concept | The answer is a little lacking and relates to the concept | The Answer is correct and relates to the concept |

Source : Iryanti (2004 : 14)

The scale given in this study is adjusted to the learning outcomes to be achieved. In giving scale grades it is very important to determine the limits of meeting or not meeting the applied learning outcomes. Scale 0 is considered no answer, scale 1 is considered incorrect answer, scale 2 is considered to be a slightly deficient answer and relates to concepts, and scale 3 is considered correct answers and relates to concepts.
Based on what has been made, the final test conducted by the student can be assessed. The score obtained by the student must be changed to a set number scale (within 0-100). The scores obtained by students if converted to a scale of 0-100 are:

$$\text{Student Grades} = \frac{scores\ earned\ by\ students}{total\ score} x100$$

After obtaining student scores then conduct a normality test aimed at testing whether the sample is taken from a normally distributed population or not. The hypotheses tested are:
$H_0$: normally distributed population
$H_1$: The population is not normally distributed

Testing can be done using the Liliefors test (Sudjana, 2005).

1. Compile student scores from lowest to high.
2. Calculate the raw score that is used as a standard score, namely:
$$Z_i = \frac{x_i - \bar{x}}{s}$$
3. Use the list of opportunities by using
$$F(Z_i) = P(Z \leq Z_i$$
4. Calculating the difference between $S(Z_i)$: the proportion of the standard score that is smaller or equal to $Z_i$, then:
$$S(Z_i) = \frac{banyaknya\ Z_1, Z_2 \ldots\ldots\ldots\ldots Z_n\ yang \leq Z_i}{n}$$
5. Calculates the difference $(Z_i)$- $S(Z_i)$, then find the absolute price


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Take the largest price among the absolute prices of the difference, then compare it with the critical value of $L_{table}$ at the level $\alpha = 0.05$, if $L0 < L_{table}$, H0 is accepted then the sample is normally distributed.
After the normality test is carried out, then perform the homogeneity test aims to see whether the sample group has homogeneous variance or not. The variance homogeneity test was performed against post-test data. Testing can be done in the following ways:

$H_0 : {\sigma_1}^2 = {\sigma_2}^2$
$H_1 : {\sigma_1}^2 \neq {\sigma_2}^2$

Where:
${\sigma_1}^2$ = Variance of student mathematics learning outcomes with window shopping learning models

${\sigma_2}^2$ = Variance of student mathematics learning outcomes using conventional learning.

The formula used to test this hypothesis according to Sudjana (2005) is:

$$F = \frac{{S_1}^2}{{S_2}^2}$$

Where:
$F$ = Comparison between experimental class learning outcomes variances with control class learning variances
${S_1}^2$ = Variance of experimental class learning outcomes
${S_2}^2$ = Variance of control class learning outcomes

After the $F_{calculate}$ price has been obtained, compare the price of the $F_{calculate}$ with the price of Ftable. If $F_{calculate} < F_{table}$ then both groups of data have homogeneous variance.
After the normality test and homogeneity test are carried out, then do the hypothesis test with a one-party t-test. The statistical hypotheses tested are:

$H_0 : \mu_1 = \mu_2$
$H_1 : \mu_1 > \mu_2$

Where:
$\mu_1$ = Average test scores of students' mathematics learning outcomes by applying the Window Shopping learning model.
$\mu_2$ = Average test scores of students' mathematics learning outcomes by applying conventional learning models.

According to Sudjana (2005), the t-test formula is:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{S\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

with

$$S = \sqrt{\frac{(n_1 - 1){S_1}^2 + (n_2 - 1){S_2}^2}{n_1 + n_2 - 2}}$$

Information:
$\bar{X}_1$ = Experimental class average score
$\bar{X}_2$ = The average score of the control class
$n_1$ = Number of experimental class students
$n_2$ = Number of control class students
${S_1}^2$ = Experimental class variance
${S_2}^2$ = Control Class Variance
$S$ = Standard deviation/standard deviation

The test criteria are: Accept H0 if $t_{calculate} < t_{table}$ or reject $H_0$ if t has another price with degrees of freedom n1+n2-2.


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## 3. Results and Discussion

### (a) Result

The hypothesis in this study is to determine the effect of the application of the window shopping learning model on the mathematics learning outcomes of grade VIII students of SMP Negeri 29 Sijunjung. Before testing the hypothesis with a one-party t-test, a normality test is first carried out with the Liliefors test and a homogeneity test of variance with the F test.

After the normality test, results were obtained for the experimental class $L_0 = 0.1637$ and $L_{table} = 0.1674$, while the control class had $L_0 = 0.1417$ and $L_{table} = 0.1674$. From the two sample classes, we can see that we receive $L_0 < L_{table}$, which is $H_0$. From this, it follows that both classes of samples are normally distributed. After the normality test, a homogeneity test is performed. The homogeneity test uses the F-test to determine if the sample group has a uniform variance.

After conducting homogeneity tests for both sample classes, it showed that the two sample classes were evenly distributed. Based on normality test results with normally distributed samples and homogeneity test results with evenly distributed samples. Therefore, hypothesis testing is performed using the right-sided t-test on one side.

The test criterion accepts H0 if the degree of freedom dk= n1+n2-2 and $t_{calculate} < t_{table}$ and rejects $H_0$ instead. Based on the test results, $t_{calculate} > t_{table}$ was obtained, so $t_{calculate} = 2.3569$ and $t_{table} = 1.7056$, discarding $H_0$. From this, it can be concluded that the application of the window shopping learning model has an impact on the learning outcomes of Class VIII students of SMP Negeri 29 Sijunjung.

Learning process In the experimental class, a window shopping learning model was carried out. In the first stage of grouping students, namely, students are made into several learning groups where each group consists of 4-5 people. In the second stage of the division of questions, where each group gets the questions that must be completed by the group, then the teacher distributes different questions to each group. Before doing the work, students are allowed to read and find information about the material to be studied through the package book. After understanding the material, students do the questions by discussing with their group of friends.

Then the results of solving the questions are written on a piece of newsprint. After that, the results of the group's work are displayed on the walls of the classroom, in this activity the teacher guides as necessary. The third stage of visiting other groups and visiting other groups, that is, each group divides the members of their group into two parts. Some are in charge of guarding the group and some are shopping in other groups. Then the group members in charge of guarding the group are in charge of explaining the discussion of the results of the group to other groups who visit and write down the results of corrections or comments that visit.

Meanwhile, the group members who shop are in charge of correcting and recording the answers of the groups visited and providing appropriate input. After the allotted time is over, each member who goes around returns to the original group. After returning, the group members exchanged information based on the results of the visit that had been carried out. Furthermore, the teacher goes around checking the results of the work and the things that need to be improved and giving a score to the results of the work on each group tap.

The fourth stage of group presentation is when the teacher asks each group to present the results of the discussion and group work in front of the class. After the teacher has made feedback and corrections to the work of each group. Then to understand students' knowledge, an individual quiz is carried out with questions of the same type as the questions that have been done by all groups. The following are the results of a randomly drawn group discussion.

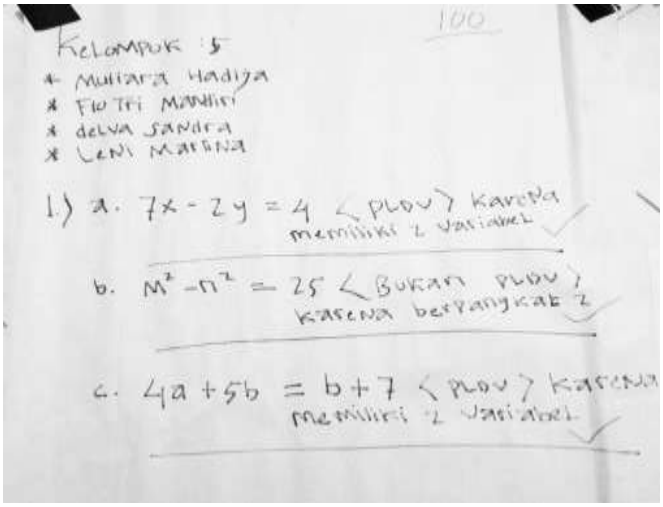


**Figure 1.** Results of Group Five Discussions at Meeting 1

Based on Figure 1, the results of a randomly selected group discussion showed that students were able to answer the questions asked. The group consists of 6 groups and each group is given a different question. Each group was able to answer the questions posed on the supplementary material to understand the concept of a two-variable linear equation. Students can identify equations that contain linear equations in two variables and equations that are not linear equations in two variables. Each group has a different solution, with some groups answering very clearly and others simply closing or unclear. Some of the group of students were embarrassed and afraid to announce the results of their work, and the other students were hesitant to give a response and did not pay attention to the group that appeared. To overcome this, teachers provide direction and motivation to their students. The teacher then checks the student's answers. At the end of the lesson, a quiz is given for evaluation or to see if the student has mastered the material given. Of the 28 students who took the quiz, more than half were able to answer the quiz questions.

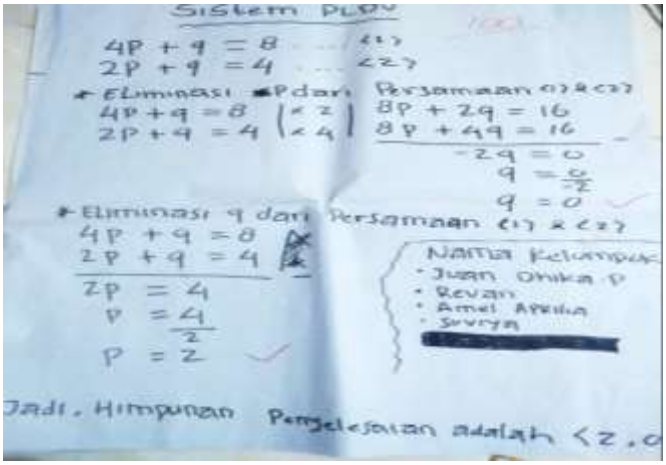


**Figure 2.** Results of Group Four Discussions at the Meeting 2

Based on Figure 2, the results of a random group discussion showed that students were able to answer the questions asked. The group will consist of 6 groups and each group will get a different question. Each group can answer questions posed on complementary materials. In other words, we can solve a system of linear equations with two variables using the process of elimination. At the time when there was still a group presentation, students were embarrassed to present the results of their work, and other students were reluctant to give responses and did not pay attention to the group performance. To overcome this, teachers provide more direction and motivation to students. The teacher then checks the student's answers. At the end of the lesson, a quiz is given for evaluation or to see if the student has mastered the material given. Of the 27 students who took the quiz, more than half were able to answer

quiz questions.

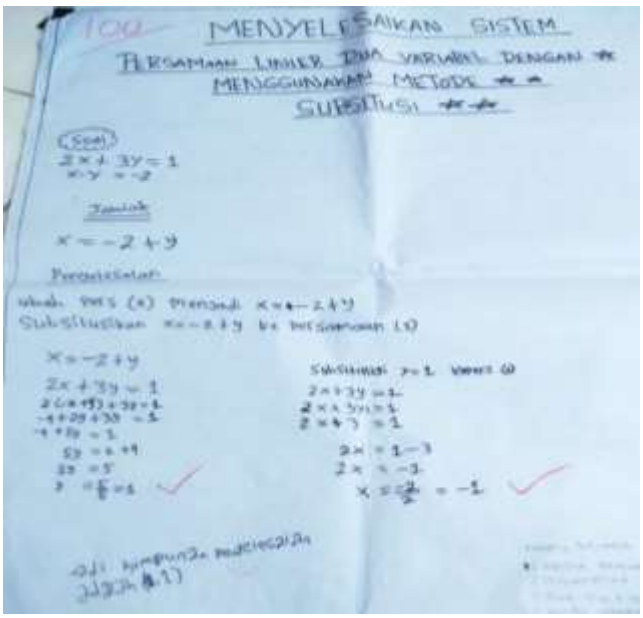


**Figure 3.** Results of Group Two Discussions at the Meeting 3

Based on Figure 3, the results of the random group discussion showed that students were able to answer the questions asked, and six group groups got different questions. Each group can answer the question posed on the sub-material, how to solve a system of two-variable linear equations using the substitution method. Some students hesitated to present the results, some students were reluctant to give feedback to the group that appeared, and some group members ignored the group that appeared. To overcome this, teachers appreciate and motivate their students. The teacher then checks the student's answers. At the end of the lesson, a quiz is given for evaluation or to see if the student has mastered the material given. Of the 26 students who took the quiz, more than half were able to answer quiz questions.

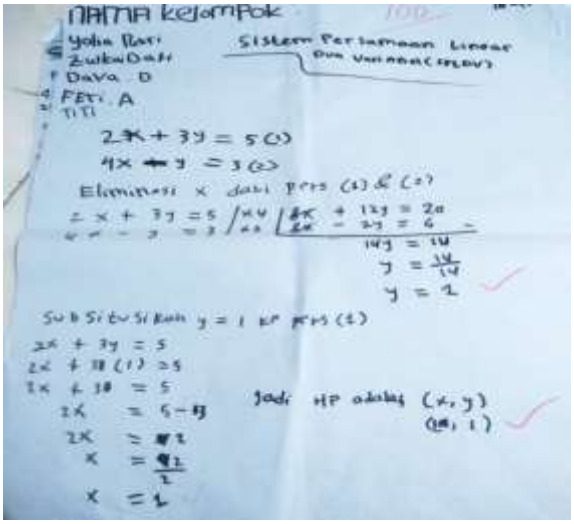


**Figure 4.** Results of Group Six Discussions at the Meeting 4

Based on Figure 4, the results of randomly selected group discussions found that students were able to answer the questions asked. Groups of 6 will be given different questions. Each group can answer the questions posed in the sub-material. That is, you solve a system of linear equations in two variables with elimination and substitution. In percentage terms, each group began to dare to present the results of their work, other students began to answer the group that performed, and the members of the group who did not perform noticed the group that performed. To overcome repetition from the first to the third, the teacher provides rewards and actions in the form of group evaluations. The teacher then checks

the student's answers. At the end of the lesson, a quiz is given for evaluation or to see if the student has mastered the material given. Of the 27 students who took the quiz, more than half were able to answer the quiz questions.

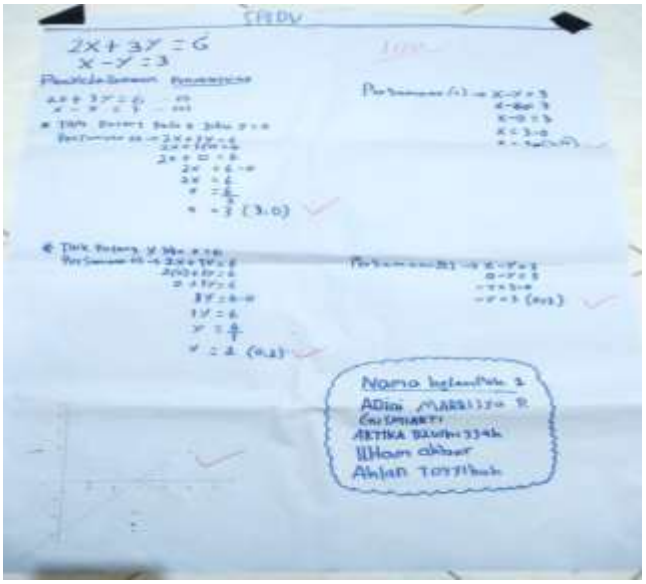

**Figure 5.** Results of Group One Discussions at the Meeting 5

Based on Figure 5, the results of random group discussions show that students can answer the questions asked. Groups of 6 groups were given different questions. Each group was able to answer the question posed on the complementary material, how to solve a system of two-variable linear equations by drawing graphs. Students dare to actively present the results of their group discussions. I took the liberty to present the results of the work I had achieved, and other students were able to give feedback to the emerging group, and all the other members of the group paid attention to the group that appeared. The teacher then checks the student's answers. At the end of the lesson, a quiz is given for evaluation or to see if the student has mastered the material given. Of the 28 students who answered the quiz, many students were able to answer the quiz.

Based on the final test (post-test) that has been carried out in the two sample classes, the average student mathematics learning outcomes in the experimental class were 61.14 while the average student mathematics learning outcomes in the control class were 43.04.

### (b) Discussion

Based on the results of the research obtained, there is an influence of the application of the window shopping learning model on students' mathematics learning outcomes. According to Suprapto (2017), the application of the window shopping learning model can improve student learning outcomes and provide opportunities for students to develop mathematical skills and communicate their knowledge to their peers.

According to Kurdi (2017), window shopping is one of the unique and interesting cooperative learning models because this learning model is based on group work by shopping around, and looking at the work of other groups to increase their insight. In the learning model, students can shop actively and dynamically by displaying their work creatively. Two people from each group guard their work (guarding the stand) while other group members visit the stand to see the work of the other group (shopping) by giving comments and ratings so that each participant in the group can spark their creativity.

## 4. Conclusion

Based on the results of the research and discussion, it was concluded that there is an influence of the application of the window shopping learning model on the mathematics learning outcomes of grade VIII students of SMP Negeri 29 Sijunjung, which can be seen from the data obtained, namely $t_{calculate}$ =


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$2.3569 > t_{table} = 1.7056$. This can be seen from the final test given to experimental class students and control classes, the average test score of student mathematics learning outcomes by applying the window shopping learning model is greater than the average test score of student mathematics learning outcomes by applying conventional learning models.

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