Improving Students' Mathematical Communication Skills and Learning Independence through Team Assisted Individualization (TAI) Model Assisted by Symbolab Application

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Abstract
The purpose of this study was to determine the improvement of students' mathematical communication skills, to determine the achievement of students' mathematical communication skills, and to determine the improvement of students' learning independence using the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application. The design of this study was Nonequivalent Pretest Posttest Control Group Design. The sample in this study were students of class X IPA 5 and X IPA 3 of SMA Negeri 1 Cibeber, each of which consisted of 28 students per class. The sampling process was carried out using a purposive sampling technique, namely a sampling technique based on the considerations of mathematics teachers. The instrument used was a test question in the form of 4 mathematical communication ability questions on the triginometric comparison material. The results of this study indicate that there is an increase in the mathematical communication ability of students who use the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application with students who use the Team Assisted Individualization (TAI) learning model only. There is an achievement in the mathematical communication ability of students who use the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application with students who use the Team Assisted Individualization (TAI) learning model only. There is no increase in student learning independence before and after learning using the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application. Based on this study, it can be concluded that the increase and achievement of mathematical communication ability of students who use the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application is better than students who use the Team Assisted Individualization (TAI) learning model only.

Article History:

Keywords:
Mathematical Communication, Learning Independence, Team Assisted Individualization (TAI), Symbolab

1. Introduction

In Indonesia, mathematics is one of the compulsory subjects for students at the primary to secondary education level. The standards of mathematical abilities that must be possessed by students are formulated by the National Council of Teachers of Mathematics (NCTM) (2000), namely problem solving, communication, connection, reasoning, and representation. In the curriculum in Indonesia, namely in the independent curriculum currently in effect, Mathematics subjects aim to equip students to be able to have: mathematical understanding and procedural abilities, mathematical reasoning and proof, mathematical problem solving, mathematical communication and representation, mathematical connections and mathematical disposition (Kemendikbudristek, 2022). Based on these two things, one of the important mathematical skills is mathematical communication skills.

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Mathematical communication skills are essential in the learning and application of mathematics. These skills include the ability to clearly articulate mathematical ideas, both orally and in writing, which is essential for effective problem solving and collaboration in educational settings. The importance of mathematical skills includes that mathematical communication skills will facilitate understanding. Effective communication allows students to express their mathematical reasoning and understand the concepts being taught. Effective communication helps them to clarify their thoughts and articulate their understanding, which is essential for understanding complex mathematical ideas (Qohar, 2011). In addition, through good communication skills, it can also improve the ability to understand mathematical problems and collaborate with peers. This collaborative environment fosters deeper understanding and helps in solving problems more efficiently (Rohid & Rusmawati, 2019). Allowing students to articulate their understanding and engage in collaborative discussions also allows students to have learning independence .

Learning independence in mathematics refers to an educational approach where students take initiative and responsibility for their own learning process. Learning independence in mathematics is essential as it equips students with important skills such as problem solving (Asmar & Delyana, 2022), self-confidence (Asih et al., 2021), and critical thinking (Pokhrel et al, 2024). These attributes not only improve their academic performance but also prepare them for lifelong learning and success in various aspects of life (Lin & Chen, 2023). Based on this explanation, a conclusion can be drawn that student learning independence will be very beneficial so that it becomes important to be owned by students.

However, previous research shows that students' mathematical communication skills are often low, thus posing significant challenges in mathematics learning. Qohar (2011) research results show that students struggle with oral and written mathematical communication. In particular, students in rural areas show low oral communication skills, which affects their ability to express ideas clearly, even when they understand the concepts. Meanwhile, the results of research by Yuniara et al. (2018) showed that many students find it difficult to articulate mathematical ideas effectively, both through writing and orally. This includes difficulties in explaining concepts in their own words, creating visual representations of problems, and translating real-life situations into mathematical language. These findings indicate an urgent need for learning strategies that prioritize the development of mathematical communication skills.

Likewise, students' learning independence is also still low. Research by Pratama (2023) and Sukatin et al (2023) has identified specific indicators of low learning independence , including the inability to solve problems independently, lack of self-discipline, and lack of initiative in managing their own learning tasks. For example, many students reported needing reminders to study or complete tasks, reflecting a reliance on external prompts. In Sari et al research (2024) it was found that many students exhibit dependence on external guidance, which shows characteristics such as low self-confidence and a tendency to wait for instructions from teachers or parents before engaging in learning activities. Research shows that a significant number of students still rely on others to help with assignments and lack initiative in their learning process. This suggests that there is a need for educators and parents to foster greater independence among students. This includes creating a supportive learning environment and implementing teaching strategies that encourage independent learning.

One learning model that is thought to be able to improve students' mathematical communication skills and learning independence is the Team Assisted Individualization (TAI) learning model. The TAI model emphasizes collaboration and peer-assisted learning, which can significantly improve students' mathematical communication skills. By working in teams, students are encouraged to articulate their reasoning and share problem-solving strategies, thus fostering a deeper understanding of mathematical concepts.

Symbolab application can be used in the implementation of the TAI model. The Symbolab app licationserves as a valuable tool for students by providing step-by-step solutions to math problems. This feature not only helps in understanding complex concepts but also helps students learn how to effectively communicate their problem-solving process. The app's ability to recognize problems through images and provide graphical representations further supports visual communication of mathematical ideas.

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Based on the explanation above, the researcher is interested in conducting research with the title: "Improving Mathematical Communication Skills and Student Learning independence through the Team Assisted Individualization (TAI) Learning Model assisted by Symbolab Application".

2. Method

The method in this research is Quasi Experiment method with Nonequivalent Pretest Posttest Control Group Design. This design has two parts of the group that are not randomly selected or already determined, then given a pretest (initial test) to determine the initial state (initial ability) between the experimental group and the control group. The experimental group was given the Team Assisted Individualization model treatment with the help of the Symbolab application while the control group was given the Team Assisted Individualization model treatment.

The research flow is depicted in Figure 1 as follows:

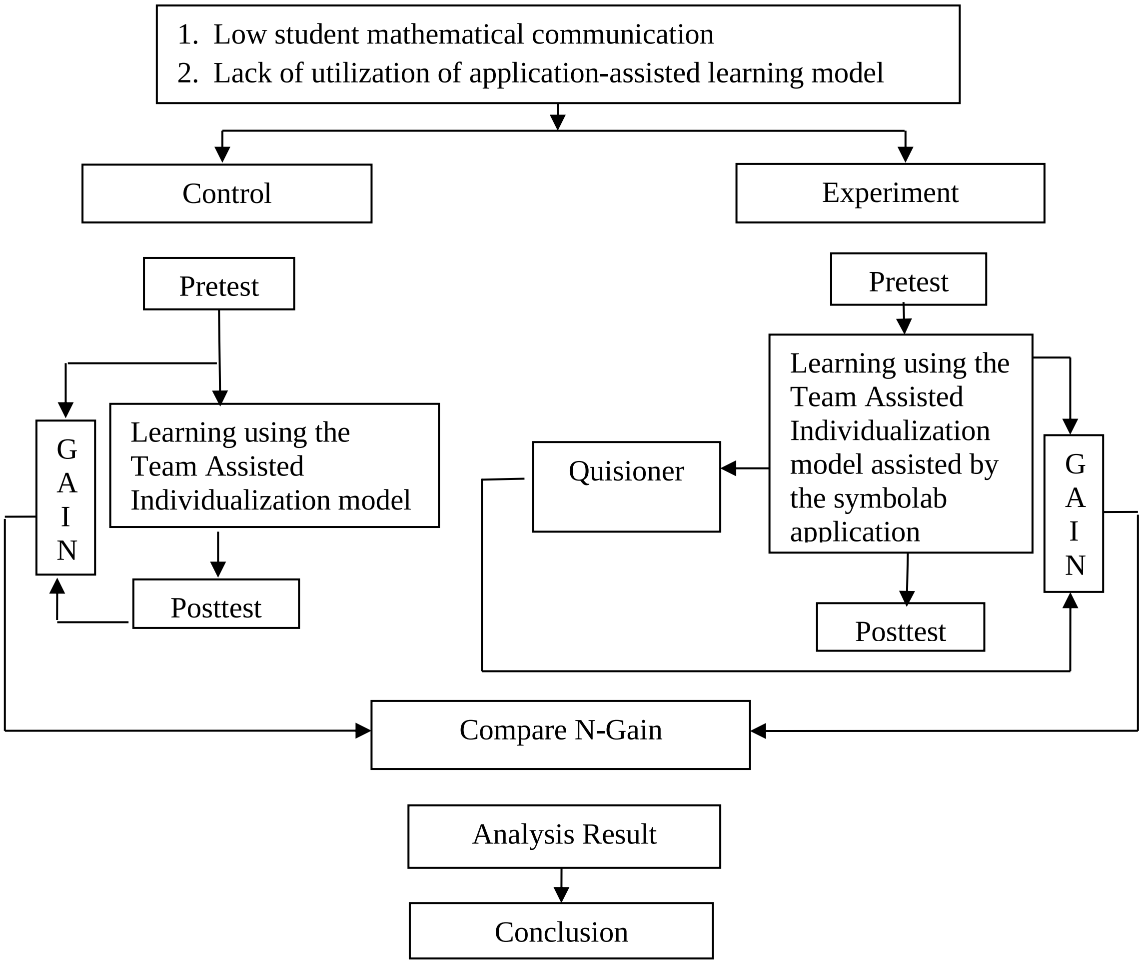

Figure 1. Research Flow

Based on Figure 1, the study began by giving a pretest related to mathematical communication skills in the experimental and control classes. After that, both classes were given different treatments and ended by giving a posttest. In the experimental class, students' learning independence was also measured using an attitude scale. Pretest and posttest were used to measure the improvement of mathematical communication skills through N-Gain. The overall data findings from the field were then analyzed to produce a conclusion.

The population chosen in this study were all students of class X SMA Negeri 1 Cibeber. The sampling technique is using Purposive Sampling Technique, where researchers take classes that have been formed based on the consideration of the math teacher. The samples used in this study were two classes, namely the first class students will be used as an experimental class, namely class X IPA 5

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as many as 28 people, while the second class was used as a control class, namely class X IPA 3 as many as 28 people.

3. Results and Discussion

3.1 Results

a. Analysis of Initial Mathematical Communication Ability Results (Pretest)

The pretest data were analyzed to see the similarities in students' mathematical communication skills in mathematics learning with the topic of trigonometric comparisons. Descriptive statistics of the pretest data from both classes are seen in the following table.

Table 1 Descriptive Statistics of Pretest Result Data

	Group	N	Mean	SD	SE
PRETEST	Experimen	28	4,93	2,39	0,45
	Control	28	5,93	2,54	0,48

Based on Table 1, it appears that both classes have relatively the same initial mathematical communication abilities. This can be seen from the average values of the experimental class and the control class, which are 4.93 and 5.93, respectively. The difference in the average between the experimental class and the control class is 0.12. The standard deviation for the experimental class is 2.39 and the control class is 2.54.

1) *Pretest Normality Test*

The normality test is used to determine whether the pretest data comes from a normally distributed or non-normally distributed population. The formulation of the hypothesis for the normality test of the pretest data is as follows:

H_0 : The pretest data sample comes from a normally distributed population.
H_1 : The pretest data sample comes from a population that is not normally distributed.

The normality test was conducted at a significance level of 0,05 so the test criteria are accept H_0 if the sig. (*p-value*) $\geq$ 0,05 and reject H_0 if the sig. (*p-value*) $<$ 0,05. The results of pretest data processing with the Shapiro-Wilk test of normality are presented in Table 2.

Table 2. Normality Test of Pretest

		W	p
Pretest	Experimen	0,85	0,00
	Control	0,95	0,22

Based on Table 2, the Sig. (p-value) experimental class is 0,00 meaning the significance value is less than 0,05 so H_0 is rejected. So it can be concluded that the pretest data sample of the experimental class comes from a population that is not normally distributed. The Sig. (p-value) control class is 0,22 meaning the significance value is more than 0,05 so H_0 is accepted. So it can be concluded that the pretest data sample of the control class comes from a population that is normally distributed. The significance value of one of the classes is less than 0,05, so it can be concluded that the pretest data sample comes from a population that is not normally distributed. Because one of the two classes is not normally distributed, there is no need to use a homogeneity test, but a non-parametric statistical test is then carried out, namely the Mann-Whitney U test..

2) Uji *Mann-Whitney U*

Because one of the data is not normally distributed, it is continued with a non-parametric statistical test, namely the Mann-Whitney U Test in JASP 0.14.1 software. The formulation of the hypothesis is as follows:

H_0 : There is no difference in the initial mathematical communication abilities of students in the experimental class and the initial mathematical communication abilities of students in the control class.

H_1 : There is a difference in the initial mathematical communication abilities of students in the experimental class and the initial mathematical communication abilities of students in the control class.

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The Mann-Whitney U Test was carried out at a significance level of 0,05 with the decision making criterion of accepting H_0 if the value is sig. (*p-value*) $\geq$ 0,05 and reject H_0 if the value is sig. (*p-value*) $<$ 0,05. he results of the Mann-Whitney U test assisted by *JASP 0.14.1 software* are presented in Table 3 below:

Table 3. Mann-Whitney U Test Pretest

	W	df	p
PRETEST	506,50		0,06

Based on Table 3, a significance value of 0,06 is obtained, meaning that the significance value of the Mann-Whitney U test of the pretest data is greater than 0,05 so H_0 is accepted. So it can be concluded that there is no difference in the initial mathematical communication ability of students in the experimental class with the initial mathematical communication ability of students in the control class.

a. Analysis of Final Mathematical Communication Ability Results (*Posttest*)

The posttest was conducted after students were given treatment. The final ability measured was the final mathematical communication ability of students in mathematics learning with the topic of trigonometric comparisons. Descriptive statistics of the posttest data results of both classes are presented in Table 4.

Table 4. Descriptive Statistics of Posttest

	Group	**N**	**Mean**	**SD**	**SE**
Postest	Experimen	28	14,79	1,17	0,22
	Control	28	13,10	1,47	0,28

Based on Table 4, it appears that the two classes have different final mathematical communication abilities. This can be seen from the average value of the experimental class, which is 14,79 and the control class, which is 13,10. The difference in the average of the experimental class and the control class is 1,68. The standard deviation for the experimental class is 1,17 and the control class is 1,47. From the posttest results, the achievement of mathematical communication skills in the experimental class is better than the achievement of mathematical communication skills in the control class.

1) *Posttest Normality Test*

The normality test is used to determine whether the posttest data comes from a population that is normally distributed or not normally distributed. The formulation of the hypothesis for the normality test of the posttest data is:

H_0 : The posttest data sample comes from a population that is normally distributed.
H_1 : The posttest data sample comes from a population that is not normally distributed.

The normality test is carried out at a significance level of 0,05 with the test criteria accepting H_0 if the sig. (*p-value*) $\geq$ 0,05 and rejected H_0 if the sig. (*p-value*) $<$ 0,05. The results of pretest data processing with the Shapiro Wilk test of normality are presented in Table 5 below.

Table 5. Posttest Normality Test

		W	P
POSTTEST	Experimen	0,83	0,00
	Control	0,88	0,00

Based on Table 5, the Sig. value of the experimental class is 0,00 meaning the significance value is less than 0,05 so H_0 is rejected. So it can be concluded that the posttest data sample of the experimental class comes from a population that is not normally distributed. The Sig. value of the control class is 0,00 meaning the significance value is less than 0,05 so H_0 is rejected. So it can be concluded that the posttest data sample of the control class comes from a population that is not normally distributed. In other words, it can be concluded that both posttest data samples of the experimental class and the control class come from a population that is not normally distributed.

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2) Uji *Mann-Whitney U*

Since both classes come from a population that is not normally distributed, there is no need to use a homogeneity test, but rather a non-parametric statistical test is carried out, namely the Mann-Whitney U test. The Mann-Whitney U test is carried out to see whether the post-test data from the experimental class and the control class have different results. The test was carried out using a non-parametric statistical test, namely the Mann-Whitney U Test in JASP 0.14.1 software with the following hypothesis formulation:

H_0 : There is no difference in the final mathematical communication ability of experimental class students with the final mathematical communication ability of control class students.

H_1 : There is a difference in the final mathematical communication ability of experimental class students with the final mathematical communication ability of control class students.

The Mann-Whitney U Test was carried out at a significance level of 0.05 with the decision-making criteria to accept H_0 if the sig. (*p-value*) $\geq$ 0,05 and rejected H_0 if the sig. (*p-value*) $<$ 0,05. The processing of the posttest results of the experimental class and control class using the Mann-Whitney U test assisted by JASP 0.14.1 software is presented in Table 6.

Table 6. Uji *Mann-Whitney U Posttest* Independent Samples T-Test

	W	df	p
POSTTEST	136,00	56	0,00

Based on Table 6, a significance value of 0.00 is obtained, meaning that the significance value of the Mann-Whitney U test of the posttest data is less than 0.05, so H0 is rejected. So it can be concluded that there is a difference in the final mathematical communication ability of students in the experimental class with the final mathematical communication ability of students in the control class. Based on the mean rank of the experimental class 14.79 and the control class which is 13.10. So it can be concluded that the achievement of students' mathematical communication abilities using the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application is better than students using the Team Assisted Individualization (TAI) learning model.

b. Analysis of Mathematical Communication Ability Improvement (Gain Index)

The processing of gain index data in the control class and experimental class was used to determine whether the improvement in mathematical communication ability of students in the experimental class was better than in the control class. The following are descriptive statistics of the gain index data.

Table 7. Descriptive Statistics of Gain Index Data

	Group	N	Mean	SD	SE
Gain Index	Experimen	28	0,90	0,09	0,02
	Control	28	0,71	0,15	0,03

Based on Table 7, it appears that the average value of the experimental class gain index is 0.90 and the standard deviation value is 0.09. While the average value of the control class gain index is 0.71 and the standard deviation value is 0.15. The difference in the average value of the experimental class gain index and the control class is 0.19. Therefore, descriptively it appears that the two classes have different increases in mathematical communication skills, statistically it must be proven that the increase in mathematical communication skills of the two classes is significantly different. Therefore, statistical tests were carried out, namely data normality tests, data homogeneity tests and two-average difference tests.

1) Gain Index Normality Test

The normality test is used to determine whether the gain index data comes from a normally distributed or non-normally distributed population. The formulation of the hypothesis for the normality test of the posttest data is:

H_0 : The gain index data sample comes from a normally distributed population.

H_1 : The gain index data sample comes from a non-normally distributed population.

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The normality test was conducted with a significance level of 0,05 with the test criteria of accepting H_0 if the sig. (*p-value*) $\geq$ 0,05 and rejected H_0 if the sig. (*p-value*) < 0,05. The results of the gain index data processing with the Shapiro Wilk test of normality are presented in Table 8.

Table 8. Normality Test of Gain Index

		W	p
Gain Index	Experimen	0,89	0,01
	Control	0,92	0,03

Based on Table 8, the Sig. value of the experimental class is 0.01, meaning the significance value is less than 0.05, so H_0 is rejected So it can be concluded that the experimental class gain index data sample comes from a population that is not normally distributed. The Sig. value of the control class is 0.03, meaning the significance value is more than 0.05, so H_0 is accepted. So it can be concluded that the control class gain index data sample comes from a population that is normally distributed. The significance value of one of the classes is less than 0.05, so it can be concluded that the gain index data sample comes from a population that is not normally distributed. Thus it can be concluded that the experimental class and control class gain index data samples come from a population that is not normally distributed, so there is no need to use a homogeneity test, but a non-parametric statistical test is then carried out, namely the Mann-Whitney U test.

2) Uji *Mann-Whitney U*

The Mann-Whitney U test was conducted to see whether the gain index data from the experimental class and the control class had different results. The formulation of the hypothesis is:

H_0 : There is no difference in the increase in mathematical communication skills of students who use the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application with classes that use the Team Assisted Individualization (TAI) model.

H_1 : There is a difference in the increase in mathematical communication skills of students who use the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application with classes that use the Team Assisted Individualization (TAI) model.

The Mann-Whitney U Test was conducted at a significance level of 0.05 with the decision-making criteria for the Mann-Whitney U test of the gain index data results being to accept H_0 if the sig. (p-value) $\geq$ 0,05 and rejected H_0if the sig. (p-value) < 0,05. Data processing of the gain index results using the Mann-Whitney U test assisted by JASP 0.14.1 software is presented in Table 9.

Table 9. Mann-Whitney U Test of Gain Index

	W	df	p
GAIN INDEX	90.,00		0,00

Based on Table 9, a significance value of 0.00 is obtained, meaning that the significance value of the Mann-Whitney U test of the gain index data is less than 0.05, so H_0 rejected. So it can be concluded that there is a difference in the increase in mathematical communication skills of students who use the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application with classes that use the Team Assisted Individualization (TAI) model. Based on the mean rank of the experimental class 0.90 and the control class, namely 0.71. So it can be concluded that the increase in students' mathematical communication skills through the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application is better than the control class using the Team Assisted Individualization (TAI) model.

c. Analysis of the Learning Independence Improvement Questionnaire

In this study, non-test data were obtained in the form of a student learning independence questionnaire from the pretest and posttest. Data analysis of the student learning independence questionnaire results was carried out with the aim of analyzing the improvement of students' learning independence attitudes in classes that were given treatment using the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application, namely the experimental class. Descriptive statistics of the learning independence improvement data are presented in Table 10.

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Table 10. Mann-Whitney U Test Learning Independence Improvement

	N	Mean	SD	SE
PRETEST	28	56,04	4,82	0,91
POSTTEST	28	56,89	6,35	1,20

Based on Table 10, it appears that the average value of the pretest of learning independence is 56.04 and the standard deviation value is 4.82. While the average value of the posttest of learning independence is 56.89 and the standard deviation value is 6.35. This shows that the data has a different increase in student learning independence, statistically it must be proven that the increase in learning independence in the pretest and posttest is different. Therefore, statistical tests were carried out, namely the normality test, the homogeneity test, and the difference test of two means.

1) Normality Test

The normality test is used to determine whether the data on the results of increasing student learning independence comes from a population that is normally distributed or not normally distributed. The formulation of the hypothesis for the normality test of the posttest data is:

H_0 : The sample data on the results of increasing student learning independence comes from a population that is normally distributed.

H_1 : The sample data on the results of increasing student learning independence comes from a population that is not normally distributed.

The normality test is carried out with a significance level of 0.05, so the test criteria are accept H_0 if the sig. (*p-value*) $\geq$ 0,05 and rejected H_0 if the sig. (*p-value*) $<$ 0,05. The results of processing data on increasing student learning independence with the Shapiro Wilk test of normality are presented in Table 11.

Table 11. Normality Test of Increasing Student Learning Independence

		W	**p**
PRETEST	- POSTES	0,87	0,00

Based on Table 11, the Sig. Pretest and posttest values are 0.00, meaning that the significance value is less than 0.05, so H_0 is rejected. So it can be concluded that the sample data from the pretest and posttest of the learning independence of students in the experimental class come from a population that is not normally distributed. Because the data is not normally distributed, there is no need to use a homogeneity test, but rather a non-parametric statistical test is carried out, namely the Wilcoxon Signed-Rank test.

2) Uji *Wilcoxon Signed-Rank*

The Wilcoxon Signed-Rank test was conducted to see whether the pretest and posttest data of students' learning independence had different results. The formulation of the hypothesis is as follows:

H_0 : There is no difference in the increase in students' learning independence before and after learning using the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application.

H_1 : There is a difference in the increase in students' learning independence before and after learning using the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application.

The Wilcoxon Signed-Rank test was conducted at a significance level of 0.05 with the decision-making criteria for the Wilcoxon Signed-Rank test being to accept H_0 *is the* sig. (*p-value*) $\geq$ 0,05 and rejected H_0 is the sig. (*p-value*) $<$ 0,05. The results of the Wilcoxon Signed-Rank test processing assisted by JASP 0.14.1 software are presented in Table 12.

Table 12. Wilcoxon Signed-Rank Test of Improving Student Learning Independence

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Measure 1		Measure 2	W	df	p
PRETEST	-	POSTEST	162,00		1,00

Based on Table 12, a significance value of 1.00 is obtained, meaning that the significance value of the Wilcoxon signed-rank test of the pretest and posttest data on students' learning independence is greater than 0.05, so H0 is accepted. So it can be concluded that there is no difference in increasing students' learning independence before and after learning using the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application. Based on the mean rank in table 4.10. so it can be concluded that the increase in students' learning independence after learning using the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application is the same as before learning using the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application.

3.2 Discussion

1. **High School Students' Mathematical Communication Skills through the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application**

a. Achievement of Students' Mathematical Communication Skills

Based on data processing with the help of JASP 0.14.1 software, a significance value of 0.00 was obtained, meaning that the significance value of the Mann-Whitney U test of the posttest data was less than 0.05, so H0 was rejected. So it can be concluded that there is a difference in the final mathematical communication skills of students in the experimental class with the final mathematical communication skills of students in the control class. Which means that the achievement of mathematical communication skills of students who receive the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application is better than the mathematical communication skills of students who receive the Team Assisted Individualization learning model. The research findings obtained information that students were enthusiastic in participating in learning with the Team Assisted Individualization (TAI) model assisted by the Symbolab application because it was different from previous learning activities. In addition to students' enthusiasm for the learning process with the Team Assisted Individualization (TAI) model assisted by the Symbolab application, there is also an achievement of students' mathematical communication ability indicators after the Team Assisted Individualization (TAI) model assisted by the Symbolab application was implemented in the learning process. This is based on the achievement of the number of students who are able to answer questions with mathematical communication ability indicators.

Based on the achievement of students' mathematical communication skills, it indicates that mathematical communication is very important for students to master because they are able to solve problems systematically and are able to interpret them into spoken and written language that will be easily understood (Septian et al., 2020). This can stimulate students' ability to develop ideas and knowledge in finding the mathematical concepts being studied. Therefore, mathematical communication skills are very much needed and prioritized, especially in mathematics learning (Dewi et al., 2020).

b. Improving Students' Mathematical Communication Skills

The improvement of students' mathematical communication skills after being given the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application can be seen based on the analysis of the gain index data. Based on the Mann-Whitney U Test on the gain index data, a significance value of 0.00 was obtained, meaning that the significance value of the Mann-Whitney U test of the gain index data was less than 0.05, so H0 was rejected. So it can be concluded that there is a difference in improving students' mathematical communication skills through the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application with the control class using the Team Assisted Individualization (TAI) model. This means that improving students' mathematical communication skills through the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application is better than the control class using the Team Assisted Individualization (TAI) model only. The results of this study are in line with the results of research by Utami et al. (2019).

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One of the causes of the difference in the improvement of mathematical communication skills in the experimental class and the control class is the difference in learning activities and atmosphere. It can be seen that students in the experimental class respond to the questions given with confidence while students in the control class are less confident and complain more when working on the questions. It can be seen that in the experimental class, students can answer mathematical communication questions clearly and systematically according to the indicators of mathematical communication skills because in the experimental class, the learning uses the Team Assisted Individualization (TAI) learning model which is supported by learning media, namely the Symbolab application., while most students in the control class do not answer questions systematically and are not clear, some students only answer without changing them into an idea or mathematical ideas into pictures, diagrams and mathematical models or vice versa because in the control class they learn without using the symbolab application. This shows that the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application has a strong contribution to mathematics learning. With the help of the Symbolab application, students feel more helped, students who are not yet confident and sure of the answers to the questions they have worked on can convince their answers by using the help of the Symbolab application. The use of this learning model and application is designed so that students are involved and active in learning. In line with Bagindo's statement, Yulia (Abdillah, 2021) the use of learning models prioritizes student activities and the classroom atmosphere can be productive and open.

Another factor that causes a significant difference between the increase in mathematical communication skills of students who receive learning with the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application and students who receive the Team Assisted Individualization (TAI) learning model, namely the use of applications that can be used as a medium for learning mathematics and make it easier for students to answer math problems, namely the Symbolab application. This is directly proportional to Linda's statement (Anggraini & Sunaryantiningsih, 2019) that the Symbolab application can be interpreted as a tool used to support mathematics learning so that students can more easily understand the material. With this application, students who are not confident in their abilities will find it easier to learn because with this they will learn independently without the help of others, and in fact they will be needed to help their other friends in communicating ideas on material that they find difficult. This is in line with Cahyaningsih's statement (2018). That from the implementation of the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application, students can more easily understand the material, if there is difficult material it can be solved together and can be solved with the help of the Symbolab application, and can improve student learning outcomes both cognitively, affectively and psychomotorically. So that the use of the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application can improve & grow students' mathematical communication skills to be better.

2. Improving Students' Learning Independence Attitudes towards the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application

Based on the Wilcoxon Signed-Rank Test on the pretest and posttest data on improving students' learning independence, a significance value of 1.00 was obtained, meaning that the significance value of the Wilcoxon Signed-Rank test on the pretest and posttest data on improving students' learning independence was greater than 0.05, so H0 was accepted. So it can be concluded that there is no difference in improving students' learning independence before and after learning using the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application. The findings of the research data state that there is no difference in improving students' learning independence before and after learning using the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application. This means that the increase in students' learning independence after learning using the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application is the same as before learning using the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application. This is in line with research by Setiawan, A. P. B. (2014) which shows that the level of student learning independence is not affected by the implementation of learning carried out in class.

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The factors causing no increase in student learning independence before and after being given treatment are seen based on indicators of learning independence, namely students still lack initiative and motivation to learn, students only utilize existing sources without looking for other relevant sources and only rely on teacher explanations without any initiative on their own to look for information/other sources about mathematics material. This is in line with Setiawan (2014) who stated that the cause of the increase in student learning independence before and after learning using the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application is the same, namely because of the lack of student initiative in asking group members when implementing TAI learning Assisted by the Symbolab Application, learning motivation and lack of student confidence to help their group members cause learning independence to have no effect. So when there is treatment of the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application given by the teacher, students do not experience an increase in student learning independence. This is supported by the statement of Isnawati & Samian (2015) that basically there are other factors that influence learning independence, namely psychological factors, physiological factors and environmental factors.

4. Conclusion

Based on the results of the research and discussion, the following conclusions were obtained:

1. There is a significant difference between the improvement of mathematical communication skills of students who use the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application and students who use the Team Assisted Individualization (TAI) learning model. The improvement of mathematical communication skills of students using the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application is better than students who use the Team Assisted Individualization (TAI) learning model.
2. There is a significant difference between the achievement of mathematical communication skills of students who use the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application and students who use the Team Assisted Individualization (TAI) learning model. The achievement of mathematical communication skills of students using the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application is better than students who use the Team Assisted Individualization (TAI) learning model.
3. There is no significant difference in student learning independence before and after learning using the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application. The increase in students' learning independence after learning using the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application is the same as before learning using the Team Assisted Individualization (TAI) learning model assisted by the Symbolab application.

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