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The Influence of Social Media in Increasing Student Motivation in Mathematics Lessons for Elementary Schools

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ABSTRACT

Background. Mathematics learning in elementary schools (SD) often requires innovative approaches to increase student engagement. With the development of technology, the use of social media as a learning tool is starting to become the focus of research to increase students' learning motivation in mathematics.

Purpose. The research aims to measure how much influence the use of social media has in increasing students' motivation in learning mathematics in elementary school, as well as providing a concrete understanding of the relationship between social media and motivation to learn mathematics.

Method. A quantitative approach using a survey model is used to examine the impact of social media on student motivation. Questionnaires were distributed to elementary school teachers and mathematics education students via Google Form and WhatsApp (WA) groups. Research ethical principles were upheld, and data were analyzed using Miles and Huberman's qualitative data analysis techniques.

Results. The majority of respondents gave a positive view of the influence of social media in mathematics learning. However, there are a small number who feel that social media can interfere with studying concentration. The integration of social media needs to be considered wisely to minimize risks and maximize its benefits in mathematics learning.

Conclusion. The research results show that social media has great potential in increasing students' motivation in learning mathematics in elementary school. However, its use needs to be managed wisely and responsive to student needs and preferences. Social media integration can be an interesting and effective learning alternative in the context of mathematics learning at school.

KEYWORDS

Increasing Student Motivation, Mathematics Lessons, Social Media

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INTRODUCTION

In the context of globalization and increasingly fierce competition, education is considered the main foundation in building a country's future (Alami et al., 2020). One subject that has a very important role in the development of science and technology is mathematics (Lee et al., 2020). As a universal language in the scientific world, mathematics is not only a tool for understanding

natural phenomena and complex processes, but also a foundation for various other scientific disciplines (Rose & Johnson, 2020). However, despite its strategic role, mathematics is often a scourge for some students, especially at the elementary school (SD) level.

The decline in students' interest and motivation in learning mathematics is a serious problem (Hartmann & Schukajlow, 2021). Mathematics, with all its concepts and formulas, is often considered difficult and boring by most students. In fact, strong understanding and high motivation are needed to succeed in studying mathematics (Demitriadou et al., 2020). When students' interest and motivation declines, their academic achievement tends to be negatively impacted. In its development, information and communication technology, especially social media, has become an integral part of everyday life (Lu & Zheng, 2020). Social media offers various conveniences and advantages, such as the ability to interact with other people, get information instantly, and access interesting content (De Oliveira Santini et al., 2020). However, the impact of social media use on students' learning motivation is still a big question, especially in the context of mathematics learning in elementary school (Kircaburun et al., 2020).

It is important to understand that learning motivation plays a very important role in students' success in understanding and mastering mathematics material (Hammad et al., 2022). With high motivation, students tend to be more active and diligent in studying the material, and more enthusiastic about overcoming various challenges that arise in learning (Sanulita et al., 2024). Therefore, in-depth research is needed to understand how the use of social media can influence students' learning motivation in mathematics learning at the elementary school level.

This background shows the need for more focused and comprehensive research to identify the role of social media in increasing or decreasing students' motivation towards mathematics learning. With a better understanding of the factors that influence student learning motivation (Yin et al., 2021), teachers and educational stakeholders can design more effective strategies in increasing student interest and achievement in mathematics. Therefore, this research aims to answer these questions and provide a more holistic understanding of the role of social media in increasing or decreasing student motivation in mathematics learning in elementary school.

Previous research aimed to develop snakes and ladders learning media for Social Sciences subjects at elementary school level. Using the Four-D R& D model by Thiagarajan, this research assesses the effectiveness and practicability of the media by paying attention to student participation, interest and learning outcomes, as well as ease of implementation for teachers. The results of the analysis show that the snakes and ladders learning media is valid and practical, effective in increasing student interest and learning outcomes. Validation by experts shows a good assessment, with an average of 4.3 on a scale of 5. This media is proven to be effective with high student participation and learning outcomes that meet standards. Its practicability was also proven through implementation observations and student interest surveys, with the majority indicating satisfaction. Overall, this snakes and ladders learning media is promising in increasing the engagement and academic achievement of elementary school students in social studies subjects (Syawaluddin et al., 2020).

Previous research, In recent years, the increasing integration of the internet in educational contexts, particularly in mathematics education, has resulted in significant transformations in classroom practices and teacher education approaches. This research explores this phenomenon by reviewing current literature on internet use in mathematics education. This research identifies three main areas where new approaches are emerging: the design of innovative learning environments, the role of social interaction in knowledge construction, and the use of digital tools and resources. Through the analysis of the multiple perspectives presented in this survey paper, it becomes clear

how digital technologies are reshaping traditional concepts such as 'tools,' 'resources,' and 'learning environments' in mathematics education. In addition, the paper highlights future research trends and emphasizes the need for further exploration of new opportunities in theoretical and methodological aspects of mathematics education (Engelbrecht et al., 2020).

Previous research has explored the relationship between mathematics anxiety and motivation and students' mathematics achievement on transition exams from middle school to high school. In the study, students' math anxiety and motivation were examined along with variables such as gender, pre-school education, support and training courses, and private tutoring. The research sample consisted of 777 eighth grade students in a province in the Aegean region, Türkiye. The Mathematics Motivation Scale (MMS) and the Mathematics Anxiety Scale for Elementary School Students (MASESS) were used as data collection tools. In addition, student demographic information was obtained with a personal information form developed by the researcher. Descriptive analysis, unpaired t-test, correlation analysis, and structural equation modeling analysis were used for data analysis. According to the research results, the level of mathematics anxiety and motivation of eighth grade junior high school students is high, and there is a positive and moderate relationship between mathematics anxiety and motivation towards mathematics. It was also determined that anxiety predicted achievement at a higher level, followed by motivation (Süren & Kandemir, 2020).

Based on previous research, there are findings that mathematics anxiety and motivation have a significant influence on students' mathematics achievement at junior high school level. High levels of anxiety and motivation can lead to lower mathematics achievement. In addition, the relationship between anxiety and mathematics motivation has also been shown to be positive and moderate. The research provides a deeper understanding of the factors that influence students' math motivation and anxiety. Therefore, taking into account these findings, further research which aims to measure the influence of social media use in increasing students' motivation in learning mathematics in elementary school becomes very relevant. By using a quantitative approach and survey model, it is hoped that this research can provide a more concrete and measurable understanding of the relationship between social media and elementary school students' mathematics learning motivation. The results of this research can provide an empirical basis for developing more effective learning strategies in the future, by utilizing the potential of social media as an innovative and motivating learning support tool.

Why is this a problem? First, students' reduced interest and motivation towards mathematics can result in low academic achievement, which in turn can have an impact on their future. Second, the challenges in teaching mathematics become greater when students are less motivated, causing learning to be less effective. Therefore, research regarding the influence of social media in increasing student motivation in learning mathematics in elementary school is very relevant.

The problem to be solved is how to increase student motivation in learning mathematics in elementary school through the use of social media. It is important to discuss this because social media has become an integral part of the daily lives of the younger generation. By utilizing it effectively, we can reverse the trend of declining interest in learning mathematics. Overcoming this problem can be done through the right approach in utilizing social media. For example, the use of social media platforms that are interactive and educational, as well as creating content that is interesting and relevant to mathematics learning material. Apart from that, the role of teachers and parents in supervising and guiding the use of social media is also very important.

The reason this research was conducted was to provide concrete solutions in increasing motivation to learn mathematics among elementary school students. This research is expected to fill

the gap in the literature which still lacks research on the use of social media in the context of mathematics learning at the elementary school level. In this research, we will use a quantitative approach with survey methods. The respondents we will involve are 30 elementary school teachers and students after the Field Experience Program (PPL) in elementary schools. Through this survey, we will collect data regarding the use of social media in the context of mathematics learning and its impact on student motivation.

The state of the art shows that there is still little research that focuses on the influence of social media in increasing student motivation in mathematics learning at the elementary level. Therefore, this research is expected to make a significant contribution to educational literature. The innovation we propose is the development of a mathematics learning strategy that integrates social media effectively. This includes creating educational content, using interactive platforms, and the teacher's active role in supervising and guiding students' use of social media.

The main aim of this research is to measure how much influence the use of social media has in increasing student motivation in learning mathematics in elementary school through a quantitative approach using a survey model. Thus, this research aims to provide a more concrete and measurable understanding of the relationship between social media and students' mathematics learning motivation, as well as providing an empirical basis for developing more effective learning strategies in the future. For future research, it is hoped that further studies can be carried out regarding the implementation of mathematics learning strategies that integrate social media on a wider scale, as well as measuring the long-term impact on student academic achievement.

RESEARCH METHODOLOGY

This research will use a quantitative approach with a survey model (Al-Saedi et al., 2020), to investigate the influence of social media in increasing student motivation in learning mathematics in elementary schools (SD). A quantitative approach allows researchers to collect data that can be measured numerically and analyze the relationships between the variables studied (Fishman et al., 2021). The survey model was chosen because it allows researchers to collect data from a number of representative respondents in an efficient way. Researchers will create a questionnaire using the Google Form platform which contains questions about social media use and student motivation in learning mathematics. After the questionnaire is completed, the survey link will be distributed to respondents via the WhatsApp (WA) group consisting of elementary school (SD) teachers and students who have undergone Field Practice (PL) in the Tadris Mathematics course. The use of the WA group is expected to facilitate the distribution of questionnaires quickly and efficiently.

The research subjects consisted of two groups, namely elementary school teachers and mathematics education students who had done PL. Elementary teachers were chosen because they have direct experience in teaching mathematics in an elementary school environment and can provide insight into the influence of social media in mathematics learning. Meanwhile, Tadris Mathematics students were chosen because they have been involved in teaching mathematics and have a fresher perspective on the use of social media in learning contexts.

This research will comply with the principles of research ethics, including the need to obtain permission from competent authorities before conducting research (Shaw et al., 2020). Participation in this research will be voluntary, and data security will be guaranteed by maintaining the confidentiality of respondents' identities. Researchers will also avoid using data that is sensitive or detrimental to respondents. Data will be collected through an online questionnaire distributed to respondents via Google Form. The questionnaire will consist of structured questions designed to

measure social media use and students' level of motivation in learning mathematics. Respondents' answers will be collected anonymously to maintain confidentiality and reduce bias.

The data collected will be analyzed using Miles and Huberman's qualitative data analysis techniques (Irawan, 2020). This analysis involves the stages of organizing, reducing, displaying, and drawing conclusions from qualitative data. The results of the analysis will be used to identify patterns, themes and relationships between the variables studied, including the relationship between social media use and student motivation in learning mathematics in elementary school.

RESULT AND DISCUSSION

Social Media

Social media is an online platform that facilitates interaction between users, sharing content, and participating in online communities (Tajvidi et al., 2020). This can include social networking sites such as Facebook, Twitter, and Instagram, video sharing applications such as YouTube, and instant messaging applications such as WhatsApp and Telegram (Saputra et al., 2023). The use of social media applications in learning has become a significant trend in recent years, with many educators utilizing them to increase student interaction, facilitate collaboration, and present learning material in an engaging and interactive way. One example of the use of social media applications in learning is through creating discussion groups or learning communities on platforms such as WhatsApp or Facebook. Here, teachers and students can interact directly, exchange ideas and share information related to learning material (Shim & Lee, 2020). For example, a math teacher can create a WhatsApp group specifically for his class of students where they can ask questions, share solutions, or discuss a particular topic.

Additionally, several social media applications have been developed specifically for learning purposes (Saputra, 2022). For example, Edmodo is a social media platform designed specifically for education, where teachers can create online classes, assign assignments, and interact with students in a safe and controlled environment. As another example, Flipgrid is a video sharing platform that allows students to create and share short videos in response to questions or assignments from teachers or fellow students.

In addition, YouTube is often used by educators as a source of rich and varied learning material (Dubovi & Tabak, 2020). Many teachers utilize video tutorials or explanations to support classroom learning in a visual and interesting way. For example, a math teacher can use instructional videos about certain concepts or step-by-step solutions to strengthen students' understanding of the subject matter. In the context of using social media applications in learning, it is important for educators to consider privacy, security, and compliance with policies schools and data protection regulations. In addition, it is necessary to ensure that the use of the application supports learning objectives and strengthens students' learning experiences without disrupting the effective learning process (Cheung & Ng, 2021).

Student Motivation

Student motivation is an internal force or psychological drive that encourages individuals to engage in learning activities, set goals, and persist in facing challenges and obstacles in the learning process (Ryan & Deci, 2020). It includes a variety of factors, such as an individual's needs, desires, interests, values, expectations, and goals, that influence a student's level of energy, persistence, and persistence in achieving academic achievement and personal development. Student motivation not only includes the drive to achieve academic success, but also involves the drive to develop skills, knowledge and positive attitudes towards learning (Estrada et al., 2021). This involves intrinsic

aspects, namely motivation that comes from an individual's intrinsic satisfaction and desire to learn and develop, as well as extrinsic aspects, which involve motivation that comes from external rewards such as awards or recognition (Hatane et al., 2021).

Student motivation is influenced by various factors, including the student's personal characteristics, such as psychological needs, interests, and values, as well as the learning environment, such as teacher support, assignment structure, and classroom climate (Komariah & Nihayah, 2023). It can also be influenced by external factors, such as parental expectations, social norms, and previous experiences in learning. The importance of student motivation in the educational context is enormous, as high motivation is associated with better academic achievement, higher engagement in learning, and sustainability in learning efforts (Xie et al., 2020). Therefore, a deep understanding of the factors that influence student motivation and strategies to increase it is important for educators in designing learning environments that stimulate, support, and motivate students.

Student motivation theory is a conceptual framework that describes the factors that influence students' behavior, desires and learning efforts in achieving academic goals (Kazanidis et al., 2021). Theories of student motivation provide insight into how internal and external processes influence student learning motivation and how teachers can design learning environments that facilitate high and sustained motivation (Zheng, 2021). For example, Expectancy Theory proposes that students' motivation is influenced by their expectations of success in achieving certain goals and the values they pursue in achieving them. In an educational context, this means that students tend to be more motivated if they believe that their efforts will produce desired results and if they see the values of learning as important and meaningful.

Another example is Self-Determination Theory, which emphasizes the importance of meeting students' basic psychological needs, such as autonomy, competence, and social connection, to increase their intrinsic motivation (Vansteenkiste et al., 2020). In practice, this means that teachers can increase student motivation by providing choice and support in the learning process, providing supportive feedback, and creating a classroom environment that promotes cooperation and togetherness.

In addition, Goal Orientation Theory investigates how Students' goal orientation in learning influences their motivation (Krou et al., 2021). This theory identifies two main orientations: performance goal orientation, in which students focus on achieving specific outcomes, such as high test scores, and learning goal orientation, in which students focus on the learning process and improving skills. Teachers can utilize this theory by designing assignments and learning activities that emphasize personal achievement and skill development, as well as providing feedback that supports students' learning processes.

The Influence of Social Media in Increasing Student Motivation in Mathematics Lessons for Elementary Schools

Based on the results of the questionnaire after the researchers distributed the results to 30 respondents, the first question was: Do you believe that social media can increase your learning motivation in mathematics? With the following answer options: Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree. With the results of the answers and analysis as follows:

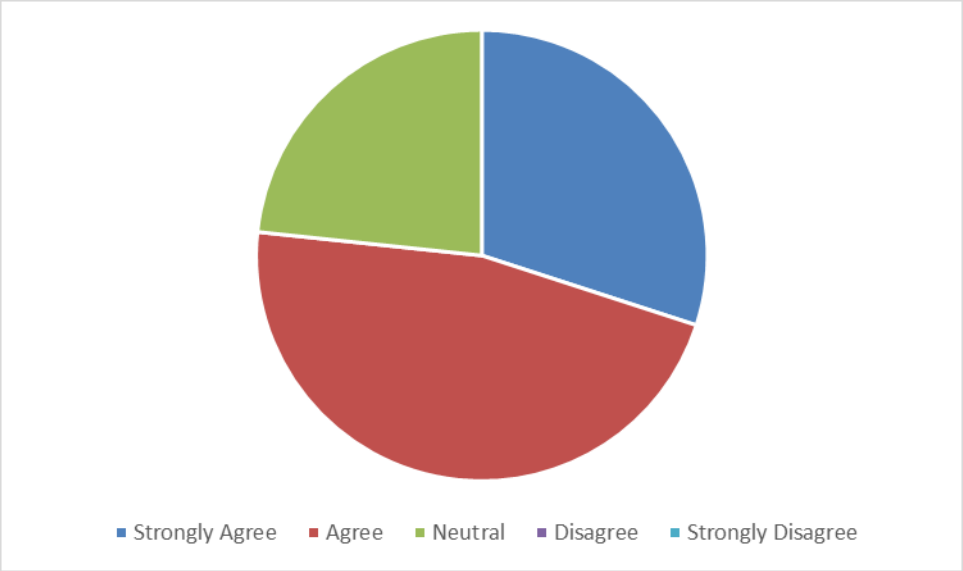

Figure 1: Levels of trust in social media can increase motivation to learn maths

Based on the results of questionnaire analysis conducted after distribution to 30 respondents, it was found that the majority of respondents had a positive view of the influence of social media in increasing motivation to learn mathematics. A total of 9 respondents or around 30% of the total respondents stated 'Strongly Agree', while 14 respondents or around 47% stated 'Agree'. This shows that the majority of respondents tend to see social media as a factor that can increase their motivation in studying mathematics.

However, there are also some respondents who feel neutral about this statement, namely 7 respondents or around 23%. This shows that there are variations in views among respondents regarding the influence of social media on motivation to learn mathematics. However, it can be concluded that the majority of respondents tend to see social media as a source of motivation in the context of mathematics learning. This is interesting to investigate further in future research to understand more deeply the factors that influence students' perceptions and experiences of social media in mathematics learning.

Next question, Have you ever used social media to study mathematics? With the following answer options: Yes, often. Yes, Sometimes and Never. With the following answer results:

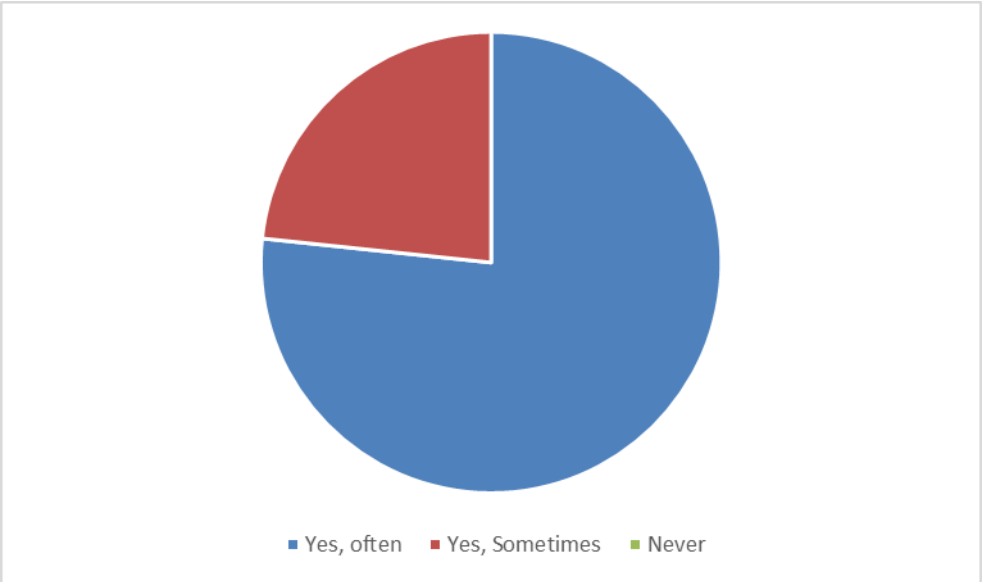

Figure 2. Using social media to learn maths

Based on the results of questionnaire analysis, the majority of respondents stated that they had used social media to study mathematics. A total of 23 respondents or around 77% of the total respondents stated that they often use social media to study mathematics. This shows that the use of social media as a mathematics learning tool is quite common among respondents. In addition, there are also a number of respondents who stated that they sometimes use social media to study mathematics. A total of 7 respondents or around 23% of the total respondents stated this. Although the number is less than that of respondents who frequently use social media to learn mathematics, it still shows that there are variations in the pattern of use of social media as a mathematics learning tool among respondents. This shows the potential importance of social media as a mathematics learning resource that is worthy of further research in an educational context.

Next question, How often do you feel motivated to learn mathematics after seeing mathematics-related content on social media? With the following answer options: Very Often, Frequently, Sometimes, Rarely and Never. With the following answer results:

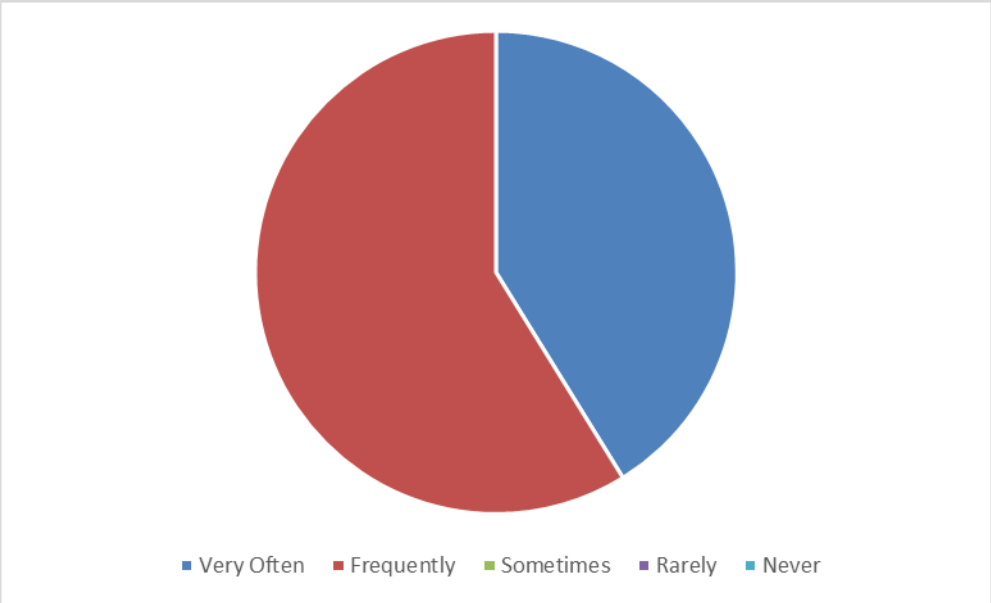

Figure 3. Motivation to learn mathematics after viewing content on social media

Based on the results of questionnaire analysis, the majority of respondents stated that they felt motivated to learn mathematics after seeing mathematics-related content on social media. A total of 7 respondents or around 23% of the total respondents stated that they felt 'Very Often' motivated after seeing the content. In addition, 10 respondents or around 33% stated that they felt motivated 'Often', while 13 respondents or around 43% felt motivated 'Sometimes'. This shows that the majority of respondents had positive experiences regarding motivation to learn mathematics after consuming mathematics content on social media.

However, there were also some respondents who felt they rarely or never felt motivated to learn mathematics after seeing mathematics content on social media. However, the number of respondents with the answer options 'Rarely' or 'Never' is quite small compared to the number of respondents who feel motivated, namely only 0% and 0% respectively. This shows that the influence of mathematics content on social media tends to have a positive impact on motivation to learn mathematics for the majority of respondents. Therefore, it can be concluded that social media

has great potential in increasing motivation to learn mathematics among students. Mathematical content presented on social media can be a source of inspiration and motivation for students to be more interested and enthusiastic in studying mathematics. This shows that the use of social media in the context of mathematics education has significant added value and needs to be considered in developing more effective and interesting learning strategies.

Next question, Do you prefer learning mathematics via social media rather than traditional methods such as books and teachers? With the following answer options: Yes, Prefer to learn via social media. There is no difference, both are equally good. No, Prefer traditional methods. With the following answer results:

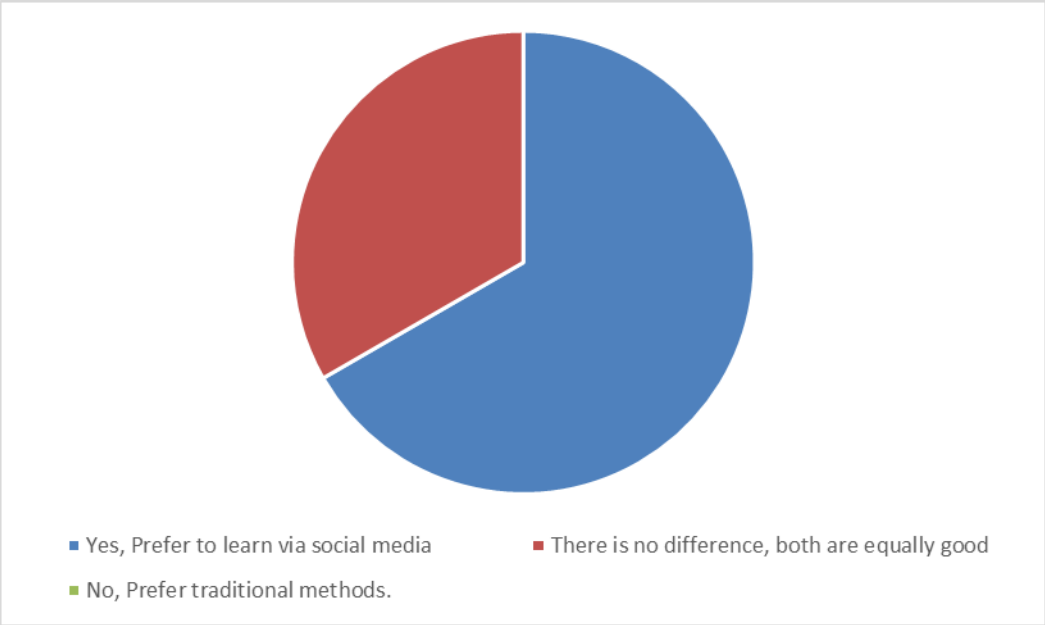

Figure 4. Learning maths through social media or traditional methods such as books and teachers

Based on the results of questionnaire analysis, the majority of respondents stated their preference for social media as a mathematics learning tool. As many as 20 respondents or around 67% of the total respondents stated that they preferred to learn mathematics through social media. This shows that the majority of respondents tend to consider social media as a more interesting and effective alternative in learning mathematics, compared to traditional methods such as books and teachers.

Apart from that, there were also a number of respondents who stated that they did not see a significant difference between learning through social media and traditional methods. A total of 10 respondents or around 33% of the total respondents stated that both were equally good. Even though the number is smaller compared to respondents who prefer social media, this shows that there are variations in respondents' views regarding the effectiveness of learning mathematics through various methods.

Thus, the results of this analysis show that social media has great potential as a means of learning mathematics liked by most respondents. However, it is important to remember that individual preferences may vary and can be influenced by factors such as learning style and personal experience. Therefore, in developing effective learning strategies, it is necessary to consider the various preferences and learning needs of individual students.

Next question, Do you feel that social media can interfere with your concentration in mathematics? With the following answer options: Very Annoying, Disturbing, Neutral, Not Disturbing and Very Not Disturbing. With the following answer results:

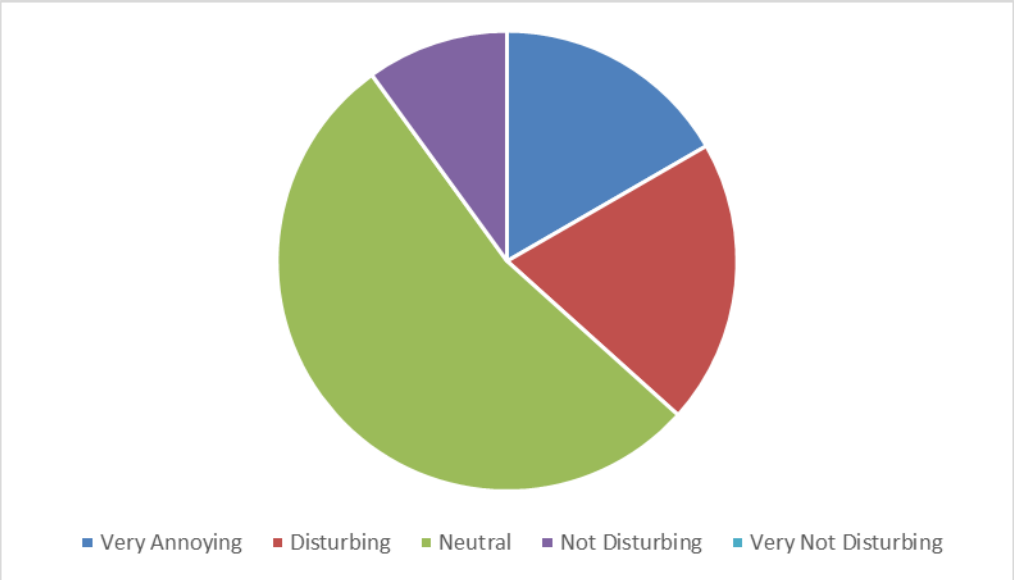

Figure 5. Social media can interfere with concentration in learning maths

Based on the results of the questionnaire analysis, the majority of respondents stated that they did not feel that social media interfered with their learning concentration in mathematics. A total of 16 respondents or around 53% of the total respondents stated that they felt 'Not Annoying'. This shows that the majority of respondents tend not to be significantly influenced by social media in maintaining their concentration in studying mathematics. Apart from that, a number of respondents also stated that they felt neutral about the influence of social media on their study concentration. A total of 6 respondents or around 20% of the total respondents stated this. Although the number is smaller compared to respondents who felt they were not disturbed, this shows that there are variations in respondents' perceptions regarding the influence of social media.

However, there was also a small number of respondents who stated that they felt social media disturbed their learning concentration in mathematics. A total of 5 respondents or around 17% of the total respondents stated that they felt 'disturbing'. This shows that although the majority of respondents do not feel disturbed by social media, there are still a small number who experience interference in their study concentration. This shows the importance of awareness and wise management of the use of social media in the learning context.

Next question, Do you have recommendations for the use of social media in teaching mathematics at school? With the following answer options: highly recommend, recommend. Not recommend, not recommend, not recommend at all. With the following answer results:

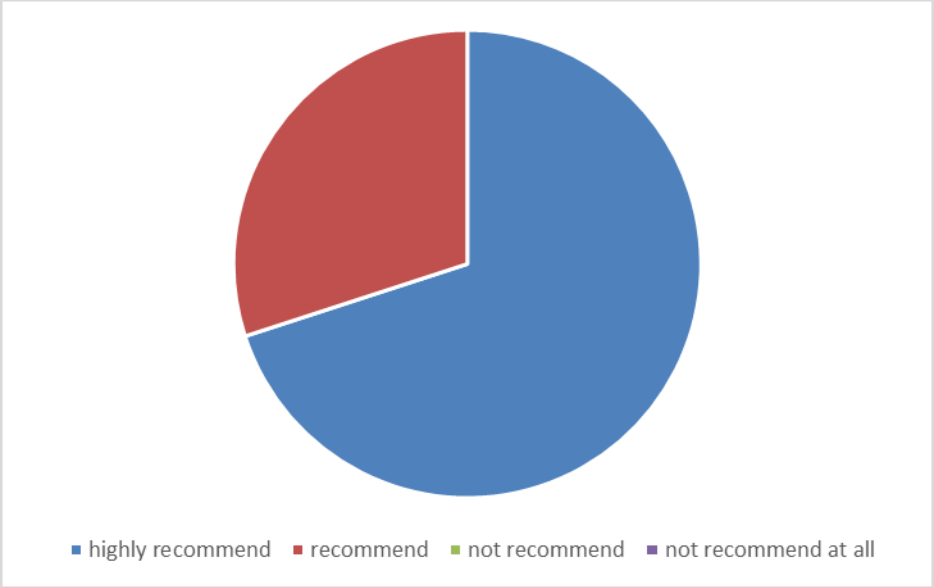

Figure 6. Respondents' recommendations for the use of social media in teaching mathematics in schools

Based on the results of the questionnaire analysis, the majority of respondents stated that they gave positive recommendations regarding the use of social media in teaching mathematics in schools. A total of 21 respondents or around 70% of the total respondents stated that they 'Strongly Recommend' the use of social media in the context of mathematics learning. This shows that the majority of respondents see great potential in the use of social media as an effective and innovative learning tool in mathematics subjects.

Apart from that, a number of respondents also gave positive recommendations, although not as strong as 'Highly Recommend'. A total of 9 respondents or around 30% of the total respondents stated that they 'Recommend' the use of social media in teaching mathematics in schools. Even though the number is smaller compared to respondents who 'Strongly Recommend', this shows that there is still significant support for the use of social media in mathematics learning.

Thus, the results of this analysis show that the majority of respondents provide positive recommendations for the use of social media in teaching mathematics in schools. This provides strong support for the integration of social media as part of an innovative and effective learning strategy in mathematics education. However, it is important to pay attention to wise management in the use of social media so that it can provide optimal benefits for the learning process.

CONCLUSION

Based on the results of a questionnaire analysis of 30 respondents regarding the influence of social media in increasing student motivation in learning mathematics in elementary school, it was found that the majority of respondents had a positive view of the role of social media in the learning context. They believe that social media can be a source of motivation in learning mathematics and often use it to deepen their understanding of mathematics material. Positive recommendations from respondents also show support for the use of social media as an effective and innovative learning tool in schools. Although the majority of respondents gave a positive view, there were also a small number who felt that social media could interfere with their learning concentration in mathematics. This shows the importance of wise management in the use of social media as a learning tool, as well as the need to be aware of the negative impacts that may arise. Therefore, the integration of social

media in mathematics learning needs to be accompanied by strategies that pay attention to the balance between benefits and risks, as well as understanding the needs and preferences of individual students.

So the results of the questionnaire analysis indicate that social media has great potential in increasing student motivation in learning mathematics in elementary school. By taking into account students' views and experiences, and managing the use of social media wisely, the integration of social media in mathematics learning can provide an interesting and effective alternative for teaching in schools. This creates an opportunity to develop learning strategies that are more inclusive and responsive to students' needs and preferences in gaining a deeper understanding of mathematics.

AUTHORS' CONTRIBUTION

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.
Author 2: Conceptualization; Data curation; In-vestigation.
Author 3: Data curation; Investigation.
Author 4: Formal analysis; Methodology; Writing - original draft.

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