



ANALYSIS OF MATHEMATIC REPRESENTATION ABILITY BY USING YOUTUBE MEDIA AS A MATHEMATICS LEARNING SOURCE

Kamilia Rahmah¹, Akhsanul In'am^{2✉}, Alfi Rachma Nisfi Laila³

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Abstrak

Tujuan Penelitian ini adalah untuk mendeskripsikan kemampuan representasi matematis dengan memanfaatkan media youtube sebagai sumber belajar matematika. Jenis penelitian yang digunakan yaitu penelitian deskriptif kualitatif. Adapun subjek penelitian 3 siswa kelas VIII SMPN 1 Bluto yang dipilih sebagai subjek penelitian dengan mempertimbangkan kesamaan kemampuan matematika dan hasil rekomendasi dari guru. Teknik pengumpulan data dan instrumen pada penelitian ini yaitu tes kemampuan representasi matematis dan wawancara. Analisis data pada penelitian ini yaitu reduksi berupa olahan data tes kemampuan representasi matematis, penyajian data berupa hasil data tes kemampuan representasi matematis, serta kesimpulan untuk mendeskripsikan kemampuan representasi siswa dengan menggunakan sumber belajar berupa youtube serta dihubungkan dengan hasil wawancara. Hasil penelitian menunjukkan bahwa kemampuan representasi berkemampuan tinggi memenuhi ketiga indikator yaitu representasi verbal, ekspresi matematis, dan visual. Siswa yang berkemampuan sedang memenuhi kedua indikator kemampuan representasi matematis yaitu representasi verbal, ekspresi matematis, namun representasi visual belum dapat menggambarkan. Siswa berkemampuan rendah memenuhi satu indikator kemampuan representasi matematis yaitu indikator kemampuan representasi matematis yaitu representasi verbal.

Abstract

The purpose of this study was to describe the ability of mathematical representation by utilizing YouTube as a source of learning mathematics. The type of research used is descriptive qualitative research. The research subjects were 3 students of class VIII SMPN 1 Bluto who were chosen as research subjects by considering the similarity of mathematical abilities and the results of recommendations from the teacher. Data collection techniques and instruments in this study were tests of mathematical representation abilities and interviews. The data analysis in this study is reduced in the form of processed mathematical representation ability test data, data presentation in the form of mathematical representation ability test data results, and conclusions to describe students' representation abilities using learning resources in the form of youtube and linked to the results of interviews. The results showed that the high-ability representation ability met the three indicators, namely verbal representation, mathematical expression, and visuals. Students who have moderate ability meet the two indicators of mathematical representation ability, namely verbal representation, and mathematical expression, but visual representation has not been able to describe. Students with low ability meet one indicator of mathematical representation ability, namely an indicator of mathematical representation ability, namely verbal representation.

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✉Alamat korespondensi:

Universitas Muhammadiyah Malang^{1,2,3}

E-mail: akhsanul@umm.ac.id²

PENDAHULUAN

In the era of the industrial revolution 4.0, it has brought an advancement in information technology that is developing so fast, so that it changes the mindset of humans in finding and getting information. We cannot avoid technological advances, especially in the field of education (M. Ardiansyah & Nugraha, 2022). With these advances, educators are required to be able to utilize and operate technology in its development. The development of information technology is also supported by the internet which has now become something that is needed by all parties (Mujianto, 2019). There are several factors that determine the success of learning, one of which is the use of learning media, learning resources, and technology and teaching staff (Choridah, 2013; Suwarno, 2017).

The use of technology in education can improve the quality of learning if used appropriately, so that in the development of this technology educators must be able to utilize information and communication technology in the learning process. (Yuberti, 2015). One of them is by utilizing technological developments through YouTube as a learning media and learning resource (M. Ardiansyah & Nugraha, 2022). With YouTube, educators can display interactive, innovative and interesting learning videos. Fleck et al (2014) stated that YouTube is a place where every user can share videos for free and is watched by millions of viewers every day. In learning mathematics, the material taught is not only in the form of knowledge, but there is also an explanation of each step of solving problems in mathematics which if written in the form of text will take up many pages. By using video, it can be summarized in just a few seconds of video (Groblinger et al., 2022). Learning videos can be uploaded on the internet so that they can be a source of learning mathematics that students can learn online (Suwarno, 2017).

The learning stages are, firstly, the teacher explains the learning objectives, motivates students and provides stimulation related to the material to be studied so that students remember the previous material. Next, the teacher gives a problem related to the material to be taught. Then the teacher gives a youtube link reference so that students take advantage of youtube media. Furthermore, students can group together to discuss the problems presented and students can look for other YouTube links.

The 2015 TIMSS explained that Indonesian students were weak in all aspects of mathematical content (representing mathematical ideas or concepts in numbers, geometry, data presentation, knowledge, application, and thinking) (Najiha Nadia & Budi Waluyo, 2017). Therefore, Indonesian students need strengthening in terms of integrating information, drawing conclusions, and generalizing their knowledge (Budi, 2017; Putra et al., 2019). A student must be able to express his ideas in a configuration that can present things in a certain way. This is what is called the ability of representation.

Mathematical representation is something that always appears when someone studies mathematics at all levels of education (Najiha Nadia & Budi Waluyo, 2017). Representation can also be interpreted as a form of interpretation of students' thoughts on a problem, which is used as a tool to find a solution to the problem (Lisarani & Qohar, 2021; Sabirin, 2014). Sternberg (2006) also explains the use of appropriate mathematical models as a form of representation that will help understanding concepts to express students' mathematical ideas. In this study, it is seen that representation is a component that deserves attention. With representation, problems that initially look difficult and complicated can be seen easily and simply, so that the problems presented can be solved more easily (Setyawan, 2017).

Previous research that discusses YouTube media, namely research Mujianto (2019) with the results of the study that youtube as a teaching medium played a significant positive role in increasing interest in learning and increasing learning motivation. In addition, research that discusses mathematical representations, namely research Suningsih & Istiani (2021) with the results of the analysis of student achievement on visual representation indicators 65.2%; indicator of expression and equation



representation 43.5%; and 41.2% word representation indicator. This shows that students' mathematical representation skills still need to be considered to be improved.

From the description above, researchers are interested in researching learning resources by utilizing YouTube media on students' mathematical representation abilities. The purpose and answer of the problem formulation in this study is to describe the ability of mathematical representation by utilizing YouTube as a source of learning mathematics.

METODE

This research is a qualitative descriptive study. The research subjects were 3 students of SMPN 1 Bluto who were chosen as research subjects by considering the similarity of mathematical abilities and the results of recommendations from teachers. Data collection techniques and instruments in this study were tests of mathematical representation abilities and interviews. The data used are the results of students' answers from the mathematical representation ability test and are associated with the results of interviews. The test given is in the form of two questions of mathematical representation ability. The data analysis in this study is reduction in the form of processed mathematical representation ability test data, data presentation in the form of mathematical representation ability test data results, and conclusions to describe students' representation abilities using learning resources in the form of youtube and linked to the results of interviews. The score of each indicator is calculated using the percentage formula as follows:

$$\text{Score percentage} = \frac{\text{jsum of scores for each indicator}}{\text{maximum score}} \times 100\%$$

The percentage scores are then interpreted into categories in the following table.

Table 1. Category Percentage Test of Mathematical Representation Ability

No	Persentase (%)	Category
1	Skor \geq 70	Tall
2	$30 \leq$ Skor $<$ 70	Currently
4	Skor \leq 30	Low

RESULTS AND DISCUSSION

The results of the analysis of the mathematical representation ability test by utilizing YouTube as a learning resource were selected based on the considerations of the school teacher in question, namely 3 subjects. Following are the results of the analysis of the subjects coded as RT, which has high mathematical representation ability, RS, which has moderate mathematical representation ability, and RR, which has low mathematical representation ability.

1. Mathematical Representation Ability in Students with High Ability

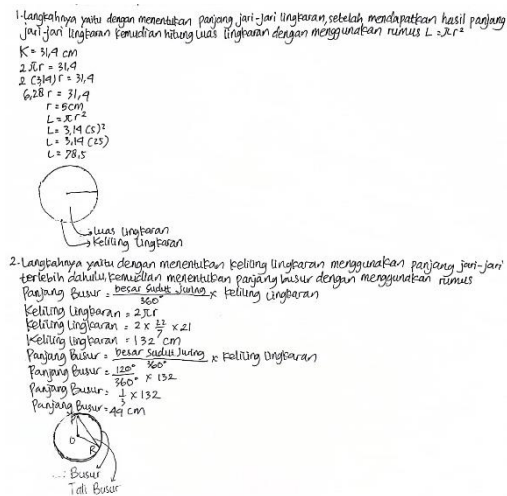


Figure 1. Results of RT Student Answers

Based on the results of RT's work, at the verbal representation stage students can provide answers by providing clear explanations and correct answers both to answers no. 1 and 2. At the expression or equation representation stage they can make mathematical equations correctly and then perform calculations by getting correct answers and complete both on answers no. 1 and 2. At the visual representation stage, you can make a complete sketch and correct answers both on answers no. 1 and 2. At the time of the interview students can explain clearly about the steps of completion. RT students can explain their mathematical equations coherently in numbers 1 and 2, namely by looking for r then finding the area by entering the radius that has been searched previously. Students can also explain the sketch that has been made by showing the area and circumference of the circle. This research is in line with (Handayani et al., 2014) that students' mathematical representations in symbols, graphics, pictures, and writing after being given an interview can solve problems.

2. Mathematical Representation Ability in Students with Moderate Ability

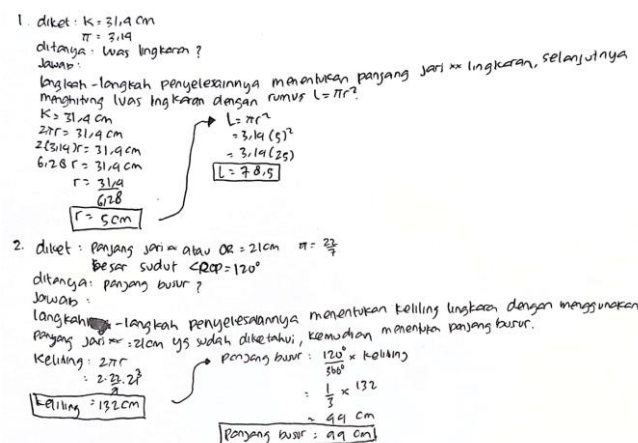


Figure 2. Results of RS Student Answers

Based on the results of RS's work, at the verbal representation stage students can provide answers by providing clear explanations and correct answers both to answers no. 1 and 2. At the expression or equation representation stage they can make mathematical equations correctly and then perform calculations by getting correct answers and complete both in answers no. 1 and 2. At the stage of visual

representation, hospital students have not been able to describe. At the time of the interview students can explain clearly about the steps of completion. Students can explain the mathematical equations coherently in numbers 1 and 2, namely by looking for r then finding the area by entering the radius that has been searched previously. However, RS students are still confused in distinguishing between circumference and area when drawn, and find it difficult to understand which parts are part of the arc of a circle so that they cannot draw. This is in line with the research of Sulastri et al (2017) students who are able to understand the given problem, are able to represent the given problem in mathematical form, are able to communicate problem solving and are precise in performing calculations.

3. Mathematical Representation Ability in Students with Low Ability

① Jawab:

Langkah - Langkahnya Panjang jari-jari lingkaran, selanjutnya menghitung luas lingkaran

$$K = 31,4 \text{ cm}$$

$$2\pi r = 31,4 \text{ cm}$$

$$2(3,14)r = 31,4 \text{ cm}$$

$$6,28 r = 31,4 \text{ cm}$$

$$r = \frac{31,4}{6,28}$$

$$r = 4,99 \text{ cm}$$

$$L = \pi r^2$$

$$L = 3,14 (4,99)^2$$

$$L = 3,14 (24,90)$$

$$L = 76,15$$

② Langkah - Langkahnya menentukan keliling lingkaran dengan menggunakan panjang jari-jari = 21 cm kemudian panjang busur

Keliling lingkaran: $2\pi r$

$$= 2 \times \frac{22}{7} \times 21$$

Keliling lingkaran = 132 cm

panjang busur = ..

Figure 3. Results of RR Student Answers

Based on the results of RR's work, at the verbal representation stage students can provide answers by providing clear explanations and correct answers both to answers no. 1 and 2. At the expression or equation representation stage they can make mathematical equations correctly but there are still errors in the calculation process on answer no. 1. While no. 2 is able to make mathematical equations to the circumference of a circle. However, we haven't solved until we find the arc length of the circle. At the stage of visual representation, RR students could not describe. At the time of the interview students can explain clearly about the steps of completion. Students can explain the mathematical equations but are not sure about the answers that have been written in the answer sheet, especially in number 2. Because they do not know the formula to be used in finding the arc length so they are unable to find the final answer. RR students are still confused in distinguishing between circumference and area when drawn, and find it difficult to understand which part is part of the arc of a circle so they cannot write. This is in line with the research of Sulastri et al (2017) which states that students with low representational abilities will have difficulty in creating and using symbolic representations and images.

CONCLUSION & SUGGESTION

Conclusion

Based on the results of research and discussion on students' mathematical representation abilities by utilizing YouTube as a learning resource for mathematics, it can be concluded that highly capable students fulfill the three indicators of mathematical representation ability, namely verbal representation, mathematical expression, and visuals. Students who have moderate ability meet the two indicators of

mathematical representation ability, namely verbal representation, mathematical expression, but visual representation has not been able to describe. Low-ability students meet one indicator of mathematical representation ability, namely the indicator of mathematical representation ability, namely verbal representation, but the representation of mathematical and visual expressions has not fulfilled because there are still errors in the calculation process and are still confused in distinguishing between circumference and area when drawn, and find it difficult to understand parts which is part of the arc of a circle so it can't write yet.

Suggestion

Suggestions for further research are that more research subjects should be made in order to be able to compare in more detail and carry out learning that emphasizes the mathematical representation of AKM questions based on numeracy literacy.

REFERENCES

- Budi, C. (2017). Analisis Keterampilan Berfikir Kritis Dalam Memecahkan Masalah Ditinjau Perbedaan Gender. *Aksioma*, 8(1), 52.
- Choridah, D. T. (2013). Peran Pembelajaran Berbasis Masalah Untuk Meningkatkan Kemampuan Komunikasi dan Berpikir Kreatif Serta Disposisi Matematis Siswa Sma. *Jurnal Ilmiah Program Studi Matematika STKIP Siliwangi Bandung*, 2(2), 194–202.
- Fleck, B. K. B., Beckman, L. M., Sterns, J. L., & Hussey, H. D. (2014). YouTube in the Classroom: Helpful Tips and Student Perceptions. *The Journal of Effective Teaching*, 14(3), 21–37.
- Gröblinger, O., Kopp, M., & Linschinger, N. (2022). The Potential of Videos for Higher Education Institutions (Hei) in the Post-Covid Era. *INTED2022 Proceedings*, 1(March), 4975–4984. <https://doi.org/10.21125/inted.2022.1308>
- Handayani, M., Hartoyo, A., Ijuddin, R., & Matematis, R. (2014). Mengatasi kesulitan representasi matematis siswa pada materi spldv menggunakan wawancara klinis kelas x sma. *Jurnal Pendidikan Dan Pembelajaran*, 3 No 8, 1–10.
- Lisarani, V., & Qohar, A. (2021). Representasi Matematis Siswa Smp Kelas 8 Dan Siswa Sma Kelas 10 Dalam Mengerjakan Soal Cerita. *Jurnal Magister Pendidikan Matematika (JUMADIKA)*, 3(1), 1–7. <https://doi.org/10.30598/jumadikavol3iss1year2021page1-7>
- M. Ardiansyah, M. A., & Nugraha, M. L. (2022). Analisis Pemanfaatan Media Pembelajaran Youtube Dalam Meningkatkan Pemahaman Konsep Matematika Peserta Didik. *Semnas Ristek (Seminar Nasional Riset Dan Inovasi Teknologi)*, 6(1), 912–918. <https://doi.org/10.30998/semnasristek.v6i1.5828>
- Mujianto, H. (2019). Pemanfaatan Youtube Sebagai Media Ajar Dalam Meningkatkan Minat Dan Motivasi Belajar. *Jurnal Komunikasi Hasil Pemikiran Dan Penelitian*, 5(1), 135–159. www.journal.uniga.ac.id
- Najiha Nadia, L., & Budi Waluyo, S. (2017). Analisis Kemampuan Representasi Matematis Ditinjau dari Self Efficacy Peserta Didik melalui Inductive Discovery Learning. *Ujmer*, 6(2), 242–250. <http://journal.unnes.ac.id/sju/index.php/ujmer>
- Putra, A., Tobing, H., Rahajeng, O., & Yuhan, R. (2019). *The Indonesian Journal of Social Studies*. 2(2), 37–45. <https://journal.unesa.ac.id/index.php/jpips/article/view/8508/4156>
- Sabirin, M. (2014). Representasi dalam Pembelajaran Matematika. *Jurnal Pendidikan Matematika*, 1(2), 33. <https://doi.org/10.18592/jpm.v1i2.49>
- Setyawan, F. (2017). Profil Representasi Siswa Smp Terhadap Materi Plsv Ditinjau Dari Gaya Belajar Kolb. *Journal of Medives*, 1(2), 82–90. <http://e-journal.ikip-veteran.ac.id/index.php/matematika>



- Sternberg, R. J. (2006). *Cognitive Psychology, Fourth Edition*. Yale University.
- Sulastri, S., Marwan, M., & Duskri, M. (2017). Kemampuan Representasi Matematis Siswa SMP Melalui Pendekatan Pendidikan Matematika Realistik. *Beta Jurnal Tadris Matematika*, 10(1), 51. <https://doi.org/10.20414/betajtm.v10i1.101>
- Suningsih, A., & Istiani, A. (2021). Analisis Kemampuan Representasi Matematis Siswa. *Mosharafa: Jurnal Pendidikan Matematika*, 10(2), 225–234.
- Suwarno, M. (2017). Potensi Youtube Sebagai Sumber Belajar Matematika. *Pi: Mathematics Education Journal*, 1(1), 1–7. <https://doi.org/10.21067/pmej.v1i1.1989>
- Yuberti. (2015). Peran Teknologi Pendidikan Islam Pada Era Global. *AKADEMIKA*, 20(01), 137–148.