PRISMA, 13(2), 278-287, December 2024
https://jurnal.unsur.ac.id/prisma
DOI:10.35194/jp.v13i2.4395

p-ISSN 2089 3604
e-ISSN 2614 4611

Teachers' Perspectives on Using YouTube as a Source of Mathematics Learning Assistance: Content Analysis of YouTuber Jerome Polin

Anggar Titis Prayitno[1], Sumarni[2,*], Imeldrif Tri Lestari[3], Nurmalasari[4]
[1,3,4] Universitas Kuningan, Kuningan, Indonesia
[2] Universitas Negeri Surabaya, Indonesia
*Corresponding Author: sumarni@unesa.ac.id

Submitted: 26-06-2024	*Revised: 24-12-2024*	*Accepted: 25-12-2024*	*Published: 27-12-2024*

ABSTRACT

The aim of this research is to determine students' perceptions of the mathematics teaching style presented via the Jerome Polin YouTube Channel and to determine the mathematical understanding abilities of students who use the Jerome Polin YouTube Channel as a source of mathematics learning. This research is a qualitative descriptive research. The research instruments used by researchers in this study were tests of mathematical understanding abilities and student perception questionnaires. The population in this study were mathematics teachers and high school students in classes X and XI in high schools in Kuningan and Majalengka Regencies. The sample from this research was high school mathematics teachers for class X and XI in high schools in Kuningan and Majalengka districts. Data collection techniques were carried out by administering tests and response questionnaires.The data analysis technique in this research uses a flow model of analysis which includes: data reduction, data presentation, verification and drawing conclusions. The research results showed that students' responses to the use of YouTube in mathematics learning were in very positive criteria, with an average score of 82%. Viewed from all aspects, YouTube videos used in mathematics learning can be used as media in the learning process. Meanwhile, the results of students' mathematical understanding tests showed that the average percentage of indicators of students' mathematical understanding abilities was 51.25% of the maximum value, namely 100%.

Keywords: learning resources; teacher perspective; youtube

INTRODUCTION

21st century education has experienced many changes related to the use of technology in learning, including in mathematics learning for millennials. Technology has played an important role in changing the way students learn mathematics in the 21st century. According to a survey conducted by Zenius Education in 2015, mathematics was in third place as the subject most hated by students and felt uninterested in studying mathematics. They consider mathematics difficult and boring because mathematical concepts are abstract and complicated, as well as teaching methods that are less interesting or less effective (Li, Cho, Cosso, & Y, 2021; Z & S, 2020). Students as the internet generation born in the millennial era have different learning styles from previous generations. The millennial generation tends to be independent and autonomous, they also want varied learning models and tend to get bored easily with conventional learning with limited resources and models (Bonfield, Salter, Longmuir, Benson, & Adachi, 2020; Mladenova, Kalmukov, & Valova, 2020). Regarding mathematics which requires detailed explanations and steps, video learning resources are an alternative to text media.

Technology can bring abstract thinking into the real world, so that abstract study objects from mathematics which make students' learning difficulties can be reduced with the help of technology (Alabdulaziz, 2021; İbili, Mevlüt Çat, Resnyansky, Şahin, & Billinghurst, 2020; Mystakidis, Christopoulos, & Pellas, 2022). Learning videos can be uploaded on the internet so they can become a mathematics learning resource that students can study online. YouTube is a popular video sharing service where users can load, watch and share video clips freely. Learning media such as YouTube are currently very popular and are packaged very attractively so that they can increase the knowledge of their users. Learning content that is presented in an interesting way triggers users to deepen the material being studied at the study table (Chorna, Hamaniuk, & Uchitel, 2019; Pires, Jose, & Scolari, 2021).

Several previous studies that use YouTube as a learning medium include (Kamhar & Lestari, 2019), conducting research on the use of YouTube as a medium for learning Indonesian in higher education. (Muzaki, 2021) conducted research on the use of YouTube as a learning medium for class XII MIPA students in high school. (Baihaqi et al., 2020) conducted research on the use of YouTube as an effective Islamic religious education learning medium in vocational schools. (Suradika & Gunadi, 2020) conducted research on the use of YouTube as a distance learning medium in class III of elementary school.

Unlike several studies that have been conducted, this study uses YouTube as a medium for learning mathematics at the high school level. The aim of this research is to determine teachers' perceptions of the mathematics teaching style presented via the Jerome Polin YouTube Channel and to determine the mathematical understanding abilities of students who use the Jerome Polin YouTube Channel as a source of mathematics learning.

RESEARCH METHODS

This research is a qualitative descriptive research that reveals the facts in the field in a factual and actual manner. The researcher chose research on the grounds that qualitative descriptive research can discuss facts in an in-depth way according to the chosen context.

This research was conducted by several high schools in Kuningan and Majalengka Regencies regarding the use of YouTube as a source of mathematics learning assistance used in high schools. The time for conducting the research was when learning activities were carried out in high schools in the odd semester of the 2023/2024 academic year.

The population in this study were mathematics teachers and high school students in classes X and XI in high schools in Kuningan and Majalengka Regencies. The sample from this research was 199 student from high school for class X and XI in high schools in Kuningan and Majalengka districts and their mathematics teachers. Samples were obtained using a random sampling method from the existing population.

Data collection techniques in this research used tests and non-tests. Data collection is through tests, namely providing test instruments in the form of description questions. Test result data is used to determine the extent of students' mathematical understanding abilities. The test consists of two description questions which are arranged based on indicators of mathematical understanding ability according to Yudhanegara. The questionnaire was used to obtain data regarding student responses to the use of YouTube as a source of mathematics learning assistance used in high school. Researchers used a questionnaire technique using a Likert scale.

The research instruments used by researchers in this study were tests and questionnaires. The test is used as a tool to assess learning outcomes on students' mathematical understanding abilities regarding the area of squares and circles. The questionnaire used is a student response questionnaire consisting of two aspects, namely response and reaction (Lijana, Panjaitan, & Wahyuni, 2018).

The data analysis technique in this research is percentage and analytical descriptive. Some data collected from the field is analyzed and presented in percentage form. The percentage data is then interpreted using reasoning or logic according to the theory used as the basis for the research, without manipulating the existing data. However, other data is directly analyzed using descriptive analysis without going through percentage model analysis. The data analysis technique in this research uses a flow model of analysis which includes: data reduction, data presentation, verification and conclusion drawing.

RESULTS AND DISCUSSION

Results of Teacher Response Questionnaires on the Use of YouTube Videos

Based on the results of the teacher response questionnaire, the majority of students gave very positive responses to the use of YouTube video media. This shows that the material in the video media provided is of good quality and can be used as media in the mathematics learning process. In detail, the following Table 1 shows the overall teacher response categories for each indicator.

Table 1. Teacher Response Results

Aspects/Indicators	Rating Average (%)	Criteria
Contents	88	Very Positive
Language	91	Very Positive
Presentation	87	Very Positive
Overall Average	89	Very Positive

Based on Table 1, the indicator with the highest percentage is 91%, namely the language indicator. These results indicate that the language used can be understood well by users. The use of language that is communicative and appropriate to the student's level of development is important so that the message and content of the video can be understood clearly by students. Then, the lowest percentage is 87%, namely presentation indicators related to the quality of images, audio and the ability to motivate students. These results indicate that the videos shown are not optimal in motivating students to learn mathematics independently. And, the content indicator with a percentage of 88% shows that the coverage of material and concepts is in accordance with high school level, and the material presented can be easily understood by students.

Mathematical Understanding Ability Test Results

Based on the test results, it was found that the majority of students got good grades after using YouTube video media. This shows that the material in the video media provided is of good quality and can be used as media in the mathematics learning process. The scoring criteria on Table 2 are divided into several categories in the ability test to understand mathematical concepts in this study as follows.

Table 2. Criteria for Scoring Results for the Concept Understanding Ability Test

Criteria (%)	Category
80< Mark ≤100	Very good
60< Mark ≤80	Good
40< Mark ≤60	Enough
20< Mark ≤40	Not enough
0< Mark ≤20	Very less

The results of the students' mathematical understanding ability test are shown in the following Table 3.

Table 3. Concept Understanding Ability Test Results

Indicator	Number of Students	Percentage (%)	Category	Average Percentage (%)
Classifying objects based on whether or not they fulfill the requirements that form the concept	10	5	Very less	51,25
Train to habitually connect one concept with another concept	150	75	Good	
Developing necessary and sufficient conditions for a concept	163	82	Very good	
Apply algorithmic concepts to problem solving.	85	43	Enough	

These results based on Tabel 3 show that 51.25% of students already have good comprehension skills. The indicator with the highest percentage is developing necessary and sufficient conditions for a concept at 82% and the indicator with the smallest percentage is classifying objects based on whether or not the requirements for forming a concept are met or not at 5%.

Of the 199 subjects who took the test, 4 subjects were selected to analyze their mathematical understanding abilities, consisting of two subjects (S1 and S2) with very good mathematical understanding abilities and two subjects (S3 and S4) with very poor mathematical understanding abilities. The following are the results of the analysis obtained from the four subjects:

Question

Mother is sewing decorative patterns from patchwork to attach to the curtains. The shape of the decoration is like a diamond. Each decoration is made from a square pattern first with the following sizes and patterns.

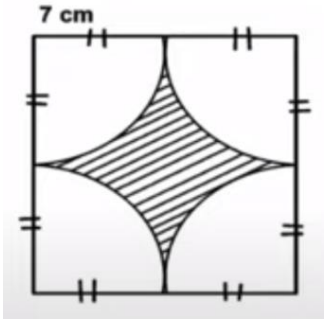

Figure 1. Diamond-Shaped Cecorations

If you want to make 20 diamond-shaped decorations, how much total area of patchwork will you need to make all the decorations?

Subject 1 (S1)

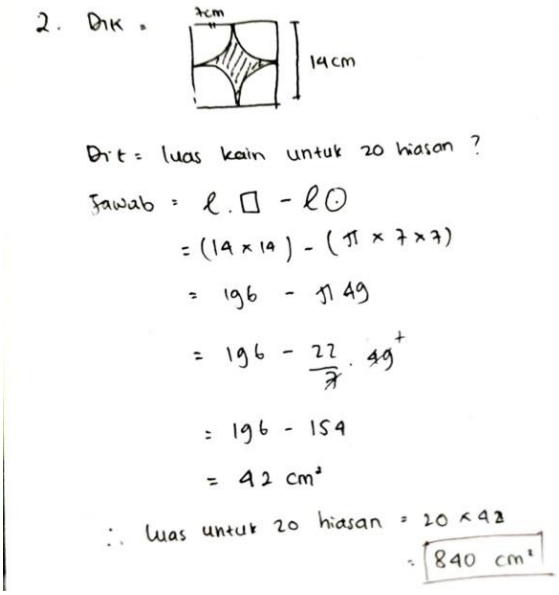

Figure 2. Results of Subject 1's Work on Question 2

Based on Figure 2, it can be seen that S1 is able to classify objects based on whether or not the concept-forming requirements are met. S1 writes down the information stated in the question completely as known and asked. S1 also explains the concept of the area of fabric that is sought by finding the exact area of a square and area of a circle. After that, S1 classified the objects that had been obtained to form a concept for finding the area of grass. S1 applies the concept of the difference between the areas of a circle and a square, so as to obtain the correct answer and conclusion.

Subject 2

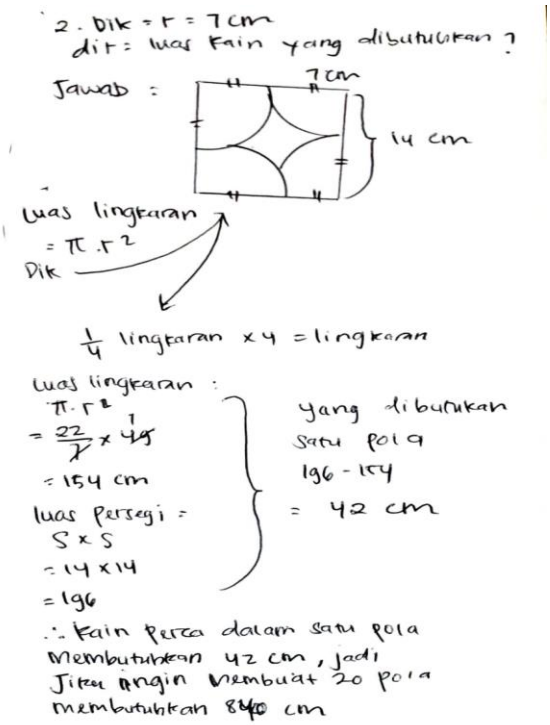

Figure 2 Results of Work on Subject 2 on Question 2

Based on Figure 2, it can be seen that S2 is able to classify objects based on whether or not the concept-forming requirements are met. S2 writes down the information stated in the question completely as known and asked. S2 also explains the concept of grass area which is sought by finding the exact area of a square and area of a circle. After that, S2 classified the objects that had been obtained to form a concept for finding the area of grass. S2 applies the concept of the difference between the areas of a circle and a square, resulting in inaccurate answers and conclusions.

Subject 3

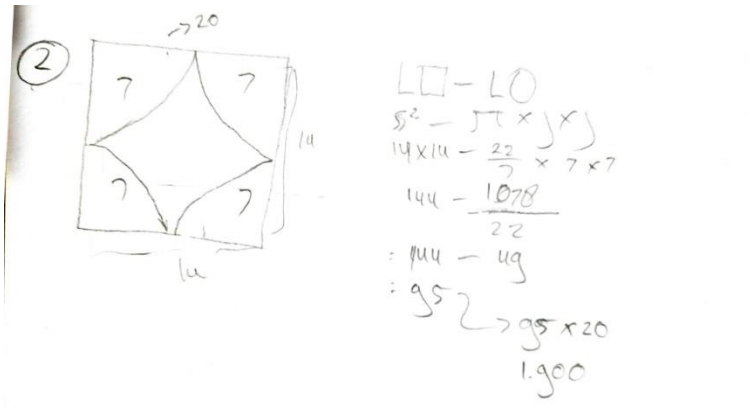

Figure 3 Results of Work on Subject 3 on Question 2

Based on Figure 3, it can be seen that S3 has not been able to classify objects based on whether or not the concept-forming requirements are met. S3 uses the concept of the area of a quarter circle and the area of a square to find the area of grass. Then, S3 applied the concept of the difference between the two areas and got an incorrect answer because there

was an error in calculating the area of the square and the area of the circle. S3 also does not write down objects such as the information contained in the questions and conclusions so that the requirements for forming concepts are not met.

Subject 4

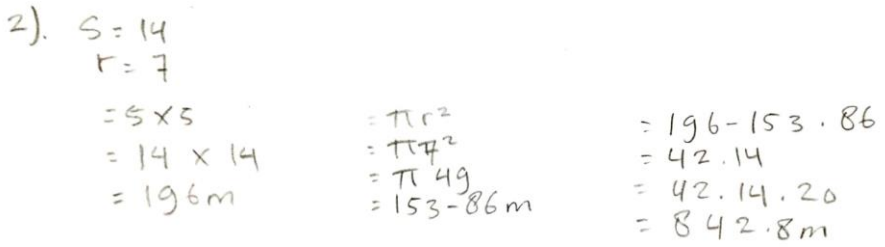

Figure 4 Results of Subject 4's Work on Question 2

Based on Figure 4, it can be seen that S4 has not been able to classify objects based on whether or not the concept-forming requirements are met. S4 uses the concept of the area of a quarter circle and the area of a square to find the area of grass. Then, S4 applied the concept of the difference between the two areas and got an incorrect answer because there was an error in calculating the area of the circle. S4 also does not write down objects such as the information contained in the questions and conclusions so that the concept formation requirements are not met.

The results obtained from the teacher response questionnaire regarding the use of YouTube video media in mathematics learning with the following indicators: 1) content, the average percentage value was 88%; 2) language, the average percentage score was 91%; and 3) presentation, the average percentage value obtained is 87%. From the results of filling out the teacher response questionnaire, it can be concluded that the use of YouTube video media in mathematics learning has very positive criteria. These results show that the lowest percentage is a presentation indicator that lacks attraction for users to watch and use YouTube videos as learning media. Meanwhile, other research states that design influences a person's interests (Miyosa, 2019). Furthermore, the highest percentage is found in the language indicator because it is important in learning. In principle, this process relies on how to move people to carry out learning activities. Language becomes a tool so that learning can achieve predetermined goals (Wicaksono, 2016).

Even the availability of learning videos on YouTube can be re-watched by students according to their needs. This is certainly more effective than traditional learning where all information centers are with the teacher and control of the delivery of information greatly affects student understanding, so that if there is something left behind it becomes difficult to equate (Suradika & Gunadi, 2020).

The use of learning videos on YouTube can encourage students' curiosity in understanding a material.The results of students' mathematical understanding tests with the Skemp indicator show that: 1) classifying objects based on whether or not the concept-forming requirements are met, the average percentage score is 5%. These results indicate that students do not yet have the prerequisite knowledge needed to carry out procedures for solving circle and square area problems. This is not in accordance with research which states

that the majority of students can do well and can solve prerequisite questions based on correct procedures and clear reasons (Giriansyah, Pujiastuti, & Ihsanudin, 2023); 2) training to regularly connect one concept with another concept, the average percentage score was 75%. These results show that the majority of students can work well and can solve questions correctly and for clear reasons. Even though some students had difficulty solving the questions, the students were able to get the right results and give logical reasons for solving them. This is in line with research which shows that the achievement of indicators connecting one concept with other concepts has very good criteria (Saparida, Yusmin, & Nursangaji, 2021). The use of learning videos on YouTube can improve critical thinking skills in learning (Kamhar & Lestari, 2019); 3) developing the necessary and sufficient conditions for a concept, the average percentage value was 82%. These results show that the majority of students can develop the necessary conditions for solving problems on the area of circles and squares correctly and completely. This is in accordance with research which states that students are able to solve mathematical problems correctly and completely (Rismen, Astuti, & Lovia, 2021). The use of videos in learning on YouTube also allows students to see learning objects in real and more realistic ways (Kamhar & Lestari, 2019); and 4) applying algorithmic concepts to problem solving, the average percentage value was 43%. The results show that students apply the algorithm systematically and explain the reasons for the answers found. This is in line with research which states that the achievement of indicators for applying algorithmic concepts to problem solving in solving mathematical problems is at sufficient criteria. (Alfiani & Rahayu, 2022).

Teacher says that the use of YouTube as teaching media has positife effect on understanding ability students. The use of YouTube as teaching materials has a positive effect on the teaching and learning process inside and outside the classroom. Youtube is inseparable from everyday life for teenagers (Kamhar & Lestari, 2019). The use of YouTube creates a positive view that Indonesian is not a boring lesson but is very exciting and even forms social character and cooperation between students (Baihaqi et al., 2020). Therefore, YouTube can be a teaching medium to increase student interest (Muzaki, 2021).

CONCLUSION

The average value of teachers' responses to the use of YouTube in mathematics learning is in very positive criteria, with an average value of 89%. So, it can be concluded from the results of applying learning media to mathematics subjects that they received a very good response. Viewed from all aspects, YouTube videos used in mathematics learning can be used as media in the learning process. Meanwhile, the results of students' mathematical understanding tests showed that the average percentage of indicators of students' mathematical understanding abilities was 51.25% of the maximum value, namely 100%. Teachers can used Youtube as teching media or teaching materials to improve understanding ability of students.

REFERENCES

Alabdulaziz, M. S. (2021). COVID-19 and The Use of Digital Technology in Mathematics Education. *Education and Information Technologies*, 7609–7633. https://doi.org/10.1007/s10639-021-10602-3

Alfiani, L., & Rahayu, R. (2022). Profil Kemampuan Pemahaman Konsep Ditinjau dari Kecemasan Matematis Siswa Smp pada Pembelajaran Tatap Muka Terbatas. *Seminar Nasional Pendidikan Matematika (SNAPMAT)*, *5*(1), 44–57. https://doi.org/10.24176/anargya.v5i1.7694

Baihaqi, A., Mufarroha, A., Imani, A. I. T. (2020). Youtube sebagai Media Pembelajaran Pendidikan Agama Islam Efektif di SMK Nurul Yaqin Sampang. *EDUSIANA: Jurnal Manajemen Dan Pendidikan Islam*, *7*(1), 74–88.

Bonfield, C. A., Salter, M., Longmuir, A., Benson, M., & Adachi, C. (2020). Transformation or Evolution?: Education 4.0, Teaching and Learning in The Digital Age. *Higher Education Pedagogies*, *5*(1), 223–246. https://doi.org/10.1080/23752696.2020.1816847

Chorna, O. V., Hamaniuk, V. A., & Uchitel, A. D. (2019). Use of YouTube on Lessons of Practical Course of German Language as The First and Second Language at The Pedagogical University. *CEUR Workshop Proceedings*, *2433*, 294–307. https://doi.org/10.55056/cte.392

Giriansyah, F. E., Pujiastuti, H., & Ihsanudin, I. (2023). Kemampuan Pemahaman Matematis Siswa Berdasarkan Teori Skemp Ditinjau dari Gaya Belajar. *Jurnal Cendekia : Jurnal Pendidikan Matematika*, *7*(1), 751–765. https://doi.org/10.31004/cendekia.v7i1.1515

İbili, E., Mevlüt Çat, Resnyansky, D., Şahin, S., & Billinghurst, M. (2020). An Assessment of Geometry Teaching Supported with Augmented Reality Teaching Materials to Enhance Students' 3D Geometry Thinking Skills. *Int J Math Educ Sci Technol*, *51*(2), 224-246. https://doi.org/https://doi.org/10.1080/0020739X.2019.1583382

Kamhar, M. Y., & Lestari, E. (2019). Pemanfaat Sosial Media Youtube sebagai Media Pembelajaran Bahasa Indonesia di Perguruan Tinggi. *INTELIGENSI: Jurnal Ilmu Pendidikan*, *1*(1), 1–7.

Li, Q., Cho, H., Cosso, J., & Y, M. (2021). Relations Between Students' Mathematics Anxiety and Motivation to Learn Mathematics: a Meta-Analysis. *Educ Psychol Rev*, *33*(3), 1-33.

Lijana, Panjaitan, R. G. P., & Wahyuni, E. S. (2018). Respon Siswa terhadap Media Pembelajaran pada Materi Ekologi di Kelas X SMA. *Jurnal Pendidikan Dan Pembelajaran Khatulistiwa*, *7*(3), 1–9.

Miyosa, A. S. (2019). Kajian Komunikasi Visual pada Desain Sampul Buku Komik Merebut Kota Perjuangan. *Jurnal Ilmiah Multimedia Dan Komunikasi*, *4*(1), 1–10.

Mladenova, T., Kalmukov, Y., & Valova, I. (2020). Covid 19 – A Major Cause of Digital Transformation in Education or Just an Evaluation Test. *TEM Journal*, *9*(3), 1163–1170. https://doi.org/10.18421/TEM93

Muzaki, A. (2021). Pemanfaatan Media YouTube sebagai Media Pembelajaran pada Siswa Kelas XII MIPA di SMA Negeri 1 Tawangsari. *Media Penelitian Pendidikan: Jurnal Penelitian Dalam Bidang Pendidikan Dan Pengajaran*, *15*(1), 26–30.

Mystakidis, S., Christopoulos, A., & Pellas, N. (2022). A Systematic Mapping Review of Augmented Reality Applications to support STEM Learning in Higher Education. *Education and Information Technologies*. https://doi.org/10.1007/s10639-021-10682-1

Pires, F., Jose, M., & Scolari, C. A. (2021). What are Teens Doing with Youtube? Practices, Uses and Metaphors of The Most Popular Audio-Visual Platform. *Inf Commun Soc*, *24*(9), 1175-1191.

Rismen, S., Astuti, S., & Lovia, L. (2021). Analisis Kemampuan Pemahaman Konsep Matematis Siswa. *Lemma*, *7*(2), 123–134.

Saparida, C., Yusmin, E., & Nursangaji, A. (2021). Pemahaman Relasional Siswa dalam Menyelesaikan Soal Program Linear di Kelas XI Man 2 Pontianak. *Jurnal Pendidikan Dan Pembelajaran Khatulistiwa (JPPK)*, *11*(1), 1–13. https://doi.org/10.26418/jppk.v11i1.51897

Suradika, A., & Gunadi, A. A. (2020). Penggunaan Youtube sebagai Media Pembelajaran Jarak Jauh pada Kelas III Sekolah Dasar Islam An - Nizomiyah. In *Prosiding Seminar Nasional Penelitian LPPM UMJ* (pp. 1–10).

Wicaksono, L. (2016). Bahasa dalam Komunikasi Pembelajaran. *Journal of Prospective Learning*, *1*(2), 9–19.

Z, F., & S, C. (2020). Practices., Disciplinary Literacy in Mathematics: One Mathematician's Reading. *Journal of Mathematical Behavior*, *59*. https://doi.org/https://doi.org/10.1016/j.jmathb.2020.100799