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Development Of Numeracy Literacy Through Learning Video On Tiktok Media

Putri Maisyarah Ammy[1], Ananda Puspita[2], Zainal Azis[3]
[1,2,3]*Muhammadiyah University of North Sumatra, Indonesia*
E-mail correspondence: putrimaisyarah@umsu.ac.id
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Abstract

Numeracy literacy skills in Indonesia are still low, as seen in the results of observations at SMK Negeri 6 Medan, only 20% of students were able to understand numeracy-based material quickly, while 80% of students found it easier to master non-numeracy material. Students also have difficulty translating story problems into numbers and formulas. On the other hand, the use of social media, especially TikTok, has become a popular activity for students. This study aims to develop numeracy literacy-based learning videos through TikTok as an innovative media. The development model used in this study is R&D (Research and Development). This study involved 33 respondents consisting of 3 validators (2 lecturers and 1 teacher), and 30 students. The results showed that the use of TikTok as a learning platform can increase students' motivation and understanding of numeracy literacy, because the video format is interactive and interesting. Educational content on TikTok also allows for wider reach and is relevant to students' digital habits. The trial of students' understanding of learning concepts before and after the application of learning videos on TikTok media increased, namely from 45% to 81% and students' interest in learning videos on TikTok media was 80.9%. The development of numeracy literacy based on learning videos on TikTok media has received input from validators and mathematics educators with the category "very valid".
Keywords: *Numeracy Literacy; Learning Videos; TikTok Media*

1. Introduction

Education in the 21st-century is an intellectual battleground reflecting a profound transition from traditional educational paradigms to models more dynamic and responsive to future needs (Mansyur & Dkk, 2024). So that the development of the 21st-century world is marked by the use of information and communication technology in all aspects of life, including in the learning process (Hadiyastama et al., 2022). Education development in the modern era also demands innovation and change in the learning process. Education is inseparable from innovation, both are interrelated. Educational innovation can be interpreted as something new for a person or group of people who aim to achieve certain goals or solve problems (Ambarwati et al., 2022).

Therefore, every individual is expected to be able to equip themselves with skills in facing the intellectual era. Numeracy literacy is one of the basic literacies that must be mastered by students. In this case, numeracy literacy is a major concern, especially in the field of education, and is a competency that is tested on students through the Minimum Competency Assessment (AKM). AKM is a basic competency assessment that is tested on students which is used to measure students' reasoning abilities when faced with problems that require literacy and numeracy skills, namely problems that require basic knowledge of mathematics in their solution. (Hidayah et al., 2021)

Numeracy literacy plays an important role in everyday life. The strategy for developing numeracy literacy skills plays a role in the approach to learning mathematics, namely by utilizing contexts that are closely related to students' daily experiences, and always linking them to various mathematical topics in the real world, then focusing on understanding concepts and reasoning in context, not just on skills in counting or computing (Inayah et al., 2022). Numeracy literacy is related to students' ability to understand and use mathematical concepts in everyday life. Numeracy literacy is one of the skills that is very necessary to adapt and be able to follow the development of science and technology. Therefore, numeracy literacy is fundamental for students to be able to participate in society and achieve their goals in learning, work, and daily life. (Izzatin et al., 2022)

Numeracy literacy is the knowledge and skills to (a) be able to obtain, interpret, use, and communicate various kinds of numbers and mathematical symbols to solve practical problems in various contexts of everyday life; (b) be able to analyze information displayed in various forms (graphs, tables, charts, etc.) to make decisions (Atmazaki et al., 2017). The benefits of studying and improving numeracy literacy skills for students include having the knowledge and skills to carry out planning and good activity management, being able to apply calculations and interpretations to data found in everyday life, and being able to make the right decisions in every aspect of life (Wahyuningsih, 2021).

Meanwhile, according to Atmazaki et al., (2017), numeracy literacy is the knowledge and skills to use various numbers and symbols related to basic mathematics to solve problems practically in various contexts of everyday life and can analyze information displayed in various forms such as tables, graphs, charts, diagrams, and so on. In addition, it can utilize the interpretation of the results of the analysis to predict as well as draw conclusions and make decisions on a particular context.

The crisis of numeracy literacy culture is one of the tasks for the world of education. The culture of numeracy literacy in schools which should be part of students' self-development has not been fully cultivated. This can be seen when during recess at school, most students prefer to go to the canteen or play with smartphones to spend their break time rather than going to the library to read books. Therefore, efforts to foster a culture of numeracy literacy in students must continue to be carried out so that it becomes a habit, because the culture of numeracy literacy is not just an academic skill, but is an important foundation that forms success in everyday life. (Damanik et al., 2023)

However, the low level of numeracy literacy in Indonesia is indeed very worrying. The results of the 2022 PISA (Programme for International Student Assessment) survey which measured numeracy literacy in 15-year-old students showed a decline in learning outcomes internationally due to the pandemic (Kementerian Pendidikan, Kebudayaan, Riset, 2023). Over the most recent period (2018 to 2022), the gap between the highest-scoring students (10% with the highest scores) and the weakest students (10% with the lowest scores) narrowed in mathematics, while it did not change significantly in reading and science. In mathematics, high-achievers became weaker, while performance did not change significantly amongst low-achievers (OECD, 2023).

Teachers are the spearhead in implementing learning. Teachers seem monotonous in delivering learning in the classroom, only using lecture methods, taking notes, and doing assignments that are considered very inappropriate for 21st-century students (Hadiyastama et al., 2022). The main key to the rapid progress of education is the ability of teachers to process and innovate every learning process they teach. Teachers are expected to continue to strive to correct and update their skills at all times. (Effendi & Wahidy, 2019)

One thing that can help smooth the learning process is learning media. Because teachers are not enough to just use oral explanations, but also need to utilize learning media to deliver material effectively. Therefore, as much as possible, teachers must be able to create teaching material media that is by the material that will be taught to students. Where learning media is a tool to make facts, concepts, principles, and procedures appear more real or concrete. (Ammy & Maryanti, 2023)

In the current digital era and technological disruption, learning methods must be able to motivate and attract students' interest in learning. One of them is visual media, because visual media can help in the process of transmitting knowledge from teachers to students or vice versa and the use of media inventively can accelerate and improve learning so that learning objectives are achieved (Kunrade et al., 2023).

Based on the results of observations at SMK Negeri 6 Medan, it was seen that only about 20% of students out of 30 students could understand the material related to numeracy literacy well, while 80% of students found it easier to understand non-numeracy material. Students' difficulties were seen

in translating story problems and placing numbers, as well as formulas in the right context. Meanwhile, students seemed more interested in using smartphones and actively watching videos on platforms such as TikTok during break time.

Seeing the habits of students who like to watch videos on TikTok, researchers came up with the idea of utilizing this platform as a learning media. With this approach, it is hoped that numeracy literacy can be presented in the form of interesting videos, so that it is easier for students to understand. TikTok, as one of the most popular applications in the world, has the potential to be an effective media for conveying educational messages to young people.

One of the visual learning is short videos on TikTok. This application is not only used as a means of entertainment, but is also used as a learning media. In the increasingly advanced digital era, technology has become an integral part of everyday life, including in the world of education. This application allows its users to create and share short videos with various themes, including education. TikTok not only functions as a means of entertainment, but has also begun to be used as an innovative learning media. (Pebrimireni & Fauziya, 2024)

TikTok is a social networking application and music video platform from China that was launched in September 2016. The application is used by its users to create short music videos. Judging from TikTok's active users of 625 million, TikTok has become a fast and interesting means of providing information today. The application provides users with access to participate, share, and create their own interesting content. (Rahmana et al., 2022)

TikTok has become one of the most prominent social media platforms: according to Brooks (2021), by December 2021 it had already surpassed popular applications such as Google and Facebook, thus becoming the most visited website in 2021. TikTok is based on the creation of short videos whose duration varies between fifteen seconds and one minute. In addition, TikTok offers its users a quick way to share a wide variety of creative content, as these short videos cover very different areas, ranging from dancing and cooking to comedy. (Yélamos-Guerra et al., 2022)

TikTok allows users to create and share creative and informative educational videos. This platform has become a popular culture among the younger generation in Indonesia. According to Hasiholan et al., (2020), TikTok is a means of communication and message delivery for young people, including in learning activities. With easily accessible features, TikTok has the potential to be an effective media to improve students' numeracy literacy.

Students' difficulties in translating story problems and placing numbers, as well as formulas in the right context, which makes students' numeracy literacy still low and students' lack of interest in watching short videos on TikTok during break time, which makes researchers interested in conducting research entitled "Development of Numeracy Literacy Based on Learning Videos on TikTok Media". With the aim of increasing students' numeracy literacy and students also becoming interested in watching short videos on TikTok related to learning, especially mathematics lessons.

2. Method

The research method used in this study is the research and development method which aims to develop learning media based on learning videos based on TikTok media. Learning video based on TikTok developed in this study is expected to be a more effective and efficient alternative in supporting students' mathematics learning.

The method used in this study is the 4D model (Thiagarajan & Dkk, 1976), where this model consists of four stages, namely the Define, Design, Develop, and Disseminate stages. The first stage is to determine and define learning needs by analyzing the objectives and limitations of the material. The second stage is to design a TikTok-based learning video based on the results of the analysis. The third stage is to develop learning video based on tiktok and validate it to assess its feasibility. The validation process uses a rating scale of 1 (not good) to 4 (very good) to determine the feasibility of a TikTok-based learning video. The trial stage was carried out at SMK Negeri 6 Medan involving 30 grade XI SMK students. Two media experts and two material experts assessed TikTok media-based learning videos to ensure their suitability for validation.

Data collection uses feasibility analysis techniques, student responses, and student understanding of learning concepts. Feasibility is assessed using a validation sheet adapted to TikTok-based learning videos. Student responses are assessed through questionnaires distributed to students to measure student

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understanding of numeracy literacy and learning concepts. The last fourth stage is dissemination, but the researcher only did it up to the third stage because the fourth stage requires a longer process and time.

To analyze quantitative data from the questionnaire used by the validator and student questionnaires related to TikTok media-based learning videos are as follows:

2.1 Media and Material Validation Analysis

Data analysis used for media and material validation uses the following percentage formula:

$$Result = \frac{Total\ score\ obtained}{Maximum\ score} x\ 100\%$$

Table 1 Percentage of Media and Material Validation

Percentage	Criteria
0% - 20%	Very Invalid
21% - 40%	Invalid
41% - 60%	Quite Valid
61% - 80%	Valid
81% - 100%	Very Valid

2.2 Student Response Analysis

To see the students' responses to the development of TikTok media-based learning videos are as follows:

$$Student\ Response = \frac{Number\ of\ students\ who\ answered}{Total\ number\ of\ students} x\ 100\%$$

Table 2 Percentage of Student Responses

Percentage	Criteria
>80%	Very Good
66% - 80%	Good
56% - 65%	Quite Good
<65%	Not Good

2.3 Analysis of Students' Understanding of Learning Concepts

Analysis of students' understanding of learning concepts was obtained from the results of observation sheets for students before the implementation of TikTok media-based learning videos and after the implementation of TikTok media-based learning videos during learning activities.

$$\sum \frac{Overall\ score}{Maximum\ score} x\ 100\%$$

Table 3 Percentage of Student Learning Concept Understanding

Percentage	Criteria
75% - 100%	Very High
50% - 74,99%	High
25% - 49,99%	Medium
0% - 24,99%	Low

3. Results and Discussion

The problem formulation of this research is how to develop numeracy literacy learning media based on learning videos based on TikTok media and how to build numeracy literacy in students.

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Meanwhile, the aim of the study is that students can apply numeracy literacy in everyday life by learning videos that use TikTok media and improve students' numeracy literacy. The process of developing learning videos on TikTok media to see students' numeracy literacy in mathematics learning is carried out in several stages as follows:

3.1 Definition Stage

This stage is carried out to determine and define what is needed in the development process, one of which is by identifying the problems faced by students at school from the data collected through observation and interviews with mathematics teachers at the school, several problems were found, including low student numeracy literacy and students are more interested in watching videos than reading books. Seeing the problems found in schools, the researcher researched how to develop student numeracy literacy using TikTok media-based learning videos. The researcher gave a questionnaire to see students' interest in reading or watching videos. The questionnaire was given before the implementation of the learning video media to find out how many students like to read books, like to read books a little, don't like to read books, like to watch videos, like to watch videos a little, and don't like to watch videos.

Table 4 Student Interest Questionnaire Results

No	Indikator	Percentage
1.	Students who like to read books	15%
2.	Students who do not like to read books	2%
3.	Students who like to read books a little	33%
4.	Students who like to watch videos	37%
5.	Students who do not like to watch videos	0%
6.	Students who like to watch videos a little	13%

Based on the table above, before the implementation of learning videos, students liked to watch videos with 37% and those who liked to read books were only 15%. So it seems that students prefer to watch videos than read books during recess. After the implementation of learning videos based on TikTok media, students gave a very good response to learning media in the form of learning videos based on TikTok media.

3.2 Design Stage

In the process of designing learning video media, several things must be done, including:

- First: Objective specification, namely the preparation of tests where the test is designed to measure the level of understanding and achievement of learning objectives. The understanding achieved is the understanding of concepts and students' numeracy literacy.
- Second: Selection of media, namely choosing the learning media that best suits the learning material and students' needs, where the media used in this study is TikTok media.
- Third: Selection of format, namely determining the format of the learning media to be used, for example, the percentage of slides, learning videos, interactive games, and so on. Researchers use learning videos in selecting formats using the Canva application (creating slide percentages), Google and Pinterest (looking for image references), and Kinemaster (editing videos).
- Fourth: Design, which is carried out starting by determining the concept and material that will be used in the learning video, and then looking for animated images that will be used. Then record the sound as audio that will be combined with the learning video and finally edit by combining images, sound, and other supporting features, so that it becomes a learning video.
- Fifth: Conduct trials and evaluations to ensure that the learning video media functions well and effectively before showing it to students.

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Picture 1 Learning Video Views

3.3 Development Stage

The development of this learning video involves several activities to create valid and effective learning tools, including determining the feasibility of the product by creating an assessment instrument in the form of a questionnaire that will be given to experts and students. Where the experts validate the media and materials in the learning video, here are the results of the media and material validation, along with suggestions from the validators:

Table 5 Media and Material Validator Results

No	Validator Name	Description	Validator Type	Percentage	Criteria
1.	Indra Maryanti	Lecture	Media	83,33%	Very Valid
2.	Dr. Lilik Hidayat, M.Pd	Lecture	Material	88,46%	Very Valid
3.	Siti Zubaidah, M.Pd	Teacher	Media	80,76%	Very Valid
			Material	80,00%	Valid

Table 6 Validator Suggestion Results

Validator Name	Before Revision	After Revision
Indra Maryanti	The sound in the video is intermittent or unstable	Fixed by improving the audio quality on the video
Siti Zubaidah	The video is not finished or cut off and there are less images appearing in the video	Fixed by checking video duration deficiencies and adding images

After being validated by experts, a field trial can be conducted, namely by implementing learning videos in mathematics learning and viewing before and after the implementation of video development and the results are very high compared to the previous moderate ones.

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Table 7 Trial Results Before and After Implementation of TikTok Media Learning Videos

No	Research result	Percentage	Criteria
1.	Trial of students' understanding of learning concepts before implementing learning videos on TikTok media	45,00%	Medium
2.	Trial of students' understanding of learning concepts after implementing learning videos on TikTok media	81,00%	Very High

Based on the data above, it can be concluded that the results of increasing students' numeracy literacy based on learning videos on TikTok media can be said to be successful, because students' understanding of learning concepts in mathematics learning with learning videos on TikTok media has increased, namely from 45% to 81%.

Table 8 Results of Student Response Analysis

Rated aspect																									
No	Skills						Presentation of Material													Benefit						Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
1.	3	3	3	2	2	3	3	4	4	3	3	2	3	3	3	3	3	3	3	3	4	4	3	3	4	77
2.	4	4	3	4	3	3	4	4	4	3	3	3	4	3	3	3	3	3	4	3	4	3	3	3	3	84
3.	3	3	3	3	3	3	3	3	3	3	2	3	4	3	3	3	4	2	3	3	4	4	4	3	3	78
4.	4	4	4	4	4	4	4	4	3	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	3	97
5.	4	4	3	3	3	3	3	4	3	2	3	4	3	3	3	3	3	3	3	3	3	3	3	3	3	78
6.	4	4	3	4	3	3	3	3	4	3	4	3	4	4	4	3	3	3	3	3	3	2	3	3	3	82
7.	4	3	3	3	3	3	4	4	4	4	4	4	3	3	3	3	3	3	3	3	4	3	3	4	4	85
8.	3	3	3	3	3	3	3	3	3	2	2	3	3	2	2	3	3	2	2	4	3	3	3	2	3	69
9.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	74
10.	4	4	4	4	4	4	4	3	3	4	4	4	3	4	4	4	3	4	4	4	4	4	4	4	3	95
11.	4	3	3	3	4	3	3	2	2	3	3	3	3	3	3	3	2	3	3	3	3	3	3	2	3	73
12.	4	4	4	4	4	4	4	4	4	3	4	4	4	4	3	4	3	3	3	3	4	2	3	3	2	88
13.	3	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	3	2	3	3	3	3	3	75
14.	4	4	4	4	4	4	4	4	3	2	4	3	3	3	3	4	3	3	3	3	4	4	3	3	3	86
15.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	75
16.	3	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	76
17.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	74
18.	3	4	3	3	3	3	4	3	3	4	3	3	3	3	3	3	3	3	3	3	4	3	1	3	4	78
19.	4	4	4	4	3	3	3	3	3	3	3	3	3	3	4	3	3	3	3	3	3	3	3	3	3	80
20.	3	3	3	2	3	3	3	3	4	2	3	2	3	3	3	3	3	4	4	2	3	3	3	4	3	75
21.	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	74
22.	3	3	4	3	3	3	3	4	2	4	3	3	4	3	2	4	3	3	3	4	3	4	3	3	4	81
23.	3	3	3	3	4	4	3	3	2	2	3	4	3	4	4	3	3	4	4	4	4	3	3	2	4	82
24.	4	4	3	4	3	4	4	3	4	3	3	4	4	3	4	3	4	4	4	3	4	4	4	3	4	91
25.	3	3	2	4	4	4	3	3	4	3	3	4	4	3	3	3	4	3	3	3	3	3	4	3	3	82
26.	4	4	4	3	4	4	3	4	4	3	3	4	4	3	4	3	3	3	4	3	4	4	4	3	3	89
27.	4	4	4	4	4	4	4	4	3	4	3	3	3	3	3	3	3	3	3	3	3	2	3	3	4	84
28.	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	3	80
29.	4	3	4	4	3	4	4	4	4	4	3	4	4	4	4	3	4	2	2	3	3	4	2	3	4	87
30.	3	3	3	3	3	3	3	3	3	3	3	3	4	3	4	3	4	3	3	3	3	3	3	3	3	78
	105	103	99	100	99	101	101	101	97	94	94	98	101	95	97	95	95	92	95	92	102	95	92	90	94	2427
Average																										80,90%
Criteria																										Very Good

Based on the data above, it can be concluded that student responses to all aspects of learning media (skills, presentation of material, and benefits) reached a very good level of satisfaction, namely 80.90%.

At present, not all learning delivered using technology can be delivered in its entirety, so it is necessary to strengthen numeracy literacy to support the learning process because the level of numeracy literacy in Indonesia is still very low and is a challenge that must be faced in the world of education. Therefore, according to Darwanto et al., (2021) strengthening numeracy literacy and technology adaptation are important efforts to improve the quality of human resources in the digital era and the era of disruption by integrating numeracy literacy and technology activities in learning, both at school and at home.

Numeracy literacy skills in students must continue to be improved and developed again, because these skills are basic skills that students must have to be able to help them understand concepts in lessons more easily, both mathematics and other lessons. In line with Inayah et al., (2022) who stated the importance of numeracy literacy skills in developing the ability to understand concepts in mathematics learning.

Furthermore, the development of technology that produces various digital learning media has a great influence on learning as a means of communication used by teachers to convey material to

students. However, sometimes teachers are confused in determining and using learning media and in the end teachers return to using monotonous learning media (Atsani, 2020). The results of this study are in line with other studies which state that one of the learning media that is an alternative and interactive in online learning is TikTok social media where the use of TikTok media as a learning media can increase student activity and creativity in the online learning process (Ramdani et al., 2021).

Likewise, according to Pebrimireni & Fauziya (2024) who stated that the use of the TikTok application as a medium for learning Indonesian has been proven to have a significant positive impact on student learning motivation. Integrating TikTok into the learning process can increase students' interest and motivation to learn through an interesting and interactive short video format. This media can be an effective solution in increasing students' enthusiasm for learning because it is adjusted to their habits and preferences in consuming digital content. The use of the TikTok application is very popular with students, the types of TikTok content that are often viewed by students, and its use as a learning or educational medium for students or generation Z (Rahmana et al., 2022). Using the TikTok application with the use of the right methods and techniques can be used as an interactive learning media for learning. With its diverse features and ease of operation, the use of the TikTok application can be implemented in learning. (Taubah, 2020)

Due to the still low interest in numeracy literacy among generation Z, researchers provide one solution so that students are able to understand the concept of numeracy literacy through learning videos using the TikTok application as a modern and innovative learning media.

4. Conclusion

This study concluded that students' interest in videos (37%) was higher than reading books (15%), indicating low interest in numeracy literacy. Concept understanding before using videos was in the "Medium" category (45%), and increased to "Very High" (81%) after its implementation, with an increase in effectiveness of 36%. This shows that the development of video-based numeracy literacy on TikTok can improve students' understanding of linear equation systems.

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