Jurnal Pendidikan Matematika (Kudus)
P-ISSN 2615-3939 | E-ISSN 2723-1186
https://journal.iainkudus.ac.id/index.php/jmtk
DOI: http://dx.doi.org/10.21043/jpmk.v7i2.28026
Volume 7, Number 2, Desember 2024, pp. 265-280

The Effect of Learning Independence and Gender on Students' Mathematics Learning Achievement

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Abstract

This study was conducted at MTs Maslakul Huda Sluke Rembang, emphasizing the importance of self-directed learning and gender in mathematics achievement. The objectives of this study were to determine 1) the significant influence of self-directed learning on mathematics achievement, 2) the significant influence of gender on mathematics achievement, and 3) the significant interaction between self-directed learning and gender on mathematics achievement. This study used a quantitative approach with a correlational method. The research sample was randomly selected and consisted of 37 eighth-grade students from MTs Maslakul Huda Sluke Rembang. Data were collected through tests and questionnaires, using a self-directed learning questionnaire, gender data, and a mathematics achievement test. Hypothesis testing was conducted using two-way ANOVA and Tukey's post-hoc test. The results showed a significant influence of self-directed learning on mathematics achievement with a significance value of 0,000<0,05. Tukey's post-hoc test indicated a significance value among the self-directed learning groups of 0,000, showing significant differences among the groups. There was no significant difference between gender and mathematics achievement with a significance value of 0,121>0,05. There was a significant interaction between self-directed learning and gender on mathematics achievement with a significance value of 0,016<0,05. The implications of this study are the importance of enhancing students' self-directed learning as a key factor in improving mathematics achievement and that gender does not significantly affect this, so the focus of learning can be more directed towards developing students' self-directed learning while still considering gender equality to enhance mathematics achievement.

Keywords: Gender; Learning Independence; Mathematics Academic Achievement

Abstrak

Penelitian ini dilakukan di MTs Maslakul Huda Sluke Rembang dengan menekankan pentingnya kemandirian belajar dan gender dalam prestasi belajar matematika. Tujuan penelitian ini adalah untuk mengetahui 1) pengaruh signifikan kemandirian belajar terhadap prestasi belajar matematika, 2) pengaruh signifikan antara gender terhadap prestasi belajar matematika, 3) pengaruh interaksi signifikan antara kemandirian belajar dan gender terhadap prestasi belajar matematika. Penelitian ini menggunakan pendekatan kuantitatif dengan metode korelasional. Sampel penelitian dipilih secara acak dan terdiri dari 37 siswa kelas VIII A MTs Maslakul Huda Sluke Rembang. Data dikumpulkan melalui tes dan angket, menggunakan instrumen angket kemandirian belajar, data gender, dan tes prestasi belajar matematika. Pengujian hipotesis dilakukan dengan uji two-way ANOVA dan uji lanjut tukey. Hasil penelitian menunjukkan terdapat pengaruh signifikan antara kemandirian belajar terhadap prestasi belajar matematika dengan nilai Sig sebesar 0,000<0,05. Uji lanjut tukey menunjukkan nilai signifikansi antar kelompok kemandirian belajar sebesar 0,000, menunjukkan perbedaan signifikan antar kelompok. Tidak terdapat perbedaan signifikan antara gender terhadap prestasi belajar matematika dengan nilai Sig sebesar 0,121>0,05. Terdapat interaksi signifikan antara kemandirian belajar dan gender terhadap prestasi belajar matematika dengan nilai Sig sebesar 0,016<0,05. Implikasi dari penelitian ini adalah pentingnya peningkatan kemandirian belajar siswa sebagai faktor utama dalam meningkatkan prestasi belajar matematika, serta bahwa faktor gender tidak mempengaruhi secara signifikan, sehingga fokus pembelajaran dapat lebih diarahkan pada pengembangan kemandirian belajar siswa dengan tetap memperhatikan kesetaraan gender agar meningkatkan prestasi belajar matematika.

Kata Kunci: Gender; Kemandirian Belajar; Prestasi Belajar Matematika

Introduction

Education is the main need and the primary foundation of each person's life. Through the educational process that is passed, a person will make a valuable contribution to the country and obtain a stable quality of life and appreciate how important it is for their future survival (Ina Ledun et al., 2020). Through education, students support the development of their character and develop relevant answers as the times change. In education, mathematics is considered a fundamental science to study. Even though it is called the king of all sciences, mathematics is integral to the Qur'an. Thus, efforts to develop science and improve the quality of education through mathematics learning are significant to obtain a high-performance and economical mathematics learning process to achieve the direction of national education (Tijah, 2019).

Mathematics is one of the disciplines taught in schools. The passing standard for mathematics subjects currently needs to be higher compared to other subjects. The reason is because mathematics is often considered a complicated, boring, and even scary. The difficulties that students experience in learning mathematics are not

only due to their abilities, but also influenced by various other factors that play a role in determining their learning success (Putri & Dewi, 2020). Mathematical postulates, once confirmed, have typical applications, so mathematics is dubbed a logical approach. Mathematics is a field of study that develops thinking skills, which is why it is a science that significantly impacts their lives by advancing science and technology.

The following are the results of the mid-semester exam for the 2023/2024 school year at MTs Maslakul Huda Sluke Rembang mathematics learning achievement of grade VIII A students, there is information that describes the results of student evaluations in two categories, namely "Complete" and "Incomplete." Of the 37 students measured, here is a detailed explanation of the results: The average mathematics learning achievement of students in the midterm exam was 62.84. This average proves that overall, grade VIII A students have an average score of 62.84 in mathematics. In the "Complete" category, 45.95% of the total 37 students reached the set level of completeness. This category means that around 17 students met the exam's completeness standards. On the other hand, in the "Incomplete" category, around 54.05% of students (or about 20 students) did not achieve the expected level of completeness and it was seen that the students had not met the minimum competency criteria set at 65.

The data explains that there needs to be more achievement in learning mathematics. One of the factors is the lack of an independent learning attitude, where students do not have the initiative to learn independently and look for additional learning resources.. Before being ordered by the teacher, the results of the midterm exam above showed that some students had yet to reach the expected level of completeness. There is a learning achievement gap between female and male students, where female students tend to have better outcomes. So, it is important to provide additional support to students to develop their understanding of mathematics subjects. To ensure that mathematics learning can run effectively and efficiently, the learning process should be carried out to increase the aspect of learning independence and focus on equality of gender in the learning process, Teachers need to have a deep understanding of the characteristics of each student, including gender, intelligence level, socio-economic status, attitude towards mathematics, and level of self-learning (Kodariyati & Astuti 2018).

Student learning independence is their ability to learn without depending on others, plan the learning process independently, and be responsible for solving problems according to their abilities. Mathematics learning resources are not limited to teachers or school books only; Students can take advantage of various of other resources such as the environment, books from other publishers, the internet,

and personal experiences(Rahman et al., 2021). Students with learning independence tend to follow a learning process where they can take the initiative, either with or without the help of others, in planning their learning activities. For example, they are able to formulate learning objectives, independently search for learning materials or resources, clarify learning needs, and direct their learning process. In addition, they also have the ability to can monitor their progress, proactively face challenges, and evaluate their learning outcomes to improve their performance and understanding continuously (Sugianto et al., 2020).

Learning independence can be measured by the following indicators: 1) Initiative to start learning, 2) Identifying learning needs, 3) Setting learning goals and objectives, 4) Monitoring and controlling learning progress, 5) Considering difficulties as challenges, 6) Finding and using the right resources, 7) Determining and implementing learning strategies, 8) Evaluating learning processes and outcomes, and 9) Having personal responsibility(Sugianto et al., 2020). Through self-study, students can develop their own potential, allowing them to build on existing knowledge and form new knowledge responsibly (Firdaus et al., 2021). Self-study also helps students develop time management, problem-solving, and practical decision-making skills increase discipline and motivation. These skills are essential for their academic success, daily life, and future careers. Thus, independent learning provides flexibility and opportunities for students to learn according to their own pace and learning style, to improve learning outcomes and trust.

Based on a study entitled "The Influence of Learning Independence and Interest on the Learning Achievement of High School Students", explains that learning independence has a significant impact on mathematics learning achievement, while learning interest does not have a significant effect based on the value of the results explaining that when learning independence and learning interest are evaluated, it has a significant influence on mathematics learning achievement(Ina Ledun et al., 2020a). That is in line with research where Learning independence has a positive and significant influence on mathematics learning achievement, with a contribution of 49.8%. Independence plays an important role in the learning especially in mathematics learning (Umami, 2023). The study emphasizes that students' ability to manage their time, solve problems, and take initiative in independent learning directly impact their academic achievement. Thus, the development of learning independence not only improves mathematics learning outcomes, but also prepares students for success in various aspects of life.

In addition to learning independence, the characteristics of gender also affects learning achievement because the human gender is God's creation, men and women who have differences both physically and mentally. Gender is a social

construction that seeks to distinguish the psychological functions of men and women in terms of attitudes, behaviors, and social actions that apply and develop in society. Gender differences here certainly produce physiological differences so that they affect psychology in learning, especially mathematics(Rahmi, 2022). Thinking patterns are one of the aspects that distinguish men and women (Hafidz, 2019). This includes the way both process information, make decisions, express emotions and feelings. Hormonal differences can also affect how the two sexes think and respond to stress. Understanding these differences is important to improve communication and cooperation in various aspects of life, both in personal and organizational contexts. Gender differences are not only related to biological aspects, but also affect differences in abilities in mathematics. In addition, social and cultural factors also play a role in shaping these differences, so it is important to consider various aspects to improve mathematics achievement among students of different genders(Purborini & Hastari, 2019).

According to Devi Afriyuni Yonanda and Non Erna Sri Utami entitled "Relationship Gender Regarding Student Learning Achievement," explained that there is a difference in learning achievement between male and female students, in the case contained in his research, male and female students in learning achievement. Factors such as mindset, learning strategies and the ability to manage information can affect how students' information uses knowledge from teachers, thus affecting learning performance in school (Utami & Yonanda, 2020). Each individual has varying thinking abilities. The difference in ability between male and female students is often studied because It has been predicted that a gender influence in the learning process. Gender is a set of characteristics related to individuals born with a certain gender, developing different identities and social roles. This gender difference often raises the question of whether the way of thinking in learning differs by gender (Astra et al., 2022). Although there was no significant difference between male and female students overall, boys' better abstraction abilities allowed them to excel in math learning achievement, due to the mathematical nature of the concepts that are generally related to them (Purwanto et al., 2019).

Based on the description of the problem that has been described, the researcher was motivated to research the topic with the title "The Influence of Learning Independence and Gender Characteristics on the Mathematics Learning Achievement of Grade VIII Students at MTs Maslakul Huda Sluke Rembang". This research will focus on grade VIII students and aims to measure how much independence of learning achievement and gender characteristics affect students' mathematics learning achievement. It suggests that the research results can provide

teachers insight into learning independence and gender to develop students' mathematics learning achievements.

Method

This study uses a correlational type because the research data is in an interval format and a quantitative approach. The protocolof this study was grade VIII students of MTS Maslakul Huda Sluke Rembang with random sampling. The sample consisted of 37 students in grade VIII A. Data collection techniques used observation, questionnaires, documentation, and tests. Where the questionnaire or questionnaire to measure learning independence can be assessed based on several indicators that reflect the level of student independence, namely confidence, perseverance in initiative and creativity in learning, discipline in learning, the ability to do something without the help of others, and responsibility in learning activities. The level of learning independence can be categorized into three levels: high independence, moderate independence, and low independence, using the learning independence questionnaire score.

For the classification of students' learning independence level, the formula is as follows (Mamartohiroh et al., 2020);

Table 1 Classification of Learning Independence Levels

Learning Independence Criteria	Category
$\boldsymbol{x \geq \bar{x} + SD}$	High
$\boldsymbol{\bar{x} - SD < x < \bar{x} + SD}$	Medium
$\boldsymbol{x \leq \bar{x} - SD}$	Low

Used formula:

$$SD = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n-1}}$$

Information:
x = Number of questionnaire scores obtained
$\bar{x}$ = Average score of the questionnaire
SD = Standard deviation
x_i = I-learning independence score
n = a lot of data

By assessing students based on these indicators, we can determine their level of learning independence and identify areas that need to be improved to achieve higher independence. Therefore, the questionnaires were used to find learning independence variables. The information about gender is obtained through student data, while the test is an instrument to evaluate students' mathematics learning achievements.

The design of the relationship between variables that use the independent variable of learning independence, *gender* and the bound variable in the form of mathematics learning achievement in the study is shown in the figure below.

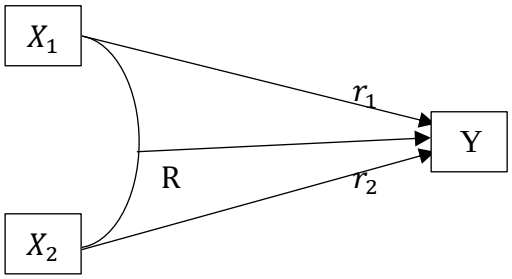

Figure 1 Variable Design

Information:
X_1 = Learning independence
X_2 = *Gender*
Y = Mathematics learning achievement

This study examines whether there is a relationship between self-directed learning and gender in students' mathematics achievement. In this research framework, self-directed learning (X_1) and gender (X_2) are considered independent variables, while mathematics achievement is considered the dependent variable (Y).

Technical data analysis is a thorough examination of all information in research instruments, including but not limited to records, documents, test results, recordings, and other data sources. The activity aimed to understand the data better; the data analysis was carried out using normality, homogeneity, two-way ANOVA, and Tukey tests. The normality test determines the distribution of scores used through the learning independence questionnaire and the mathematics learning achievement test with normal distribution. The homogeneity test was used to determine the distribution of scores used through the learning independence questionnaire and the mathematics learning achievement test with the same or different distribution. The two-way ANOVA test is used to find the influence of each factor and the interaction between factors while the tukey test is used when there is an influence on the two-way ANOVA test.

Results

Learning independence data was obtained from questionnaires answered by class VIII A students who were designated as respondents in this study. The data was analyzed using the SPSS 25 program. The learning independence measurement instrument consisted of 30 questions, and after being tested on 37 respondents, 2 questions were found to be invalid with a significance value of > 0,05. Therefore, the study used 28 valid questions with reliability values of 0,927 > 0,60, showing that the instrument has very strong reliability based on Cronbach's alpha value (α > 0,60), so the instrument is considered reliable. Mathematics learning achievement data was also taken from tests answered by students of class VIII A. This instrument consisted of 10 questions, and after being tested on 37 respondents, it was found that 1 question was invalid with a significance value of > 0,05, so that 9 valid questions were used with a reliability value of 0,667 > 0,60, indicating that the instrument has strong reliability (α > 0,60) and can be trusted. The differentiation test showed 1 question with a poor assessment, 2 questions with a good assessment, and 7 questions with a sufficient assessment. Based on the difficulty level test to determine the questions that are considered easy or difficult for students where questions number 1, 2, 6, 7, 8, and 10 are considered too easy, while questions number 3, 4, 5, and 9 are considered sufficient

The distribution of learning independence scores of grade VIII students at MTS Maslakul Huda Sluke Rembang shows a range from the lowest score of 51 to the highest score of 98, based on the results of data analysis. The average score of student learning independence was 73,05, with a median score of 75 and a standard deviation of 12,802. The table below displays the overall distribution of students' learning independence scores;

Table 1 Categories of Learning Independence Variable Tendency

No	Interval	Frequency	Presentation	Category
1.	$X \leq 60{,}252$	7	19%	Low
2.	$60{,}252 < X < 85{,}855$	22	59%	Medium
3.	$X \geq 85{,}855$	8	22%	High

Based on table 1 above, the results of the analysis of the interval of student learning independence scores show that most students, around 19% of 7 students fall into the low category, with learning independence scores $X \leq 60{,}252$, About 59% of the 22 were in the medium category, with a score range between . Meanwhile, around 22% of 8 students scored in the high category, the value of learning independence reached $60{,}252 < X < 85{,}855X \geq 85{,}855$. So for learning independence, class VIII A is classified as moderate.

The distribution data of mathematics learning achievement scores of grade VIII students at MTS Maslakul Huda Sluke Rembang shows a range from the lowest score of 34 to the highest score of 90, based on the results of data analysis. The average score of students' mathematics learning achievement was 65,78, with a median score of 68 and a standard deviation of 13,68. As for the results of mathematics learning achievement based on learning independence and gender, among others.

Table 3 Descriptive Statistical Analysis

Learning Independence	Gender	Mean	N
Low	Male	43,20	5
	Female	59	2
	Total	47,71	7
Medium	Male	68,29	7
	Female	64,67	15
	Total	65,82	22
High	Female	81,50	8
	Total	81,50	8
Total	Male	57,83	12
	Female	69,60	25
	Total	65,78	37

The results of the analysis of table 3 show that based on the table above, there is a significant difference in the average mathematics learning achievement at the level of learning independence and *gender*. At a low level of learning independence, 5 males had a lower average achievement of 43,20 compared to 2 females 59,00. On the other hand, at a moderate level of learning independence, although 7 males had a slightly higher average achievement than 15 females (68,29 compared to 64,67), this difference was not significant. For 8 women at a high level of learning independence, the average achievement reached 81,50, while data for men at that level were not available. When all levels of learning independence were combined, women overall showed a higher average achievement (69,60) compared to men (57,83), with statistically significant differences.

Prerequisite test Results The normality test uses the Kolmogorov-Smirnov strategy to examine the normality of SPSS-assisted data version 25. If the significance value resulting from the test > 0,05, it is considered to be normally distributed. However, if the significance value < 0,05, the data is considered not normally distributed; The conclusion of the normality test applied the Kolmogorov-Smirnov method. It is known that the significance value is 0,200 > 0,05. Therefore, the data is distributed normally. Homogeneity test results To determine whether

the population used in finding the same population is the same or not, a homogeneity test is carried out using *the Levene Test*. Carried out by comparing the resulting significance values, the significance level was set at 0,05., explaining that the significance value of "Mathematics Learning Achievement" was 0,550 > 0,05. Thus, because the significance value is greater than 0,05, the population variance is the same.

Testing this hypothesis, data were collected and analyzed with the help of SPSS software edition 25. Based on the analysis of the data, the complete results of the two-track variance analysis test. If the significance figure explaining the test > 0,05, then H_0it is accepted. Meanwhile, if the significance value is < 0,05 H_1, it is accepted. So that we get the following hypothesis:

1) Hypothesis test 1 obtained a significance value of 0,000 < 0,05, therefore explaining the significant influence between learning independence and mathematics learning achievement. Because there is an influence, it is continued for the tukey test;

Table 7 Tukey Test Results

					95% Confidence Interval	
(I) Learning Independence	(J) Learning Independence	Mean Difference (I-J)	Std.Error	Sig	Lower Bound	Upper Bound
Low	Medium	-18,10	3,483	0,000	-26,66	-9,54
	High	-33,79	4,154	0,000	-43,99	-23,58
Medium	Low	18,10	3,483	0,000	9,54	26,66
	High	15,68	3,314	0,000	-23,83	-7,54
High	Low	33,79	4,154	0,000	23,58	43,99
	Medium	15,68	3,314	0,000	7,54	23,83

Then in the Tukey test to evaluate significant differences between the groups tested in pairs, the results of the tukey test in table 7 include: There was a value for each comparison between learning independence groups (low with moderate, low with high, and medium with high) and the significance value was 0,000 consecutively. Because 0,000 < 0,05, there is a difference in student learning achievement between high learning independence and medium learning independence and there is a difference in student learning achievement between high learning independence and low learning independence, there is also a difference in student learning achievement between medium learning independence and low learning independence. Because each level of learning independence has a difference

in learning achievement, high learning independence gets high learning achievement as well as low learning independence results in low mathematics learning achievement.

2) Hypothesis test 2 obtained a significance value of 0,121 > 0,05, therefore there was no significant difference in the influence of *gender*on mathematics learning achievement. Therefore, further testing of the tukey is not necessary.
3) Hypothesis test 3 obtained a significance value of 0,016 < 0,05, therefore showing a significant influence between learning independence and *gender*on students' mathematics learning achievement. This means that learning independence and *gender*together affect mathematics learning achievement

Discussion

The results of the hypothesis 1 test explained that learning independence has significantly influenced the mathematics learning achievement of students in grade VIII A MTs Maslakul Huda Sluke Rembang. The significance value of the analysis of variance test (ANAVA) for learning independence was 0.000 < 0.05. Then, the follow-up test with the Tukey method also found a difference in student learning achievement between high learning independence and medium learning independence and there was a difference in student learning achievement between high learning independence and low learning independence, there was also a difference in student learning achievement between medium learning independence and low learning independence. Learning independence is an activity in which students are able to learn independently without depending on others and have strong intrinsic motivation. Students who are independent in learning desire to learn things independently and take responsibility for what they learn(Fitriana et al., 2022). They are able to organize and direct their learning process without the need for constant supervision from teachers, so that they can achieve a deeper and more comprehensive understanding. This statement states that the independence possessed by students is the main factor in achieving good learning. That sentence means that students need to have awareness, willingness, and motivation from within themselves to act, think, and be creative spontaneously, confidently, and responsibly, without any pressure from teachers or other parties(Winata et al., 2021). Students can more effectively manage their learning and achieve optimal results with this independence.

The same results were found in a study entitled The Influence of Learning Independence and Learning Interest on the Mathematics Learning Achievement of High School Students; results were obtained that showed the influence of learning

independence on mathematics learning achievement at SMA N 7 Kupang. With a learning independence significance value of 0,008 < 0,05, it means that learning independence significantly influences mathematics learning achievement (Ina Ledun et al., 2020). That result aligns with this research, which showed a significant influence between learning independence and mathematics learning achievement of students at SMP Negeri 10 Tarakan. Therefore, in the learning process, an efficient method is needed to increase students' learning independence so that they have good independence in mathematics according to (Ola & Susanti, 2024). In addition, educators' skills in building students' self-awareness are essential to increase their enthusiasm and enthusiasm for learning. Educators must be able to create a supportive learning environment, provide appropriate challenges, and encourage students to think critically and independently. Thus, students will be more motivated and able to achieve optimal learning outcomes. Mathematics lessons require learning independence in learning them. The way students learn and the results reflect their learning process. The greater the effort and hard work a person puts into learning, the higher the value he will achieve. Therefore, motivation and dedication to independence in learning significantly affect the achievement of optimal learning achievement (Siagian et al., 2020).

The results of hypothesis test 2 explain that gender did not significantly influence the mathematics learning achievement of students in grade VIII A MTs Maslakul Huda Sluke Rembang. Linguistically, gender refers to the striking physical differences that are supported by a person's biological factors. In addition, gender also reflects an individual's identity that is connected to the traits that are the person's personal characteristics. Therefore, gender factors do not have a significant effect on students' mathematical creative thinking ability in mathematics learning. On the contrary, a greater influence comes from other factors such as the learning methods applied. In addition, the affective aspect of students also plays an important role in the learning process, diligent and committed students will continue to try to find solutions to every problem they face (Astra et al., 2022). The study showed that there was no significant difference between the self-efficacy of male and female students, and it indicated that gender did not have a significant influence on the self-efficacy of students. In other words, students' level of self-confidence in their academic abilities is not affected by gender differences(Mellyzar et al., 2022). This indicates that mathematical ability is not a factor determined by gender, but is more influenced by external factors such as education, culture, and social support. Therefore, it is important to focus on providing equal opportunities for all students regardless of gender to maximize their potential in math learning achievement.

The same results are found in a study entitled "Differences in Learning Independence Reviewed from *Gender* and Mathematical Disposition" obtained a value of F as a result of the calculation for the *Gender* and the mathematical disposition of students' learning independence was smaller than the values listed in the table at the significance level of 0,05 or 0,01 (Fcal < Ftable). This means that there is no influence of interaction between *Gender* and mathematical disposition to students' learning independence (Sutrisno AB, 2021). Where Equality *Gender*in education is also reflected in Hadith of the Prophet Saw. "Seeking knowledge is the duty of every Muslim" (H.R. Ath-Thabarani through Ibn Masud r.a.). From this hadith, the conclusion is that both men and women have the same opportunity to develop their potential through the search for knowledge. This confirms that in Islam, there is no difference in rights and responsibilities between men and women in terms of the pursuit of knowledge and self-actualization (The Muqowim, 2023). Therefore, it is important not only to assess one's academic achievement based on gender. There is no difference between gender in terms of students' mathematics learning achievements. Recent studies have shown that math ability is influenced by teaching methods, learning environments, and social support, not gender. Therefore, educators and parents must avoid gender stereotypes and provide equal opportunities to all students, to create an inclusive learning environment that supports the academic success of each individual.

The results of the hypothesis 3 test explained a significant interaction between learning independence and gender on the mathematics learning achievement of students in grade VIII A MTs Maslakul Huda Sluke Rembang. If learning independence and understanding of gender are improved simultaneously, students' math learning achievement can improve significantly. Learning independence allows students to be more proactive, motivated, and effective in understanding and applying mathematical concepts. Meanwhile, although gender does not have a significant direct effect, paying attention to individual differences related to gender and ensuring an inclusive approach to learning can help all students develop optimally. With learning methods that are not gender-biased and support independence, students can achieve better and more equitable results in mathematics. This holistic approach supports improving overall math achievement, creating a fair and productive learning environment for all students.

Conclusion

Based on the results of the Two Way ANOVA test, this study shows that there is a significant influence between learning independence on students' mathematics

learning achievement, while the results of Tukey's further test confirm that there are significant differences between high, medium, and low learning independence groups, On the contrary, no significant difference was found between gender and students' mathematics achievement. However, a significant interaction exists between learning independence and gender in students' mathematics learning achievement. This study implies that increasing learning independence is important to improve students' mathematics learning achievement, while gender has no significant influence. In addition, there is a significant interaction between learning independence and gender on students' mathematics learning achievement. The limitations of this study include limited time and a small number of samples. Because the study was conducted only for a short period and with a limited sample, the results may only apply to some students. For broader and valid results, further research is needed involving more students from different backgrounds and conducted over a more extended period. Schools can use this research to design policies that support learning independence and gender equality in mathematics achievement at MTs Maslakul Huda Sluke Rembang. Teachers need to develop teaching methods that motivate and encourage student independence. Students must be aware of the importance of learning independence and the role of gender in improving achievement. This research expands the understanding of learning independence, gender, and mathematical achievement, and serves as the basis for further research.

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