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The Effect of The Tiktok Application on Students' Mathematical Reasoning

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Abstract
The increasing number of users networking social media TikTok among senior high school students in Indonesia, of course, will influence learning students, especially in terms of digital skills in mathematics. Counting is essential because students can count like that appearance so that they will later encounter a perceived problem that is difficult in learning mathematics. This research aims to determine how much influence TikTok social media users have against reasoning mathematics in students. This research adopts the quantitative experimental group control method before and after the experiment was designed, and the sample in this study adopted the cluster random sampling method. Instruments used from the paper The test consists of 5 pre-tests and five post-tests in class X TB A SMKN 3 Metro. Data analysis uses the Paired Samples Statistics Test. The results of the research using paired samples statistics conclude that the application of TikTok is influential and significant to reasoning mathematics in students; the average pre-test score is 45.88, and the average score post-test is 87.06. As such, it has been proven that TikTok influences reasoning mathematics in students.
Keywords— Learning Outcome, Mathematical Reasoning, Tiktok Application

Introduction

Achievement at the national level is usually measured through various national assessments, and exams are held regularly (Shaleha & Shalihah, 2021). Achievement level province usually refers to results assessment report at the level reflecting province performance students in the area (Teresia, 2021). This data is essential for measuring the development of mathematics education at the national and provincial levels. Based on ANBK (National Based Computer Assessment Results) on capabilities numeracy students for vocational schools 2022. For level SMA/SMK/MA/ equivalent schools, 41.14% of students have competency numeracy above the minimum of 5.98 from 2021 (35.16%), in the current category. As quoted from OECD, Indonesia's PISA scores show enhancement from 2000 to 2018, with the increase sharper in math, though the trend throughout the rising period, in PISA 2018, scores Indonesia relatively down in all areas. According to the OECD, around 71% of students do not achieve a minimum level of competence in mathematics. According to the PISA schedule, there should be A test with patterns of three yearly implementations. It will be held in 2021 because almost all parts of the world are infected with the COVID-19 pandemic, and its implementation will be postponed to 2022. As usual, the results have just been released a year. The next time is in 2023.

Achievement results of the learning process influence learning; an effective learning process can increase the understanding, skills, and achievements of students in the eyes of specific areas, including mathematics (Ningsih & Hayati, 2020). Factors like method teaching, teacher quality, environment learning,

motivation of students, and parental support can influence the results of Study students (Tampubolon et al., 2021). It is essential to ensure the learning process is arranged and structured well to give students the maximum opportunity to achieve good results in mathematics and eye lessons (Sholiha et al., 2022).

The mathematics learning process at SMKN 3 Metro in class X is the learning material he taught. Teachers also use LKPD and books using LCD and quizizz, but students struggle if it is not explained directly. They use blackboard by how the teacher writes and explains the material directly. The teacher also instructs them to search for material on Google and YouTube, but students do not understand if they are not guided directly by the teacher in this way through the whiteboard. The learning media currently used is according to the students, but it still will be challenging to understand if not explained directly. Students' interest in learning also depends on their respective significant classes for the primary classes of interest, so learn it tall, so reasoning. Students' mathematics learning is also high, and it is easy to do math problems. As for classes that interest you, learn low, so reasoning students' mathematics learning is also low, and it will be difficult to do math problems. In an independent study, several feeble students are independent to learn where; from the observation of the results, they see that The teacher's role is still to explain the material, which has become an indispensable activity Because the level of independence of students to learn still low (Results of an interview regarding the mathematics learning process with one of the mathematics teachers at SMKN 3 Metro, personal communication, on October 2023).

Understanding the material related to the previous will influence the smooth learning process. Problems faced by teachers at SMKN 3 Metro were discovered, and several current students had difficulty understanding the previous material. For example, when the teacher explains material about real numbers like addition and subtraction, students do not understand the material, so teachers have to review and Return the material at each time meeting, although only some actual number material is reviewed, if not reviewed return the material so will have difficulty with the following material.

One of the competencies in learning mathematics is the ability to use mathematical reasoning (Izzah & Azizah, 2019). Mathematics reasoning ability is how the brain works, like habits, and other habits must be developed and not changed using Miscellaneous contexts; getting to know reasoning and proof are a part of the basic principles in mathematics (Santosa et al., 2020). Mathematical reasoning at SMKN 3 Metro in class X depends on their major classes. Some classes are interested in learning it rather than doing math problems at the time. It is easy, and the results will be too satisfying, but some classes are interesting; learning it low and then working on math problems will be difficult, and the results will also be unsatisfactory. Students must guided one by one. The aim is to make things easier for students at the moment. So, the reasoning for students at SMKN 3 Metro in class X depends on characteristics and interests in studying math (Results of an interview regarding the mathematics learning process with one of the mathematics teachers at SMKN 3 Metro, personal communication, on October 2023).

Learning has five communication components: educator (communicator), learning materials, learning media, students (communicants), and objectives learning. Teaching materials will be delivered to students in a sequence used by

educators and students in manual Learning (Devi, 2021). If there is no preparatory learning media to educate and learning cannot be done, there is no need for media to provide teaching materials (Mu'minah, 2021). The first thing educators do when using learning media is search, select, and find learning media that can attract students (Rahma, 2019).

TikTok is one of the many applications accessible to most groups, including students at level school, and TikTok can be used as a medium for learning. Research results (Irianto & Al-Amin, 2021) Analysis Influence of TikTok App Against Improving English Language Learning in Students pointed out that TikTok can give better results in learning English language material. Research results (Indriani et al., 2023) Influence TikTok Application on Students' Attraction in Learning Mathematics in Elementary Schools pointed out that tikTok is effective for level mathematics learning. However Thus, with limitations in readings owned by researchers, researchers Not yet found how effectiveness TikTok app for reasoning mathematics at the level of school intermediate vocational.

Refer to the description above, then conclusions can be drawn that the TikTok app can utilized as a suitable learning medium. Firstly, the TikTok app complies with student learning. Second, the TikTok application can attract students to learn because of its uniqueness. Third, the TikTok application is progressing, developing, and interacting between teachers and students connected to the digital world. In this study, researchers will apply TikTok media in mathematics learning to improve mathematical reasoning.

METHOD

This research method is a type of quantitative research. This type of research involves treatment active experiments to measure the direct influence of TikTok use on reasoning study math and technique taking sample using cluster random sampling and using size. The sample was 34 students from one class created as an experimental and control class sample. The experimental class got special treatment by learning using TikTok, the application. This research was conducted at SMKN 3 Metro.

Research instruments used using pre-test and post-test questions from grille instruments that have been made previously. This design compares the experimental class with the control class. The experimental class accepts TikTok program video lessons, while the control accepts instructions. Study like usual. The members of this research are students of SMKN 3 who form the sample, class X TB A (containing 34 students). The data analysis technique was the paired samples t-test using SPSS version 21 for Windows 2016. In this research, the technique is experimental class learning using the application TikTok with implementation treatment of learning activities.

RESULTS AND DISCUSSION

TikTok Application as a Learning Media

The results of this research involve using TikTok as a means in the context of learning media. This learning process consists of the five elements of communication, which consist of the communication teacher, namely the teacher (communicator), learning materials, learning media, students (communicants), and

objectives learning (Nadiyah, 2021). At the same time, Teaching materials are materials compiled teaching materials in a systematic way utilized by teachers and students in handling learning (Malina et al., 2021). Thus, learning media is part of framework learning that cannot be separated. Devi (2021), without learning media preparation, education and learning will not happen, and even one will be required to provide the teaching materials.

Relating to the issue of students who are interested in media and representation, The message conveyed by educators must also be considered in media selection. There are at least three operating capacities concurrently with media use. First, function stimulates interest in the learning process and encourages the search for information about the content presented in the media. Second, function intervention is an intermediary between teachers and students, so the media becomes a communication between them. Third, the data function provides clarification to the instructor in communication. Using media, students can access their data or clarifications needed or receive the information they want delivered by educators.

Table 1 Features found in the TikTok Application

Feature	Function
Record Sound	Record voice via gadget, then integrate it into individual TikTok accounts.
Record Video	Record video via the gadget, then integrated into individual TikTok accounts.
Background	Give voice possible background downloaded from the media storage TikTok application.
Edit	Edit and change the draft video that has been created.
Share	Share video recording.
Comment	Give opinions on the videos watch
Duet	Collaborate with users of other TikTok applications.

Based on the explanation above, it concluded that the TikTok app can effectively be used as an appropriate learning medium. First, the TikTok application can fulfil the need for student learning. Second, it can provide uniqueness and diversity. TikTok's features can attract students' attention and integrate them into learning. Lastly, the TikTok app keeps pace with the progress development of the times and reflects the interaction between students in an era connected to the digital world, especially involving gadgets.

Application of Learning Using TikTok App

Before commencement session learning, students are given a pre-test question to assess the mathematical reasoning ability they were involved in learning through the TikTok app.

Figure 1. Students working on pre-test questions

While learning started, researchers delivered material at SPLDV learning meetings and engaged students using the TikTok app. Researchers have prepared content that can be downloaded from TikTok with the name users "Salam Mathematics," "Bela Jar," and " Syahida Mardhatila." The researcher shared the link with students to make content learning on TikTok more accessible, making them more easily involved in learning via the platform. Once students click the link, they focus on learning videos on TikTok and observe The steps presented in the video. The researcher arranges four meetings to ensure student achievement and in-depth understanding. Every meeting is designed to achieve mature, encouraging results, active interaction, and support developing understanding drafts.

Figure 2. Researchers Delivering Material

Figure 3. Students Watch Learning Videos on TikTok

After learning using the TikTok application, students are given post-test questions to evaluate their ability to reason mathematical them after the involved learning TikTok app.

Figure 4. Students working on post-test questions

Study results show that using social media TikTok as a learning medium can increase the liveliness and creativity of students in the learning process.

Validity and Reliability Test

For invalidity testing, use the formula Aiken Index. The instruments in this research can be used If the level of validity reaches moderate with a minimum value of 0.40. The research carried out a question validation test using seven questions; according to the research results, est and seven post-test questions that Next, five questions were taken and tested on class XI students, with validity results being measured using the device SPSS version 21 software.

Table 3. Validation Test

	Results	Amount	Question Number
Pre-test	Valid	5	12,3,4,5
	Drop	0	
Post-test	Valid	5	1,2,3,4,5
	Drop	0	

After carrying out the validation test, test the reliability, using the Cronbach Alpha formula to see the extent to which the research instrument is reliably used and worthy of application. The instrument in this research is said to be reliable if Cronbach Alpha (r_{11}value) ≥ 60. This study's pre-test and post-test reliability tests have degrees of reliability of 0.844 and 0.809. This means instrument-used researchers are competent in collecting data and trusted as tool data collectors.

Paired Sample T-Test

Paired t-test is one method of testing a hypothesis where the data is not independent (paired). The most frequent characteristics found in cases where pairs are one Individual (research objects) are subjected to 2 pieces of different treatments (Farida et al., 2022). Although using the same individual, the researcher still obtains two types of sample data: data from the first treatment and data from the second treatment.

Results of data management using SPSS version 21, available seen as follows:

Table 9. Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre-test - Post-test	-41,176	44,297	7,597	-56,632	-25,721	-5,420	33	,000

Table 9 shows the calculated t-amounts to -5,420 t-count worth. This negative is caused By the average value of the results lower pre-test learning than the average value of the results study post-test. In this case, the t-value negative got a meaningful positive. So that t-counts to 5,420. Thus, because the calculated t-value 5.420 > t-table value = 2.034, then as a base deciding on it can concluded that H_0 rejected, with value significance (2-tailed) 0.000 < 0.05 which means that social media TikTok influences reasoning mathematics for students at SMKN 3 Metro. Learning videos using the TikTok application are focused learning videos for students to understand the material being studied independently; by utilizing the video with the learning video-based application Titkok listed, teachers and students can work well together when learning starts. Tutorial video-based application TikTok can be used in learning next to

So far, no TikTok application has specifically been intense. TikTok is a diverse short video-sharing platform, including various content from entertainment, creativity, and education (Novalia et al., 2021). The connection between mathematics and the TikTok application can appear in several cheerful and challenging contexts. According to (Ajir, 2022), some math content creators content on TikTok can make videos that explain or teach mathematical concepts in general.

This can cover explanations, mathematical formulas, or practical applications of mathematical concepts in daily life.

According to this research this is also confirmed by meeting some significant research. Research carried out by First, research carried out by (Amelia & Ma'arif, 2022): The Influence of Tik Tok Social Media on the Mathematical Numeracy Ability of Grade IV Students in Elementary Schools. The results of this research prove that the experimental and control pre-test T-count = -7.629 < T_{table} = 1.672 = (0.05). Therefore, in the experimental and control pre-test, H_0 was rejected, while in the experimental and control post-test, T-count = 6.029 > T-table = 1.672 = (0.05). Therefore, the experimental and control post-test H1 is accepted. As such, you can prove so influential social media user TikTok to ability mathematical results Study fourth grade students. Second, (Hasanah et al., 2022): Perceptions of School Students Upper Intermediate Concerning Content Mathematics Learning Education in Applications TikTok. The research results show that as many as 83.3% of students use TikTok and feel immensely helped by its content mathematics education applications, TikTok. Content education TikTok has various weaknesses and strengths as a mathematics teaching medium for students. Therefore, TikTok is expected to become a variation of teaching media that educators can use in the learning process. Third, (Cahyani & Sritresna, 2023): Reasoning Ability Student Mathematics in Solving Story Problems. The results of this research are: 1) Students with abilities reasoning high in solving story problems, namely S-2 and S-3, can fulfill four indicator reasoning. Meanwhile, S-1 can fulfill its three indicator reasoning. 2) Students with abilities reasoning While completing the story questions, he fulfilled two indicators of reasoning, namely S-4. 3) Students with low abilities in reasoning in solving story problems can only fulfill one indicator of reasoning, namely S-5 and S-6. Fourth, (Khusnul & Dwi, 2022) Reasoning Ability High School Students' Mathematics on Inequalities in Two Variables. Based on results analysis test ability reasoning mathematics and interviews obtained results amounting to 22.58% in the excellent category (7 students), 6.45% in the good category (2 students), 48.39% in the sufficient category (15 students), 16.13% in the poor category (5 students), and 6.45 % inferior category (2 students). So, complete readiness before the learning process and focusing on the learning material is essential for students to increase reasoning mathematics in students.

CONCLUSION

This study concludes that significant usage of social media learning media technology TikTok to reasoning mathematics in students' intermediate vocational school, with results this research can he said influence application to reasoning mathematics in students. Therefore, this learning media can be used in the learning process because it has been proven to increase the ability to reason with mathematical students in intermediate vocational schools.

REFERENCES

Ajir, M. (2022). *Pengembangan Video Pembelajaran Edukatif Berbasis TikTok Pada Materi Sistem Persamaan Linier Dua Variabel* [PhD Thesis, UIN Ar-Raniry Banda Aceh]. https://repository.ar-raniry.ac.id/id/eprint/25695/

Amelia, N. P., & Ma'arif, S. (2022). Pengaruh Pengguna Media Sosial Tiktok Terhadap Kemampuan Numerasi Matematika Siswa Kelas IV Di SD. *Jurnal Cakrawala Pendas*, *8*(4), 1201–1207.

Cahyani, N. D., & Sritresna, T. (2023). Kemampuan penalaran matematis siswa dalam menyelesaikan soal cerita. *Jurnal Inovasi Pembelajaran Matematika: PowerMathEdu*, *2*(1), 103–112.

Devi, A. A. (2021). Pemanfaatan Aplikasi Tik Tok Sebagai Media Pembelajaran. *Jurnal Teknologi Pendidikan*, *1*(1), 1–5.

Dini, D. C. (2021). *Dampak Penggunaan Aplikasi Tik Tok dalam Interaksi Sosial (Study Kasus di SMA Negeri 11 Teluk Betung Timur Bandar Lampung)* [PhD Thesis, UIN RADEN INTAN LAMPUNG]. http://repository.radenintan.ac.id/13179/

Farida, A., Kasiyun, S., Ghufron, S., & Djazilan, M. S. (2022). Pengaruh Model Pembelajaran Analogi Terhadap Keterampilan Berpikir Kritis pada Mapel Bahasa Indonesia Siswa Sekolah Dasar. *Jurnal Basicedu*, *6*(2), 2922–2930.

Firamadhina, F. I. R., & Krisnani, H. (2020). Perilaku generasi Z terhadap penggunaan media sosial TikTok: TikTok sebagai media edukasi dan aktivisme. *Share: Social Work Journal*, *10*(2), 199–208.

Hasanah, U., Pujiastuti, H., Sultan, U., & Tirtayasa, A. (2022). Persepsi Siswa Sekolah Menengah Atas Mengenai Konten Edukasi Pembelajaran Matematika pada Aplikasi TikTok. *Jurnal Penelitian Matematika Dan Pendidikan Matematika*, *5*, 30–39.

Hasil wawancara tentang proses pembelajaran matematika dengan salah satu guru matematika di SMKN 3 Metro. (2023, pada tanggal Oktober). [Wawancara dilakukan melalui aplikasi WhatsApp].

Indriani, N., Auliya, D. R., Chafsoh, N. P., Pratiwi, N. O. D., & Zahroh, T. L. (2023). PENGARUH MEDIA TIKTOK TERHADAP DAYA TARIK PESERTA DIDIK DALAM PEMBELAJARAN MATEMATIKA DI SEKOLAH DASAR. *Khazanah Pendidikan*, *17*(2), 278–285.

Irianto, S., & Al-Amin, A.-A. (2021). Analisis pengaruh Aplikasi Tiktok Terhadap Peningkatan Pembelajaran Bahasa Inggris Pada Siswa. *Innovative: Journal Of Social Science Research*, *1*(1), 42–48.

Izzah, K. H., & Azizah, M. (2019). Analisis kemampuan penalaran siswa dalam pemecahan masalah matematika siswa kelas IV. *Indonesian Journal of Educational Research and Review*, 210–218.

Khusnul, D. R., & Dwi, A. (2022). Kemampuan Penalaran Matematis Siswa SMA pada Materi Pertidaksamaan Dua Variabel. *Plusminus: Jurnal Pendidikan Matematika*, *2*(2), 187–200.

Malina, I., Yuliani, H., & Syar, N. I. (2021). Analisis kebutuhan e-modul fisika sebagai bahan ajar berbasis PBL di MA muslimat NU. *Silampari Jurnal Pendidikan Ilmu Fisika*, *3*(1), 70–80.

Mu'minah, I. H. (2021). Pemanfaatan media pembelajaran berbasis video sebagai alternatif dalam pembelajaran daring IPA pada masa pandemi covid-19. *Prosiding Penelitian Pendidikan Dan Pengabdian 2021*, *1*(1), 1197–1211.

Nadiyah, D. L. (2021). Pemanfaatan Aplikasi Tik Tok Sebagai Media Pembelajaran Akidah Akhlak Di MTS NU Banat Kudus. *Al-Riwayah: Jurnal Kependidikan*, *13*(2), 263–280.

Ningsih, W. F., & Hayati, I. R. (2020). Dampak Efikasi Diri Terhadap Proses & Hasil Belajar Matematika (The Impact Of Self-Efficacy On Mathematics Learning Processes and Outcomes). *Journal on Teacher Education*, *1*(2), 26–32.

Novalia, N., Balqis, A., & Ramadhana, A. (2021). Pemanfaatan Aplikasi Tiktok sebagai Media Promosi untuk Meningkatkan Brand Awareness (Studi Kasus pada PT. ES Teh Indonesia). *Jurnal Akrab Juara*, *6*(4), 84–98.

Rahma, F. I. (2019). Media Pembelajaran (kajian terhadap langkah-langkah pemilihan media dan implementasinya dalam pembelajaran bagi anak Sekolah Dasar). *Pancawahana: Jurnal Studi Islam*, *14*(2), 87–99.

Santosa, F. H., Negara, H. R. P., & Bahri, S. (2020). Efektivitas pembelajaran google classroom terhadap kemampuan penalaran matematis siswa. *Jurnal Pemikiran Dan Penelitian Pendidikan Matematika (JP3M)*, *3*(1), 62–70.

Shaleha, R., & Shalihah, A. (2021). Analisis Kesiapan Siswa Filial Dambung Raya Dalam Mengikuti Analisis Nasional Berbasis Komputer di SMAN 1 Bintang Ara Kabupaten Tabalong. *Joel: Journal of Educational and Language Research*, *1*(3), 221–234.

Sholiha, T. A., Kurniati, N., Tyaningsih, R. Y., & Prayitno, S. (2022). Pengaruh Self-Regulated Learning (SRL) terhadap Hasil Belajar Matematika Siswa Kelas XI SMAN 1 Masbagik. *Jurnal Ilmiah Profesi Pendidikan*, *7*(3), 1355–1362.

Tampubolon, R. A., Sumarni, W., & Utomo, U. (2021). Pengaruh Pembelajaran Daring dan Motivasi Belajar terhadap Hasil Belajar Siswa di Sekolah Dasar. *Jurnal Basicedu*, *5*(5), 3125–3133.

Teresia, W. (2021). *Asesmen Nasional 2021*. Guepedia.