

# The Influence of Whiteboard Animation Media on the Creative Thinking Abilities of Sixth-Grade Mathematics Learning

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**Abstract.** The importance of creative thinking skills is that students can have understanding or ideas to find new solutions to the problems they face every day. This Literature Review is motivated by improving elementary school students' creative thinking abilities in mathematics learning. This Literature Review aims to improve elementary school students' creative thinking skills in mathematics through whiteboard animation learning media. Whiteboard animation learning media develops animation-based micro video learning media that presents presentations with picture illustrations on a white background. The initial stages of creating whiteboard animation media are determining the material, designing slides, adding animation elements, recording sound explaining the material, and inserting recorded sound into each slide of the required material. Using whiteboard animation learning media, you can create new ideas, overcome mental obstacles, change your approach to a problem, describe a particular object, and have ideas that emerge through the student's thinking rather than taking ideas from others.

**Keywords:** Creative Thinking, Whiteboard Animation, Elementary School, Mathematics Learning.

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## INTRODUCTION

21st century learning requires people to have the ability to think creatively (Maskur et al., 2020). Creative thinking skills are needed in the 21st century because creative thinking skills can help students face world changes (Suherman & Vid'akovich, 2022). In the 21st century, various technologies have emerged, and the ability to think creatively is needed to solve everyday problems analyze and summarize previous knowledge (Hu et al., 2017). Thinking creatively is needed during learning to solve problems or questions the teacher presents. Apart from that, the ability to think creatively is also needed in society, especially in the world of work. Creative thinking generates solutions to non-routine, open-ended mathematical problems (Muthaharah et al., 2018). Creative thinking is also critical for students to apply during mathematics learning to solve mathematical problems or generate new ideas (Suherman & Vid'akovich, 2022).

Mathematics cannot be separated from problems or questions more and more. More routine questions and open problems are presented in accompanying learning books. So, students need to master creative thinking skills to solve mathematical problems. Thinking creatively and mathematically can help students devise various solutions to one problem. Mathematics cannot be separated from problems or questions. More and more non-routine questions and open problems are presented in accompanying learning books. So, students need to master creative thinking skills to solve mathematical problems. Thinking creatively and mathematically can help students devise various solutions to one problem. The ability to think creatively is not only limited to remembering and conveying known information; in other words, the ability to think creatively is included in the ability to think at a higher level (Arifah & Asikin, 2018). Each student has different creative thinking abilities. Students classified as creative will be able to come up with several different solutions to a problem, while pretty creative students will only be able to present one correct answer in the usually used way. For students with problem-solving abilities, low problems are classified as not creative (Herdani & Ratu, 2018).

Creative thinking is essential because it can help someone see problems from different points of view and create more innovative solutions; considering various possibilities and

different ideas, someone can find better and more effective solutions (Ajeng et al., 2017). However, elementary school students' creative thinking abilities are still low. The impact when creative thinking abilities are low is on people with high levels of expertise. This person will not produce creative work without creative thinking abilities (Marasabessy, 2021). Therefore, teachers must take action early to anticipate this through various effective learning strategies. One effective learning strategy is to use learning media.

Learning media is one component that has an essential role in learning (Putri & Dewi, 2020). Learning media can indirectly influence students' enthusiasm and interest in participating in learning activities. It is hoped that students' interest and enthusiasm in the learning process can improve the quality of learning so that the results obtained are as expected. There are several types of learning media, for example, comics, animation, visuals, and so on (Musfiroh, 2018). Learning animation media is audio-visual media, a collection of moving images and sounds containing learning material displayed via projector electronic media to create active and fun learning (Hambali et al., 2020). Increasing student creativity during the learning process can be carried out by using whiteboard animation learning media.

The results of research conducted by (Sudiantini and Shinta, 2018) show the influence of animation media on creative thinking abilities in Cisalak Muhammadiyah Middle School students. The results of research conducted by (Andini, 2019) Conclude that the use of animation media can improve the creative thinking process of MAN 1 Nagan Raya students even though this research has shortcomings in allocating time, making the learning objectives less well implemented. The research was also carried out by (Rochmania and Restian, 2022), where the results concluded that using animated videos for fifth-grade elementary school students could improve students' creative thinking processes. So, the application of animation media in learning in elementary schools is reasonable, valid, and effective because it can improve students' creative thinking processes.

The novelty of the research that the researcher will carry out compared to previous research is the animation media used, the research time, and the agency level where the research is conducted. Based on the description above, the author is interested in researching "The Effect of Whiteboard Animation Media on the Creative Thinking Ability of Sixth-grade Students in Learning Mathematics." To find out whether the Whiteboard animation media affects the creative thinking abilities of sixth-grade students and whether there is an increase and achievement in the creative thinking abilities of sixth-grade students through the application of the Whiteboard animation media.

## **LITERATURE REVIEW**

### **Instructional Media**

The word media comes from the Latin *medius*, which means "middle," "intermediary," or "introduction." In Arabic, media is an intermediary or messenger from the sender to the message's recipient. So, media is a tool that conveys or delivers teaching messages (Arsyad, 2013). Learning media are tools that can help the teaching and learning process so that the message's meaning becomes more transparent and educational or learning objectives can be achieved effectively and efficiently (Nurrita, 2018). According to Dina Indriana, she explained that media is a handy tool for students and educators in the learning and teaching process (Sanjaya & Wina, 2011). So learning media is one method of overcoming all kinds of problems in teaching, not only solving problems but learning by providing various comprehensive information to students.

One of the many types of learning media is animated learning media. Currently, animation is often used as a learning medium. Animation is a moving image, usually in writing or moving images (Utami, 2011). Animated learning media is designed to be public for all groups to see by considering its advantages, which will later be posted to YouTube, social media, or the web (Schulz et al., 2020). The learning method using animation media aims to make it easier for teachers to teach and make it easier for students to understand the material. Animation media is also helpful for fighting student boredom in learning so that students remain active in participating in the learning process (Anggriani et al., 2020). Animation media, part of multimedia, contains sound, writing, and images that can move (Munandar et al., 2018). Animation media is designed to

improve student learning outcomes and stimulate students' audio and visual audio-visual content (Sulfiana, 2019). So animated learning media is learning media used in learning in the form of images or visuals whose function is to help make learning more enjoyable.

### Whiteboard Animation

Whiteboard Animation is one form of progress offered by technology in learning. With Whiteboard animation, students will get an accurate picture to make the student admission process more meaningful. Whiteboard animation is a communication medium created by the sender to the recipient of the sign through the symbols on the whiteboard animation. The presence of symbols such as words, sentences accompanied by images, and audio-visuals will help recipients of the sign easily understand what they want to order.sender (Najahah & Ulfah, 2020). Whiteboard Animation is an animated video that shows illustrative images accompanied by a narrative that guides learning through the plot told in the images (Taufiq et al., 2022). Whiteboard animation is a communication medium created through symbols such as words and sentences accompanied by images and audio-visuals that will help recipients of signs quickly (Musyadat, 2015). Whiteboard animation is a digital learning media that stimulates students' creative thinking abilities in learning (Pratiwi et al., 2019). Whiteboard animation has the characteristics of being able to present unique images, sounds, animations, writing, and models so that it can help students understand the subject matter.(Nurul & Hidayat, 2018).So Whiteboard animation is a digital animation media in the form of video that is used as a way to improve students' creative thinking abilities

The steps for making whiteboard animation are first determining the theme that will be developed in whiteboard animation media, then making a storyboard or content script for the content to be created, then entering the content and adding components that make the content attractive, then recording sound or adding background music so that animations are more lively. The last is to evaluate the content before using it in learning (Air et al., 2015). So, when making whiteboard animations, it cannot be done randomly but must follow the existing steps to maximize the results.

The advantages of Whiteboard Animation are that the media developed is more exciting and easy to apply in learning, this learning media can be used as a practical learning media, is practically effortless to carry anywhere, and can be accessed at any time, the media developed is also interesting because it is easier for students to understand, students can learn independently, can grow student memory, and be more efficient. The advantage of using whiteboard animation media in learning activities is that it can make it easier to explain lessons. This is because this software is assisted by computer animation, where the software provides animations according to our needs. Besides this, the whiteboard animation application has unique and exciting animations so that activities Learning becomes more fun and can be used as a more accessible and straightforward learning alternative. Apart from the advantages, there are also disadvantages to whiteboard animation, namely, having to have strong enough internet access when you want to watch the video online when the video size is reduced, the video resolution becomes poor, such as the image display being blurry or less clear (Pratiwi et al., 2019).

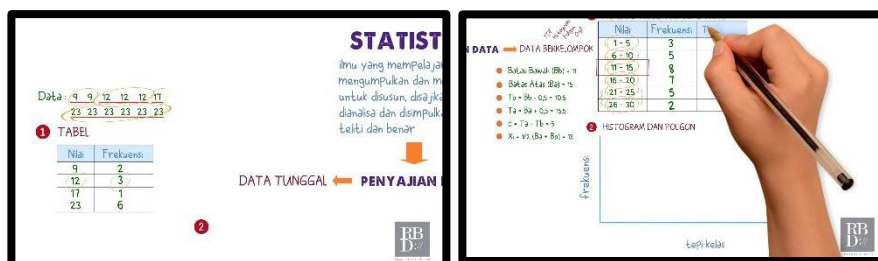


Figure 1. Chart of whiteboard animation media

## **Creative Thinking**

Creative thinking can produce quality thoughts. According to Opinion (Sani, 2014), creative thinking is the ability to develop unusual ideas that are high quality and appropriate to the task. Creative thinking is a process that involves elements of originality, fluency, flexibility, and elaboration. This shows that creative thinking can develop thinking power, including broad insight (Susanto, 2013). The ability to think creatively is an ability related to creativity, which can be interpreted as a way of thinking to change or develop a problem, seeing a situation or problem from a different side, and being open to various ideas and concepts, even those that are not common (Saputra, 2019). Based on the opinion that has been described, it can be concluded that creative thinking is a process that develops unusual ideas and produces new thoughts that have a broad scope. As stated, creative thinking benefits a person's life, such as adding new knowledge and creating solutions to solve problems (Johnson, 2018). The benefits of creative thinking are comprehensive, unlimited, and cannot be limited so that you can discover completely new things or renewable ideas/concepts. According to (Munandar, 2012). Creativity or inventiveness enables discoveries in science and technology and all other fields of human endeavor. So creativity is essential for every child because creative potential will always be needed in an environment that is constantly changing and competitive.

There are four components of creative thinking skills, namely fluency (the ability to think fluently), flexibility (the ability to think flexibly), originality (the ability to think original), and elaboration (the ability to detail) (Sholihah et al., 2022). Fluency is a student's ability to develop various ideas, answers, and solutions to problems or statements. Flexibility is a student's ability to come up with various ideas, solutions, or questions and change their approach by looking at problems from different angles. Elaboration is the ability to develop an idea, modify it, or describe an object, goal, or situation in detail. Originality is the ability to express personal ideas in response to a problem that must be solved. Indicators in creative thinking that are used as references for researchers (Susanto, 2013), namely, fluent skills, flexible skills, original skills, detailing skills, and evaluation skills. The indicators of preparation for implementing learning by utilizing the environment, according to (Uno & Nurdin, 2014), namely arranging learning materials, learning environment, choosing learning strategies, and choosing learning media. Based on the explanations above, it can be concluded that the indicators of creative thinking ability are divided into 4, namely fluency, flexibility, elaboration, and originality.

## **Mathematics Learning**

Mathematics is one of the subjects that play an essential role in education because it can be seen from the time spent in mathematics lessons at school more than other subjects. Moreover, the implementation of education is provided at all levels of education, from elementary school to college (Amir, 2016). Learning mathematics is one of the mandatory lessons in elementary school. In mathematics subjects, there are subject materials that are related to each other, and also as subjects that are related to other subjects in elementary school. This shows that mathematics is not just about learning how to count but can also be applied to other subjects (Anitra, 2021). Mathematics learning is a teaching and learning process built by teachers to develop students' creative thinking and can improve the ability to construct new knowledge to improve mastery of mathematical material (Susanto, 2016). Mathematics learning is a deliberate activity to modify various conditions to achieve goals through reasoning activities so that abstract and socio-cultural mathematical objects can be conveyed and mathematics learning objectives can be achieved (Sumardiyono, 2004). Mathematics learning in elementary school is a study that is always interesting to discuss because of the differences in characteristics, especially between the nature of children and the nature of mathematics (Karso, 2014). Mathematics subjects need to be given to all students starting from elementary school, intended to "equip students with the ability to think logically, analytically, systematically, critically and creatively as well as the ability to work together" (Soviawati, 2011).

According to (Yuliyanto et al., 2023), The objectives of learning mathematics include: 1. Understanding mathematical concepts, explaining the relationship between concepts, and applying concepts or algorithms in a flexible, accurate, efficient, and precise manner in solving

problems; 2. Using reasoning on patterns and properties, carrying out mathematical manipulations in making generalizations, compiling evidence, or explaining mathematical ideas and statements; 3. Solve problems; 4. Communicate ideas with symbols tables. Diagrams or other media to clarify situations or problems; and 5. Have an attitude of respect for the usefulness of mathematics in life, an attitude of curiosity, attention, and interest in studying mathematics, as well as a tenacious and confident attitude in solving problems.

## **DISCUSSION**

Creative thinking skills must be applied starting from early childhood, where the role of parents and educators is very determining. The role of parents is to guide and direct their children to carry out positive activities at home, while the role of teachers is to organize quality learning activities at school so that future generations have creative thinking skills through education (Sonjaya & Yuliyanto, 2022). Based on the quote above, it can be said that one of the teacher's duties is to provide learning that can stimulate students' creative thinking abilities. Four indicators of creative thinking ability are Fluency, Flexibility, elaboration, and originality. Fluency is a student's ability to develop various ideas, answers, and solutions to problems or statements. Flexibility is a student's ability to come up with various ideas, solutions, or questions and change their approach by looking at problems from different angles. Elaboration is the ability to develop an idea, modify it, or describe an object, goal, or situation in detail. Originality is the ability to express personal ideas in response to a problem that must be solved (Susanto, 2013).

Learning using whiteboard animation media is one learning strategy that can stimulate students' creative thinking abilities. The benefits of developing whiteboard animation media in learning are: 1. Providing innovation in education, especially in making learning media; 2. Teachers can use whiteboard animation media as a teaching medium that can be used anywhere and at any time and can facilitate students' critical and creative thinking skills according to learning strategy objectives; 3. Schools can use whiteboard animation media in learning as an alternative learning media in learning activities to obtain better quality education; 4. For the author, it can be used as a learning medium outside of the face-to-face learning process in class, such as creating network animations in server administration as material that is taught and immediately implemented during face-to-face learning (Ayu, 2018). Based on the benefits of whiteboard animation, it can be concluded that whiteboard animation media can be a tool for improving students' creative thinking abilities. The learning steps using whiteboard animation media are as follows: the teacher prepares the animation media that will be used and then displays an engaging animation about the material that will be used and studied. After that, evaluation activities are carried out to measure students' creative thinking abilities. After showing the material using animation media, it is hoped that students will be able to solve problems regarding the material fluently, flexibly, in detail, and original or be solved by the students themselves. The success factors for increasing creative thinking skills using whiteboard animation learning media are when students can solve problems correctly, find several solutions to problems, solve problems in a detailed way, and solve problems in their own way.

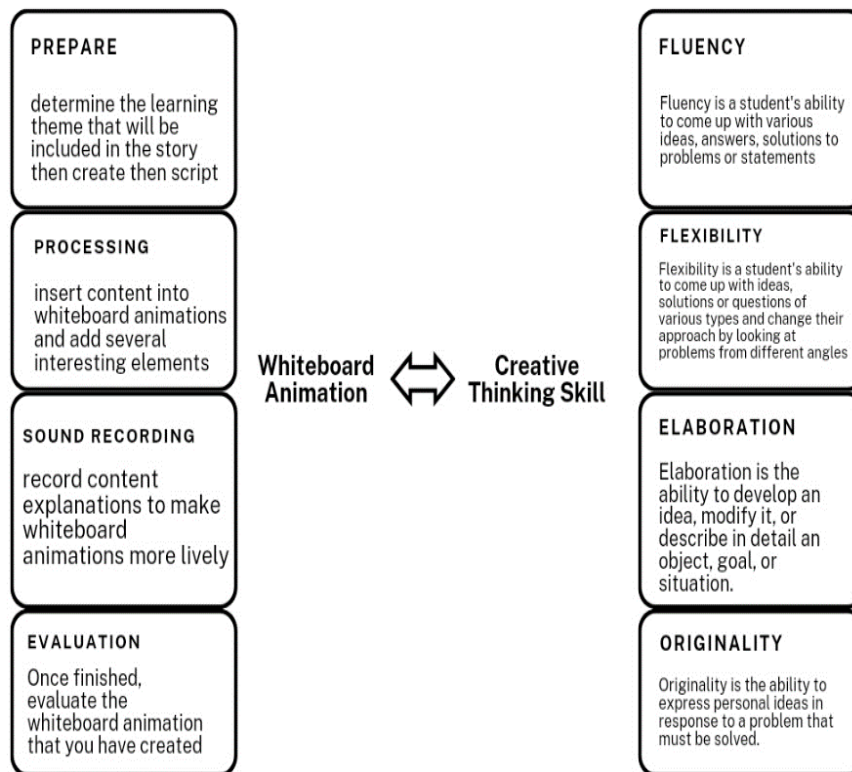


Figure 2. Chart of the influence of whiteboard animation media on creative thinking abilities

## CONCLUSION

The conclusion from this literature review is that the ability to think creatively is an ability that a person must have from elementary school. Creative and innovative learning is also needed to improve creative thinking abilities, especially in learning mathematics. Mathematics learning needs to be given to all students starting from elementary school, intended to equip students with the ability to think logically, analytically, systematically, critically, and creatively, as well as work. The same way to realize creative and innovative learning is to use animated learning media. Whiteboard animation is an animation medium that can make learning more creative. In animated learning media, various interesting elements can attract students' attention to learning mathematics.

## REFERENCES

- Air, J., Oakland, E., & Walters, C. (2015). *How To Design Your Whiteboard Animation Books* (F. Lindsay, Ed.). Sparkol Books. [www.sparkol.com/books](http://www.sparkol.com/books)
- Ajeng, N., Maftukhah, N., & Khomsun, I. (2017). Kemampuan Berpikir Kreatif dalam Pembelajaran Model Connecting Organizing Reflecting Extending Ditinjau dari Kecerdasan Emosional. In *JPE* (Vol. 6, Issue 3). <http://journal.unnes.ac.id/sju/index.php/jpe>
- Amir, A. (2016). Penggunaan Media Gambar dalam Pembelajaran Matematika. *Jurnal Eksakta*, 2(1), 34–40.
- Andini, A. (2019). *Pengaruh Media Animasi terhadap Keterampilan Berpikir Kritis Peserta Didik pada Materi Pengukuran*. [https://scholar.google.co.id/scholar?q=Pengaruh+Media+Animasi+terhadap+Keterampilan+Berpikir+Kritis+Peserta+Didik+pada+Materi+Pengukuran&hl=id&as\\_sdt=0&as\\_vis=1&oi=scholar](https://scholar.google.co.id/scholar?q=Pengaruh+Media+Animasi+terhadap+Keterampilan+Berpikir+Kritis+Peserta+Didik+pada+Materi+Pengukuran&hl=id&as_sdt=0&as_vis=1&oi=scholar)
- Anggriani, Y., Ahzan, S., Sukroyanti, B. A., Rina, B., Safitri, A., & Hidayat, S. (2020). Pengembangan Media Pembelajaran Berbasis Animasi Swish Max 4 Untuk Meningkatkan Kemampuan Berpikir Kreatif Siswa. In *Jurnal Ilmiah IKIP Mataram* (Vol. 7, Issue 1).

- Anitra, R. (2021). Pembelajaran Kooperatif Tipe Jigsaw dalam Pembelajaran Matematika di Sekolah Dasar. *Jurnal Pendidikan Dasar Indonesia*, 6(1), 8–12.
- Arifah, N., & Asikin, M. (2018). Kemampuan Berpikir Kreatif Matematis dalam Setting Pembelajaran Creative Problem Solving dengan Pendekatan Open-Ended. 6.
- Arsyad, A. (2013). *Media Pembelajaran*. PT Raja Grafindo Persada.
- Ayu, F. G. (2018). Pengembangan Media Pembelajaran Menggunakan White Board Animation Pada Mata Pelajaran Administrasi Server Kelas Xi Smk Negeri 1 Solok. *Jurnal Ilmiah Ilmu Pendidikan Dan Ilmu Teknik*, 4.
- Hambali, S., Akib, E., Sitti, D., & Azis, A. (2020). Pengaruh Media Animasi Terhadap Menulis Cerita Murid Kelas V SD Se-Kota Makassar. *Jurnal Ilmiah Indonesia*, 5(6).
- Herdani, P. D., & Ratu, N. (2018). Analisis Tingkat Kemampuan Berpikir Kreatif Matematis Siswa SMP Dalam Menyelesaikan Open-Ended Problem Pada Materi Bangun Datar Segi Empat. *JTAM (Jurnal Teori Dan Aplikasi Matematika)*, 2(1).
- Hu, R., Xiouhui, S., & Shieh, C. J. (2017). A Study on the Application of Creative Problem Solving Teaching to Statistics Teaching. *Eurasia Journal of Mathematics, Science and Technology Education*. <https://doi.org/10.12973/eurasia.2017.00708a>
- Johnson, J. (2018). *The Way of Thinking: Tingkatkan Cara Berpikir agar Lebih Kreatif, Rasional, dan Kritis*. PT Alex Media Komputindo.
- Karso, H. (2014). *Pembelajaran Matematika di SD*.
- Marasabessy. (2021). *Kreativitas dan Pembangunan Ekonomi Umat*. CV. Absolute Media.
- Maskur, R., Sumarno, Rahmawati, Y., Pradana, K., Syazali, M., Septian, A., & Palupi, E. K. (2020). The Effectiveness of Problem-Based Learning and Aptitude Treatment Interaction in Improving Mathematical Creative Thinking Skills on Curriculum 2013. *European Journal of Educational Research*, 375–383.
- Munandar. (2012). *Pengembangan Kreativitas Anak Berbakat*. Rineka Cipta.
- Munandar, H., Sutrio, & Taufik, M. (2018). Pengaruh Model Pembelajaran Berbasis Masalah Berbantuan Media Animasi Terhadap Kemampuan Berpikir Kritis Dan Hasil Belajar Fisika Siswa Sman 5 Mataram Tahun Ajaran 2016/2017. *Jurnal Pendidikan Fisika Dan Teknologi*.
- Musfiroh, D. (2018). Pengaruh Penggunaan Media Komik Terhadap Keterampilan Bercerita Siswa Kelas V Sd Negeri Sinduadi 1.
- Musyadat, I. (2015). *Pengembangan Media Pembelajaran Berbasis Video Scribe untuk Peningkatan Mata Pelajaran Sosiologi kelas X Man Bangil*.
- Najahah, N., & Ulfah, U. N. R. (2020). Inovasi Pengembangan Materi Pelajaran Bahasa Asing Tingkat Madrasah Tsanawiyah Berbasis Whiteboard Animation. *Al'adalah*, 23(2), 163–177. <https://doi.org/10.35719/aladalah.v23i2.34>
- Nurrita, T. (2018). Pengembangan Media Pembelajaran Untuk Meningkatkan Hasil Belajar Siswa. *Jurnal Misyk184at*, 3(1), 171.
- Nurul, A., & Hidayat, B. (2018). Pengembangan Media Pembelajaran Berbasis Videoscribe pada Materi Sejarah Kerajaan Islam di Sumatra dan Akulturasi Kelas X SMA Muhammadiyah 1 Metro. *Jurnal Swarnadwipa*, 2(3).
- Pratiwi, E. D., Latifah, S., & Mustari, M. (2019). Development of Physical Learning Media using Videoscribe Sparkol. *Indonesian Journal of Science and Mathematics Education*, 2(3), 303–309.
- Putri, L. A., & Dewi, S. (2020). Media Pembelajaran Menggunakan Video Atraktif pada Materi Garis Singgung Lingkaran. *MATHEMA JOURNAL E-ISSN*, 2(1).
- Rochmania, D. D., & Restian, A. (2022). Pengaruh Penggunaan Media Belajar Video Animasi Terhadap Proses Berfikir Kreatif Siswa Sekolah Dasar. *Jurnal Basicedu*, 6(3), 3435–3444. <https://doi.org/10.31004/basicedu.v6i3.2578>
- Sani, S. (2014). *Pembelajaran Sainifik untuk Implementasi Kurikulum*. Jakarta: Bumi Aksara.
- Sanjaya, & Wina. (2011). *Strategi Pembelajaran Berorientasi Standar Proses Pendidikan*. Penerbit Kencana Prenada Media Group.
- Saputra, H. (2019). *Kemampuan Berpikir Kreatif Matematis*.
- Schulz, D., der Woud, A. van, & Westhof, J. (2020). The best indycaster project: Analysing and understanding meaningful YouTube content, dialogue, and commitment as part of

- responsible management education. *International Journal of Management Education*, 18(1).  
<https://doi.org/10.1016/j.ijme.2019.100335>
- Sholihah, F., Suyitno, H., & Dwijanto. (2022). Creative Mathematical Thinking Ability in Creative Problem-Solving Model Viewed from Gender. *Journal of Primary Education*, 9(1), 58–65.
- Sonjaya, D. N., & Yulianto, A. (2022). Pendekatan Terbuka Untuk Meningkatkan Berpikir Kreatif Matematika Keterampilan Siswa Sekolah Dasar. *Jurnal Pendidikan Matematika*, 1(1).  
[www.onlinedoctranslator.com](http://www.onlinedoctranslator.com)
- Soviawati, E. (2011). Pendekatan Matematika Realistik (PMR) Untuk Meningkatkan Kemampuan Berpikir Siswa di Tingkat Sekolah Dasar. *Jurnal Edisi Khusus*, 2(2), 79–85.
- Sudiantini, D., & Shinta, N. D. (2018). Pengaruh Media Pembelajaran Terhadap Kemampuan Berpikir Kreatif dan Penalaran Matematis Siswa. *JPPM (Jurnal Penelitian Dan Pembelajaran Matematika)*, 11(1).
- Suherman, S., & Vid'akovich, T. (2022). *Assessment of Mathematical Creative Thinking*.  
<https://doi.org/10.1016/j.tsc.2022.101019>
- Sulfiana, S. (2019). *Pengertian Media Animasi*.
- Sumardiyono. (2004). *Karakteristik Matematika dan Implikasinya terhadap Pembelajaran Matematika*.
- Susanto, A. (2013). *Teori Belajar dan Pembelajaran di Sekolah Dasar* (p. 110). PT Fajar Interpratama Mandiri.
- Susanto, A. (2016). *Teori Belajar & Pembelajaran di Sekolah Dasar*. Prenadamedia Group.
- Taufiq, W., Santoso, D. R., & Susilo, J. (2022). *Development of Digital Learning Materials Using Whiteboard Animation Pengembangan Materi Pembelajaran Digital Menggunakan Whiteboard Animation*. <https://pssh.umsida.ac.id>.
- Uno, & Nurdin. (2014). *Belajar Dengan Pendekatan PAILKEM*. Bumi Aksara.
- Utami, D. (2011). Efektifitas Animasi Dalam Pembelajaran. *Majalah Ilmiah Pembelajaran*.
- Yuliyanto, A., Sofiasyari, I., Farikhin, I., & Rogibah, R. (2023). *Model-model Pembelajaran untuk Sekolah Dasar* (A. A. Rochim, Ed.). Eureka Media Aksara.