Mathematical connection skills in sequence and series

Hilma Siti Nafisah[1*]
[1*]Mathematics Education Teacher, MTs Al-Quran Kudang, West Java, Indonesia
[1*]hilmasitinafisah100@gmail.com

DOI: https://doi.org/10.31980/pme.v2i3.1763

Submission Track:
Received: 05-09-2023 | Final Revision: 13-10-2023 | Available Online: 30-10-2023

How to Cite:
Nafisah, H. S. (2023). Mathematical connection skills in sequence and series. *Jurnal Inovasi Pembelajaran Matematika: PowerMathEdu (PME)*, *2*(3), 253-260.

Abstract
This research is a qualitative descriptive study that aims to analyze how the mathematical connection abilities of high school students of class XI in the material of the rows and rows. The subjects of this study were 3 random students from class XI in SMA in Putrajawa Village. The instrument used in this study was in the form of 3 questions that referred to the indicators of students 'mathematical connection ability. The results of this study showed that the students' mathematical connection ability was in the moderate category, as seen from the percentage of errors made by students on the indicators of recognizing and applying mathematics. in contexts outside mathematics.
Keywords: Connection Ability; Qualitative Descriptive; Sequences and Series

Abstrak
Penelitian ini merupakan penelitian deskriptif kualitatif yang bertujuan untuk menganalisis bagaimana kemampuan koneksi matematis yang dimiliki oleh siswa SMA kelas XI pada materi Barisan dan Deret . Subjek dari penelitian ini adalah 3 orang siswa secara acak kelas XI di SMA di Desa Putrajawa. Instrumen soal yang digunakan dalam penelitian ini berupa 3 buah soal yang mengacu pada indikator kemampuan koneksi matematis siswa. Hasil dari penelitian ini menunjukkan bahwa kemampuan koneksi matematis siswa tergolong dalam kategori sedang, yang terlihat dari persentasi kesalahan yang dilakukan siswa pada indikator mengenali dan menerapkan matematika dalam kontek-konteks di luar matematika.
Kata Kunci: Kemampuan Koneksi; Deskriptif Kualitatif; Barisan dan Deret

Introduction

Education is a very important issue, especially for a developing nation. A nation will progress if its human resources are qualified (Wahyu, Suharto, & Hobri 2017; Marliani & Puspitasari, 2022). Education plays a very important role in human life, because with education, humans will have a clearer and more focused outlook on life (Pitriani & Afriansyah 2016; Fatimah & Sundayana, 2022). Many people sometimes do not realize the

importance of mathematics because it is considered difficult, so they do not want to learn more materials in mathematics which of course have many uses if applied in everyday life.

Mathematics is a science that is identical to formulas and calculations (Fitriani, 2023), but even though it is identical to formulas and calculations, it does not mean that everything is only about formulas and calculations. Many things can be obtained and then applied in everyday life by studying mathematics. By studying mathematics, we will also acquire and be able to develop various skills, both hard skills and soft skills, one of which is the ability to connect mathematics (Chronika et al. 2020; Indriani & Sritresna, 2022).

Mathematics has a very large role in life, as a universal science, mathematics is the basis for the development of modern science and technology, advancing human thinking and analysis. Mathematics is a very important material for students, considering that learning mathematics has many benefits and advantages that someone will feel if they can understand mathematics well. (Chronika et al. 2020). NCTM (National Council of Teacher of Mathematics), (in Hamdani & Nurdin 2020) describes the goals to be achieved from the mathematics learning process, namely so that students have problem solving, reasoning, representation, communication and connection skills.

According to Mayasari & Afriansyah (2016), mathematics is a subject that has various topics that are interconnected with each other so that mathematical connection skills are very important for students to have. The Ministry of Education (Hadiat & Karyati, 2020; Soleha & Wulantina, 2023) states that connections refer to the ability to see and make connections between mathematical ideas, between mathematics and other subjects, and between mathematics and everyday life.

García-García and Dolores-Flores (2018) stated that mathematical connection ability is a cognitive process in which a person connects two or more ideas, concepts, definitions, procedures, representations and their meanings to each other, to other disciplines or to real life.

However, in reality, the mathematical connection ability is very low, in line with Sugiman's statement (Mayasari & Afriansyah 2016; Indriani & Noordyana, 2021) based on the results of his research that the mathematical connection ability is very low seen from the research on the average value of the connection ability obtained by students is 5.35 with a standard deviation of 3.8. seen from the average, it means that students' ability to master connection ability is 53.5%.

High mathematical ability will have high connection ability, and vice versa, low mathematical ability will have low connection ability (Chronika et al. 2020; Wiharso & Susilawati, 2020). To achieve connection ability in students, more emphasis must be placed on solving the concept of connecting mathematical ideas and everyday life concepts. In directing students to be able to complete the concept of connecting mathematical ideas

and everyday life concepts, teachers can direct students such as searching for concepts, finding concepts, and applying concepts in solving problems in questions.

According to Supriadi (2015), building mathematical connections is a very important activity that must be carried out by teachers and students in learning mathematics so that students' mathematical understanding can be formed. Furthermore, Mousley stated that there are three types of mathematical connections that need to be developed (Femisha & Madio, 2021), namely: (a) connections between new mathematical knowledge and previously existing mathematical knowledge; (b) connections between mathematical concepts, and (c) connections between mathematics.

One of the important materials for students to learn is sequence and series material. With good mathematical connection skills, students will easily connect the results of understanding the sequence and series material in everyday life.

Method

The research method used is a qualitative descriptive method. Qualitative research methods are studies that use a naturalistic approach to seek and find an understanding of the phenomenon of what is experienced by the research subjects (Moleong, 2011). These subjects are grade XI students in Putrajawa village and, this research was conducted in January. For data collection that will be taken by triangulation or combination. for qualitative data analysis, which will emphasize meaning rather than generalization. The mathematical connection ability test consists of three questions representing one indicator with a maximum score of 4 each.

Result

The results obtained from this study are students' connection abilities in working on Sequence and Series problems.

Table 1. Mathematical Connection Ability test analysis and interview.

No.	Respondent Initials	Code
1	NV	R-1
2	RD	R-2
3	RF	R-3

For questions No. 1 R-1, R-2, R-3 are able to answer the questions given correctly as expected because they solve the questions starting with the known asked and the solution, but on average the students do not describe the final score. They only complete the solution answer in mathematical form. Even so, they have solved it correctly or close to correct, it is possible that question no. 1 with the first indicator of mathematical connection

ability, namely the indicator of students' mathematical connection ability connecting mathematical concepts in sequence and series problems is not too difficult or can be said and students can answer it. However, students cannot interpret the solution they have made well (see Figure 1).

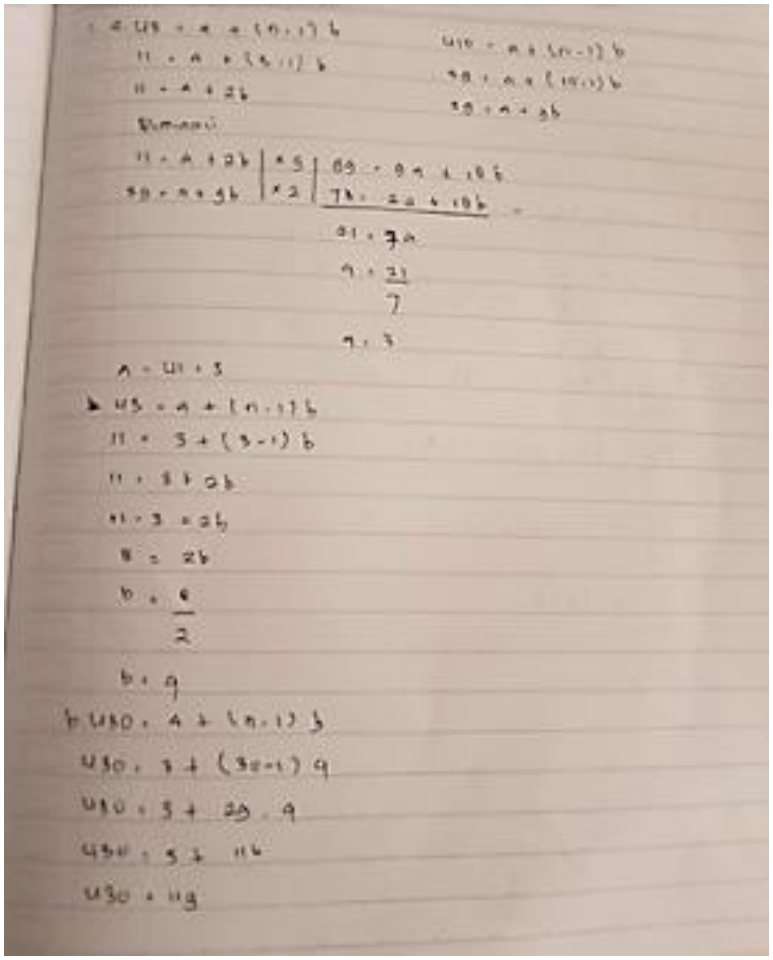

Figure 1. Students' answer

For Question No. 2, in the Mathematical Connection Ability Indicator The mathematical connection ability indicator of students connects mathematical concepts with everyday life. R-1, R-2, and R-3 show that students are able to work according to the indicator of the relationship between mathematical concepts and everyday life and are able to formulate questions related to everyday life into mathematical form.

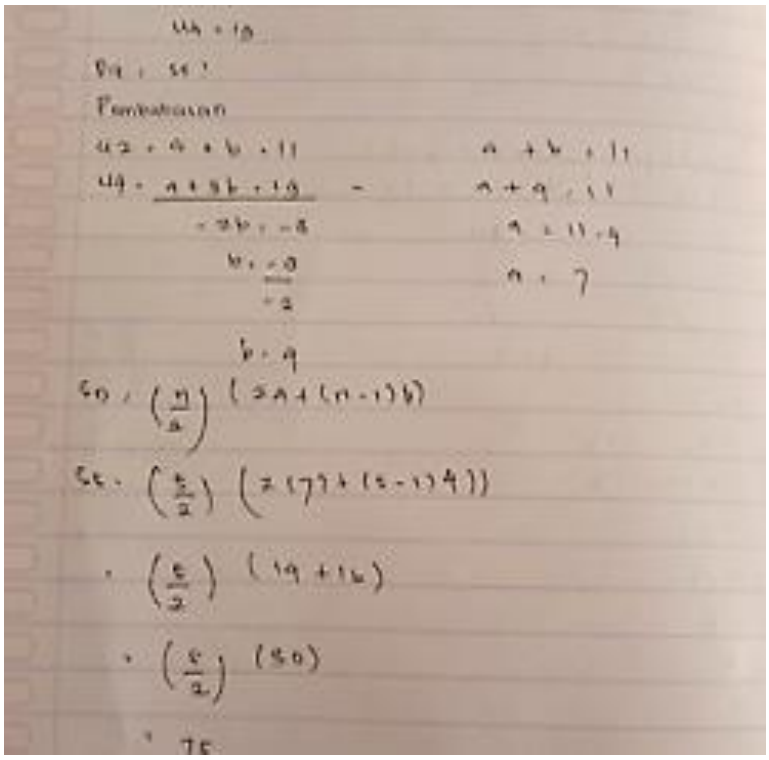

Figure 2. Students' answer

In Figure 2, students work in a structured and neat manner. However, students are still unable to interpret the solution properly, it can be seen that students only work on mathematical solutions without providing conclusions in the form of descriptions. However, when students work on the problem, students understand what is ordered in the problem, what they know and how to do it. In this case, it means that students have met the criteria for the indicator of connecting mathematics with everyday life.

For question No. 3 on the Mathematical Connection Ability Indicator, namely the mathematical connection ability indicator of students connecting mathematical concepts with other fields of science. Of the 3 students, only 1 can formulate it into mathematical form, but is unable to interpret and draw conclusions for the solution.

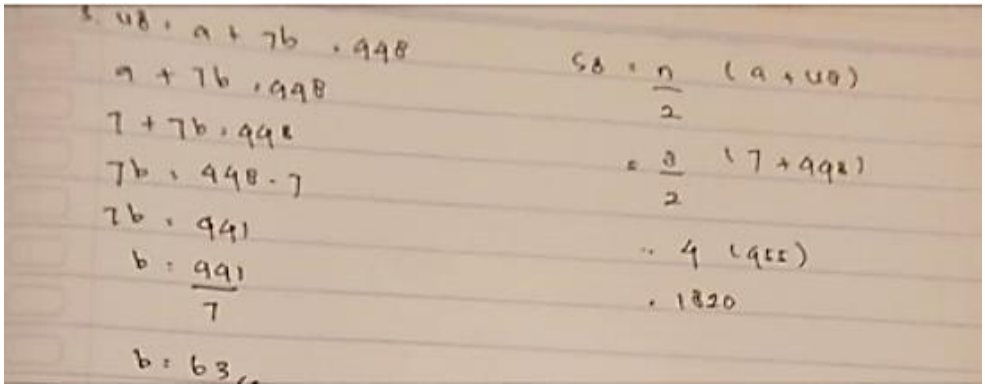

Figure 3. Students' answer

Based on Figure 3, it can be seen that students work on questions by formulating them into mathematical form. And the answer is correct, but the problem is still the same as the answer to questions 1 and 2, the student did not include a conclusion in a descriptive manner. However, the student was able to solve the question from the mathematical connection ability on the sequence and series material on the indicator. The indicator of students' mathematical connection ability connects mathematical concepts with other fields of science.

Discussion

Based on the analysis of several students on each indicator of mathematical connection ability, it can be seen that there are still students who are not able to connect mathematics with mathematics itself, everyday life, and with other disciplines. Meanwhile, mathematical connection ability is important for students to have in order to make it easier to understand mathematical material in their lives and in other matters.

Based on the results of interviews with students, they admitted that they still found it difficult to formulate story problems into mathematical form, did not understand what was being asked, and admitted that they lacked time to work on the questions.

Conclusion

Based on the test results that have been described in the discussion, it shows that students' mathematical connection abilities towards sequence and series material based on the tested question instruments, the error is only in the final conclusion and from the results of the interview, students have difficulty in formulating story problems into mathematical form. so it can be concluded that the mathematical connection abilities possessed by students are already included in the moderate category.

Conflict of Interest

The authors declare that no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely by the authors.

Reference

Chronika, A. (2020). Analisis Kemampuan Koneksi Matematis Siswa Smk Pada Materi Fungsi Kelas Xi. *Jurnal Cendekia: Jurnal Pendidikan Matematika, 4*(1), 254–260.

Fatimah, E. S., & Sundayana, R. (2022). Kemampuan koneksi matematis berdasarkan disposisi matematis siswa pada materi sistem persamaan linear dua variabel. *Jurnal Inovasi Pembelajaran Matematika: PowerMathEdu*, *1*(1), 69-82.

Femisha, A., & Madio, S. S. (2021). Perbedaan peningkatan kemampuan koneksi dan disposisi matematis siswa antara model pembelajaran CTL dan BBL. *PLUSMINUS: Jurnal Pendidikan Matematika*, *1*(1), 97-112.

Fitriani, D. (2023). Self–Directed Learning dan Disposisi Berpikir Terbuka Aktif Terhadap Kemampuan Koneksi Matematis Siswa. *Plusminus: Jurnal Pendidikan Matematika*, *3*(3), 511-520.

Hadiat, H., & Karyati. (2020). Hubungan Kemampuan Koneksi Matematika, Rasa Ingin Tahu Dan Self-Efficacy Dengan Kemampuan Penalaran Matematika. *Jurnal Riset Pendidikan Matematika, 6*(2), 200–210.

Hamdani, M., & Erdawati, N. (2020). Kemampuan Koneksi Matematis Berdasarkan Minat Belajar Siswa. *Juring (Journal for Research in Mathematics Learning), 3*(3), 275–282.

Indriani, N. D., & Noordyana, M. A. (2021). Kemampuan koneksi matematis melalui model pembelajaran connecting, organizing, reflecting, and extending dan means ends analysis. *Plusminus: Jurnal Pendidikan Matematika*, *1*(2), 339-352.

Indriani, R., & Sritresna, T. (2022). Kemampuan Koneksi Matematis ditinjau dari Self Efficacy Siswa SMP pada Materi Pola Bilangan. *Plusminus: Jurnal Pendidikan Matematika*, *2*(1), 121-130.

Marliani, S., & Puspitasari, N. (2022). Kemampuan representasi matematis siswa pada materi kesebangunan dan kekongruenan di kampung sukawening. *Jurnal Inovasi Pembelajaran Matematika: PowerMathEdu*, *1*(2), 113-124.

Mayasari, Y., & Afriansyah, E. A. (2016). Kemampuan Koneksi Matematis Siswa Melalui Model Pembelajaran Berbasis Masalah. *Jurnal Riset Pendidikan, 2*(1), 27–44.

Pitriani, R., & Afriansyah, E. A. (2016). Persepsi dalam pembelajaran pendekatan keterampilan proses terhadap kemampuan koneksi matematis siswa. *Mosharafa: Jurnal Pendidikan Matematika, 1*(2), 15–24.

Soleha, R. P., & Wulantina, E. (2023). Development of Mathematics Adventure Educational Game on SPLDV Material to Improve Students' Mathematical Connection Ability. *Mosharafa: Jurnal Pendidikan Matematika*, *12*(4), 925-936.

Supriadi, N. (2015). Mengembangkan Kemampuan Koneksi Matematis Melalui Buku Ajar Elektronik Interaktif (BAEI) Yang Terintegrasi Nilai-Nilai Keislaman. *Al-Jabar: Jurnal Pendidikan Matematika, 6*(1), 63–73.

Wahyu, E., Suharto, & Hobri. (2017). Analisis Kemampuan Koneksi Matematis Berdasarkan Nctm (National Council of Teachers of Mathematics) Siswa Smk Kelas Xi Jurusan Multimedia Pada Pokok Bahasan Hubungan Antar Garis Eko. *Kadikma, 8*(1), 128–136.

Wiharso, T. A., & Susilawati, H. (2020). Meningkatkan kemampuan koneksi matematik dan self efficacy mahasiswa melalui model CORE. *Mosharafa: Jurnal Pendidikan Matematika*, 9(3), 429-438.