International Conference on Teaching and Learning Proceeding
Faculty of Education and Teacher Training – Universitas Terbuka
UTCC, South Tangerang, Banten, June 28th 2024
Vol. 2, No. 1, pg. 140 – 145
ISSN: 3046-594X

COMPARISON OF RATES SELF-EFFICACY FOR STUDENTS WITH LOW, MEDIUM, HIGH MATHEMATICAL REASONING ABILITIES

Fadhlan Nur Ichsan [1*], Dara Septia Azmy [2], Dini Fauziyanti Rahmi [3], Ari Septian [4]
[1234]FKIP, Universitas Suryakancana, Cianjur, Indonesia
email: Fadhlan.n.i.fni@gmail.com

Abstract: This research aims to determine the comparison of levels self-efficacy in students with low, medium and high mathematical reasoning abilities. The method used in this research is a quantitative method using survey research. The sample in this research was class X-4 of SMA Negeri 1 Cianjur, totaling 30 people. The sampling technique in this research uses techniques purposive sampling. The data analysis technique used in this research is using prerequisite tests: normality test and variance homogeneity test; one way anova test (one way anova). The research results showed that there was no difference self-efficacy on students with low, medium and high mathematical reasoning abilities at SMA Negeri 1 Cianjur.

Keywords: Self-Efficacy; Mathematical Reasoning Ability; comparison

Accepted: 20 June 2024 Approved: 10 July 2024 Published: 30 July 2024

INTRODUCTION

Mathematics is one of various educational subjects that has its own function in the field of education. Mathematics is a universal science that is the basis for the development of modern technology, plays an important role in various fields, and develops human reasoning abilities (Indrawati et al. 2019) Mathematics teaching aims to prepare students to face dynamic developments, by emphasizing reasoning, rationality, critical thinking and requiring students to be skilled, able to use mathematics and mathematical reasoning in everyday life or in studying other sciences (Profitasari, et al. 2020) Education and Culture of the Republic of Indonesia Number 21 of 2016 concerning Primary and Secondary Education Content Standards explains that one of the competencies that students need to have is explaining patterns and using them to predict trends (trend) or check the validity of the argument. This is a mathematical reasoning activity. Mathematical reasoning abilities describe comprehensive activities that include generalizing patterns, making conjectures, providing arguments and developing evidence (Stylianides & Stylianides, 2006).

With the very important role of mathematical reasoning abilities in learning mathematics, students should be able to have good reasoning abilities. However, this is not in line with the quality of mathematics education in Indonesia, which is still relatively low. Based on Indonesia's score on PISA (Programme International for Student Assesment) in 2022 it will still be very sad, namely 366 for mathematical literacy. With

Vol. 2, No. 1, pg. 140 – 145
ISSN: 3046-594X

these results, Indonesia was ranked 70th out of 79 participating countries. This result is still very far below the scores of neighboring countries such as Thailand and Singapore. According to Arini & Rosyidi (2016) one of the factors causing poor PISA results is that students' reasoning abilities are very poor. This is because the PISA study refers to students' mathematical reasoning abilities. This lack of good mathematical reasoning abilities is caused by several factors, namely internal and external factors. One of the internal factors that influences is self-confidence (self-efficacy) which is in the student's soul because self-confidence will describe the actions that the student will take in facing mathematics problems. One of the supports for students' mathematical reasoning abilities isself-efficacy. Self-efficacy is a person's self-confidence to complete something that is his duty (Ramadan, 2022).

Bandura in Subaidi (2016) states that students who haveself-efficacy low levels experience difficulty in solving tasks and perceive the task as a threat to themselves. Students who have low aspirations and weak commitment to goals tend to give up. On the other hand, individuals who haveself-efficacy high, high aspirations, and high commitment to goals, difficult tasks are seen as challenges to be solved rather than as threats to be avoided. Can be concluded thatself-efficacy influences students' mathematical reasoning abilities, whether or not students are able to solve mathematical problems is influenced byself-efficacy that they have.

In the research of Profitasari et al. (2020) with the title “RelationshipsSelf-efficacy "Towards the Mathematical Reasoning Ability of Middle School Students" shows that there is a positive and significant relationshipself-efficacy on mathematical reasoning abilities with a correlation coefficient of 5% significance. Apart from that, in the research of Umaroh et al. (2020) with the title “InfluenceSelf-efficacy And Mathematics Anxiety on the Mathematical Reasoning Ability of Middle School Students" also shows the results that there is a positive and significant influence betweenself-efficacy on students' mathematical reasoning abilities of 8.11%. Based on the results of Ramadan, (2022) entitled "InfluenceSelf-efficacy Regarding Students' Mathematical Reasoning Ability" it was found thatself-efficacy influence on students' mathematical reasoning abilities with an influence of 18.9%.

Based on what has been explained above, this researcher will take research with the title "Differences in Self-efficacy in Low, Medium, and High Mathematical Reasoning Ability” using quantitative research approaches and survey research types. The novelty of this research is that it focuses on SPLTV material (System of Linear Equations with Three Variables), because this material can be completed according to indicators of mathematical reasoning ability and has been studied by class X high school students who are the subjects of this research. Therefore, researchers aim to find out whether there are differences self-efficacy in low, medium and high categories of mathematical reasoning ability.

METHOD

The method used in this research is a quantitative method using survey research. According to Sugiyono, (2016) Quantitative research is a research method based on scientific principles used to research certain populations or samples, collecting data using research instruments, quantitative or statistical data analysis in order to test predetermined hypotheses. Meanwhile, the survey method is a method used to obtain data from certain

natural places, but researchers carry out treatments in collecting data in the form of questionnaires, tests, structured interviews and so on (Sugiyono, 2009) This research was conducted to examine level comparison sself-efficacy with low, medium, high mathematical reasoning abilities in class X SMA Negeri 1 Cianjur. The population in this study were all class X students of SMA Negeri 1 Cianjur. The sample in this research was class X-4 of SMA Negeri 1 Cianjur, totaling 30 people. The sampling technique in this research uses techniques purposive sampling. The research instruments used in this research were tests of students' mathematical reasoning abilities and questionnaires self-efficacy.The data analysis technique used in this research is using prerequisite tests: normality test, variance homogeneity test, and linearity test; one way anova test.

RESULT AND DISCUSSION

To find out the differences in self-efficacy among students with low, medium and high mathematical reasoning abilities, it is necessary to categorize mathematical reasoning abilities by first finding the average of mathematical reasoning abilities. Below we will present the results of the JASP 16 mathematical reasoning ability table data, the average (mean) mathematical reasoning ability is obtained as follows:

Table 1. Statistical Data on Mathematical Reasoning Ability

Descriptive Statistics

	MATHEMATICAL REASONING ABILITY
Valid	30
Mean	13.033
Std. Deviation	3.672

In accordance with the results of table 4.4, the mean result for mathematical reasoning ability is 13.033. The mean results are used to categorize mathematical reasoning ability scores which are presented in the following table:

Table 2. Categorization of Mathematical Reasoning Ability

Category	Criteria
Height	$X > \text{mean} + (1 \times \text{St. Deviation})$ $X > 13{,}033 + (1 \times 3{,}672)$ $X > 16{,}705$
Currently	$X > \text{mean} + (1 \times \text{St. Deviation})$ $> X \leq \text{mean} - (1 \times \text{St. Deviation})$ $9{,}362 < X \leq 16{,}705$
Low	$X \leq \text{mean} - (1 \times \text{St. Deviation})$ $X \leq 13{,}033 - (1 \times 3{,}672)$ $X \leq 9{,}362$

After that, categorization was carried out and calculated the frequency of categories of students' mathematical reasoning abilities using Excel, so the following results were obtained:

Table 3. Frequency and Percentage of Mathematical Reasoning Ability Data

Categori	Frequency	Percentage
Height	7	23%
Currently	18	60%
Low	5	17%

From table Frequency and Percentage of Mathematical Reasoning Ability Data, the results show that students who have high mathematical reasoning abilities are 23% with a total of 7 students, students who have moderate mathematical reasoning abilities are 60% with a total of 18 students, and students who have low mathematical reasoning abilities are 17%. with a total of 5 students.

With the results of the categorization of mathematical reasoning abilities, to see the differences in self-efficacy in mathematical reasoning abilities in the low, medium and high categories, a one-way ANOVA test was carried out, with the test results using JASP 16 as follows:

Tabel 4. One Way ANOVA Test Results (One Way ANOVA)

ANOVA - SELF EFFICACY

Cases	Sum of Squares	df	Mean Square	F	P
KATEGORI Reasoning	58.808	2	29.404	0.430	0.655
Residuals	1846.659	27	68.395		

Note. Type III Sum of Squares

Based on table One Way ANOVA Test Results (One Way ANOVA), it is obtained that the p-value is 0.655, which means > 0.05, so it is accepted and rejected. This means that there is no difference in self-efficacy in low, medium and high mathematical reasoning abilities at SMA Negeri 1 Cianjur. The results of this study show that there is no difference self-efficacy on low, medium and high mathematical reasoning abilities at SMA Negeri 1 Cianjur.

This is not in line with research conducted by Nurussalamah & Marlina, (2022) which shows that: (1) students who have self-efficacy high have good mathematical reasoning abilities (2) students who have self-efficacy while there are those whose mathematical reasoning abilities are quite good and high, (3) students who have self-efficacy low, some have a good level of mathematical reasoning ability and some have low mathematical reasoning ability.

There is no difference self-efficacy This can be caused by various factors that can influence it self-efficacy student. As stated by Lau et al. (2018) namely: performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal.

Of these four factors, students have different levels of answers to the questionnaire results *self-efficacy* every student. One of the most prominent factors of these four factors is emotion, this is because students who have high levels of self-confidence in learning mathematics can influence *self-efficacy* his. Students' high self-confidence is based on self-esteem factors. According to (Vandini, 2016) one of the factors that influences self-confidence is self-esteem. Self-esteem is an assessment made of oneself. People who have high self-esteem will evaluate themselves rationally for themselves and easily establish relationships with other individuals. This is due to school environmental factors, the environment of SMA Negeri 1 Cianjur which is considered one of the favorites because the school is located in the middle of an urban area, there are many students from well-to-do communities, and many achievements have been achieved from this school both in terms of academic and non-academic aspects. This sense of self-confidence appears in each individual student. With this, the students of SMA Negeri 1 Cianjur, especially in class X-4, have *self-efficacy* which is medium to high based on the questionnaire *self-efficacy* which they have answered.

CONCLUSION

Based on the results of influence research self-efficacy Regarding high school mathematical reasoning abilities carried out at SMA Negeri 1 Cianjur, several conclusions were obtained as follows There is no differenc eself-efficacy on low, medium and high mathematical reasoning abilities.

REFERENCES

Arini, Z., & Rosyidi, A. H. (2016). Profil Kemampuan Penalaran Siswa SMP dalam Menyelesaikan Masalah Matematika Ditinjau dari Tipe Kepribadian Extrovert dan Introvert. *MATHEdunesa Jurnal Ilmiah Pendidikan Matematika*, *2*(5), 127–136.

Indrawati, Fiqi Annisa, & Wardono. (2019). Pengaruh self efficacy Terhadap kemampuan literasi matematika dan pembentukan kemampuan 4C. *Prisma, Prosiding Seminar Nasional Matematika*, *2*, 247–267.

Lau, C., Kitsantas, A., Miller, A. D., & Drogin Rodgers, E. B. (2018). Perceived responsibility for learning, self-efficacy, and sources of self-efficacy in mathematics: a study of international baccalaureate primary years programme students. *Social Psychology of Education*, *21*(3), 603–620. https://doi.org/10.1007/s11218-018-9431-4

Nurussalamah, A., & Marlina, R. (2022). Kemampuan Penalaran Matematis Siswa Ditinjau Dari Self-Efficacy Pada Materi Relasi Dan Fungsi. *... Pembelajaran Matematika ...*, *5*(5), 1255–1268. https://doi.org/10.22460/jpmi.v5i5.1255-1268

Profitasari, A., Darmono, P. B., & Maryam, I. (2020). Hubungan self efficacy Terhadap Kemampuan Penalaran Matematis Siswa SMP. *Ekuivalen: Pendidikan Matematika*, *43*(1), 13–18.

Ramadan, C. (2022). PENGARUH SELF-EFFICACY TERHADAP KEMAMPUAN PENALARAN MATEMATIS SISWA (Studi pada Siswa Kelas VIII SMP Muhammadiyah 3 Bandar Lampung Semester Genap Tahun Pelajaran 2021/2022). *Skripsi*, 1–55.

Stylianides, A. J., & Stylianides, G. J. (2006). Content Knowledge for Mathematics Teaching: the Case of Reasoning and Proving1. *Proceedings of the 30th Conference of the International Group for the Psychology of Mathematics Education*, *5*, 201–208.

Subaidi, A. (2016). Self-Efficacy Siswa Dalam Pemecahan Masalah Matematika. ∑*Igma*, *1*(2), 64–68.

Sugiyono. (2016). *Metode Penelitian Kuantitatif, Kualitatif dan R&D* (1st ed.). Bandung: Penerbit Alfabeta.

Sugiyono, 2019. (2009). *Prof_dr_sugiyono_metode_penelitian_kuant.pdf*.

Umaroh, S., Yuyu Yuhana, & Aan Hendrayana. (2020). Pengaruh Self-Efficacy dan Kecemasan Matematika terhadap Kemampuan Penalaran Matematis Siswa SMP. *WILANGAN: Jurnal Inovasi Dan Riset Pendidikan Matematika*, *1*(1), 1–15. Retrieved from https://jurnal.untirta.ac.id/index.php/wilangan/article/view/7971

Vandini, I. (2016). Peran Kepercayaan Diri terhadap Prestasi Belajar Matematika Siswa. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, *5*(3), 210–219. https://doi.org/10.30998/formatif.v5i3.646