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Leveraging Technology in Education: The Impact of Gitmind Mindmapping on Social Studies Learning

Raza Syarif Hidayatullah, Zaharah Zaharah*
Universitas Islam Negeri Syatif Hidayatullah, Jakarta, Indonesia 506030
zaharah@uinjkt.ac.id *

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ABSTRACT

This study uniquely examines the impact of globalization on education in Indonesia, specifically focusing on the integration of technology into learning environments. In light of the increased use of technology, many students are experiencing decreased concentration and interest in learning due to its excessive and uncontrolled use. Additionally, a significant number of teachers and lecturers exhibit low technological literacy, resulting in the continued use of outdated teaching methods. Utilizing a descriptive quantitative methodology with a simple random sampling technique, the research involved 125 Social Science students from the 2021 cohort at the Jakarta State Islamic University. Data were collected through Google Form questionnaires post-Final Semester Examination, along with observations and literature reviews, and analyzed using SmartPLS software. The findings revealed that integrating the mind mapping method via the Gitmind application significantly enhanced students' learning outcomes in Social Studies, highlighting the need for updating learning media, methods, and strategies to align with technological advancements. This study underscores the critical need for educational reform in Indonesia, advocating for a transition from traditional teaching practices to more innovative, technology-driven approaches. The successful use of Gitmind suggests that such tools can substantially improve student engagement and learning efficacy. The implications of this research extend beyond the Social Science curriculum at Universitas Islam Negeri Jakarta, proposing that similar technological integrations could benefit various subjects and disciplines across other universities. This contribution to educational development underscores the importance of creative and effective learning approaches suitable for the digital era, potentially serving as a model for broader educational reforms.

1. Introduction

In today's globalized world, technology has become an indispensable part of education, transforming traditional teaching methods and paving the way for more effective learning processes (Ngafifi, 2014). The integration of technology in education not only enhances access to information but also fosters the development, implementation, and dissemination of knowledge globally (Pratiwi, 2016). Without incorporating technology, educational institutions risk becoming obsolete and unable to meet the evolving needs of modern learners (Al, 2023). Thus, educators must leverage technological tools to enrich the teaching and learning experience (Gunawan & Widiati, 2019).

Education stands as one of the most vital components of human existence, facilitating the acquisition of knowledge, skills, and expertise, which in turn maximizes human potential (Fauhah & Rosy, 2020; Suwartini, 2017). The learning process is essential for the full realization of human capabilities (Salim, 2014). To support educational objectives, learning media have become an integral part of the teaching process (Kristanto, 2016). Despite significant technological advancements, many educators continue to rely on traditional methods, leading to diminished student motivation and engagement (Hidayah, 2011). This gap underscores the need for innovative technologies to enhance educational activities and streamline learning processes (Pratiwi, 2016).

Historically, the lack of diverse learning resources has contributed to student disinterest and disengagement (Sutirna, 2018). Consequently, educators must adapt their instructional methods, utilizing various learning media to captivate students' attention and facilitate effective learning (Tafonao, 2018). The rapid advancement of technology in education has provided educators with a wide array of options to choose from when selecting engaging and effective educational materials. Lestari (2020) emphasizes the significance of leveraging technology to enhance the educational experience for both teachers and students. Integrating technology into teaching practices can lead to increased student engagement, improved learning outcomes, and the creation of dynamic learning environments that cater to diverse learning styles.

Moreover, the use of digital-based learning models has been shown to significantly enhance student participation, learning quality, and academic performance Dongoran (2024). By incorporating digital tools and resources, educators can create interactive and immersive learning experiences that resonate with students in today's digital age. This aligns with the idea that technology plays a crucial role in modern education and can be a powerful tool for transforming teaching and learning practices. However, the introduction of Android-based learning media, although prevalent, often fails to emphasize student involvement, creativity, and imagination in the learning process (Adinugroho & Wahyono, 2022; Aziz et al., 2021; Nazar et al., 2020).

Despite the availability of numerous Android applications designed for educational purposes, many of these apps lack comprehensive interactivity features that are essential for enhancing students' learning experiences and information retention. Additionally, a common issue with current educational applications is their failure to align with learning theories that emphasize critical investigation and problem-solving skills. Research by Huntington et al. (2023) highlights the importance of pedagogical features in interactive apps for effectively supporting the learning of foundational skills and improving educational outcomes. This underscores the significance of incorporating interactive elements that promote engagement and critical thinking in educational apps to enhance the overall learning experience. Moreover, the study by Blitz-Raith and Liu (2017) emphasizes the role of interactivity in educational apps for young children, focusing on how non-discursive modes such as images, colors, sounds, and movements contribute to creating meaningful learning experiences. This suggests that incorporating diverse interactive elements in educational apps can cater to different learning styles and enhance comprehension and engagement among users. This inadequacy highlights the necessity for new, technology-centered, and education-based solutions to support effective learning (Trihartini & Ginanjar, 2021).

This research aims to address these gaps by integrating the Gitmind mind mapping tool into the teaching of Social Studies Education, a field that has been relatively unexplored in previous studies (Rahayu, 2021). Mind mapping has proven beneficial in various subjects, yet its application in Social Studies remains under-researched. This study seeks to establish the impact of Gitmind on improving learning outcomes in Social Studies, thereby contributing a unique perspective to the existing body of research.

Furthermore, this research evaluates the effectiveness of mind mapping tools in bridging the gap between theoretical knowledge and practical experience in Social Studies. By assessing the impact of these tools on students' learning processes, the study aims to identify innovative strategies to enhance the quality of Social Studies education, fostering creativity and engagement among students.By utilizing mind mapping models, students can condense Social Studies materials into easily accessible formats, such as PDFs or images, using the Gitmind application. This approach not only aids in content summarization but also encourages students to create their mind maps, thereby enhancing their creativity, inventiveness, and active participation in the learning process. This study's unique focus on the implementation of mind mapping in Social Studies addresses a significant gap in the literature. Additionally, the use of Gitmind's advanced AI features to generate dynamic and interactive mind maps represents a substantial improvement over traditional techniques. Consequently, this research aims to introduce an innovative approach to teaching Social Studies, utilizing the Gitmind application to enhance learning outcomes and provide practical insights for educators.

2. Literature Review

The introduction highlights the advantages of mind mapping and various educational applications in improving students' learning achievements across various fields. However, most developments in educational applications focus predominantly on Natural Sciences, lacking initiatives to foster student involvement and creativity (Adinugroho & Wahyono, 2022; Aziz et al., 2021; Nazar et al., 2020). This study aims to fill this gap by applying the Gitmind mind mapping tool to Social Science Education, a less explored area in the current research landscape.

Rahayu (2021) emphasizes the efficacy of conventional mind maps in enhancing understanding across subjects. This study innovatively applies these techniques to Social Studies, incorporating Gitmind's dynamic and interactive features to address practical challenges in teaching this discipline. This approach offers strategies for practical demonstrations to

educators, highlighting the unique contributions of this research. Research by Purwaningrum and Faradillah (2020) demonstrates that digital devices improve student engagement and learning outcomes, primarily in Science and Mathematics. However, similar implications for Social Science Education remain underexplored. Arikarani and Amirudin (2021) note that digital technology enhances students' analytical skills in solving social problems, underscoring the potential benefits of digital tools in Social Studies. The literature suggests that tools like Gitmind can significantly enhance learning effectiveness and outcomes. However, there is a notable lack of research on their application in Social Science Education. This study aims to investigate the effects of Gitmind on students' participation, innovation, and performance, thus advancing knowledge in educational technology.

This research seeks to provide a robust foundation for developing future educational applications, particularly to improve learning effectiveness and outcomes in Social Studies. It aims to fill existing gaps by exploring the impact of Gitmind in this field and offering practical insights for educators.

2.1 Mindmap

Mindmapping, as described by Fitriani et al. (2023), facilitates a comprehensive and straightforward learning approach, enhancing students' understanding of information. Aprinawati (2018) outlines the steps for applying mind maps, which include defining concepts, building mock-ups, and presenting materials. Research shows that mind mapping boosts critical thinking, participation, and learning outcomes (Sari, 2016; Wati, 2022). Additionally, mind maps improve long-term information recall and problem-solving skills (Suryati, 2019; Syahidah, 2015), as observed by Kibtiyah (2010).

2.2 Gitmind

Gitmind, an AI-based online mind mapping application, generates mind maps and soft files, enhancing learning effectiveness and outcomes (Gitmind, 2020; Bhattacharya & Mohalik, 2020). Gitmind promotes interaction between students and teachers through real-time cooperation and content sharing features. Asrori et al. (2023) found that using Gitmind in an online learning environment significantly improves learning effectiveness and student outcomes.

2.3 Learning Effectiveness

Learning effectiveness refers to a process that meets intended educational goals and enhances student outcomes (Latifah & Supardi, 2021). It involves the acquisition of knowledge, student engagement, and the practical application of learned skills (Fathurrahman et al., 2019; Ahlaro, 2020). Studies by Sukarman (2023) and Susanto (2015) indicate that engaging and involved learning strategies positively impact learning efficiency.

2.4 Learning Outcomes

Learning outcomes are the final assessments reflecting the knowledge and behavior changes resulting from educational activities (Wicaksono & Iswan, 2019). Research indicates that incorporating educational technology enhances students' knowledge retention and critical thinking skills (Yaumi, 2018; Siringoringo & Alfaridzi, 2024; Suyuti et al., 2023; Hasanah, 2021; Rusiadi, 2024). These studies support the hypothesis that Gitmind positively affects learning effectiveness and student outcomes in Social Studies Education.

3. Method

This study employs a descriptive quantitative research methodology to provide data that align with the research questions and objectives (Zellatifanny & Mudjiyanto, 2018). Descriptive quantitative methods are chosen to gather consistent data through respondents' feedback on questionnaires (Isnawati et al., 2020). This approach ensures that the data accurately reflect the participants' perspectives and experiences with the Gitmind application.

The study population comprises all students from the Department of Social Science Education, class of 2021, at UIN Jakarta, totaling 125 students. A random sampling technique was employed to ensure that the sample accurately represents the larger population, providing each student an equal chance of being selected. This approach enhances the generalizability of the study findings.

Data collection techniques in this study include questionnaires, observations, and literature reviews (Ardiansyah et al., 2023). The questionnaire, administered via the Google Forms platform after the Final Semester Examination, uses a Likert scale to measure students' interest, satisfaction, and frequency of Gitmind use in teaching contexts. The Likert scale ranges from "Strongly Agree" to "Strongly Disagree," providing a nuanced understanding of students' attitudes and behaviors. Data were collected through questionnaires distributed on Google Forms, supplemented by observations and literature reviews conducted throughout the learning period. This comprehensive data collection strategy ensures that all necessary information is captured, contributing to the completeness and utility of the research data.

For data analysis, the study utilizes SmartPLS software, which supports Partial Least Squares (PLS) models—structural equation models used to analyze measurement and structural models (Moscato, 2023). The measurement model focuses on validity and reliability tests, while the structural model involves

analyzing the outer model, inner model, and hypotheses (Irwan & Adam, 2015).

The primary aim of this research is to evaluate the effectiveness and efficiency of using Gitmind in Social Science learning among students at UIN Jakarta. By employing mind-mapping applications like Gitmind, the study hypothesizes improvements in student learning outcomes due to the innovative and effective learning models facilitated by the application.

The results section will present the validity and reliability of the collected data, alongside theoretical insights regarding the effectiveness of Gitmind in enhancing social science learning. The study aims to establish Gitmind as a viable tool for improving student engagement, creativity, and overall learning performance, contributing significantly to the field of educational technology.

4. Result

The primary research problem addressed in this study is the impact of using the Gitmind mind mapping application on learning effectiveness and students' learning outcomes. Based on the methods employed and the literature review, this results section discusses the validity and reliability of the collected data, as well as the theoretical foundations related to the effectiveness of Gitmind in learning social studies.

This study aims to establish the viability and productivity of the Gitmind application in social studies education among the 2021 cohort of Social Studies Education students at Jakarta Islamic University. A key concern of this study is the observed low student engagement and creativity in social studies learning. By using mind mapping applications like Gitmind, it is anticipated that students' learning achievements will be enhanced due to the effectiveness and innovative nature of these learning tools.

In the context of teaching and learning, incorporating digital technologies like Gitmind is seen as a valuable approach to enhance the educational process. This research demonstrates how students can use this application to better interpret and understand social studies content. Additionally, Gitmind helps students plan their work more methodically and logically, thereby improving their memory retention alongside the material taught..

Outer Model

Figure 1 depicts the exterior model. The objective of the external model is to verify whether or not the measurements conducted by researchers using Cronbach Alpha, Composite Reliability, Average Variant Extracted (AVE), Convergent Validity, and Discriminant Validity are valid and reliable.

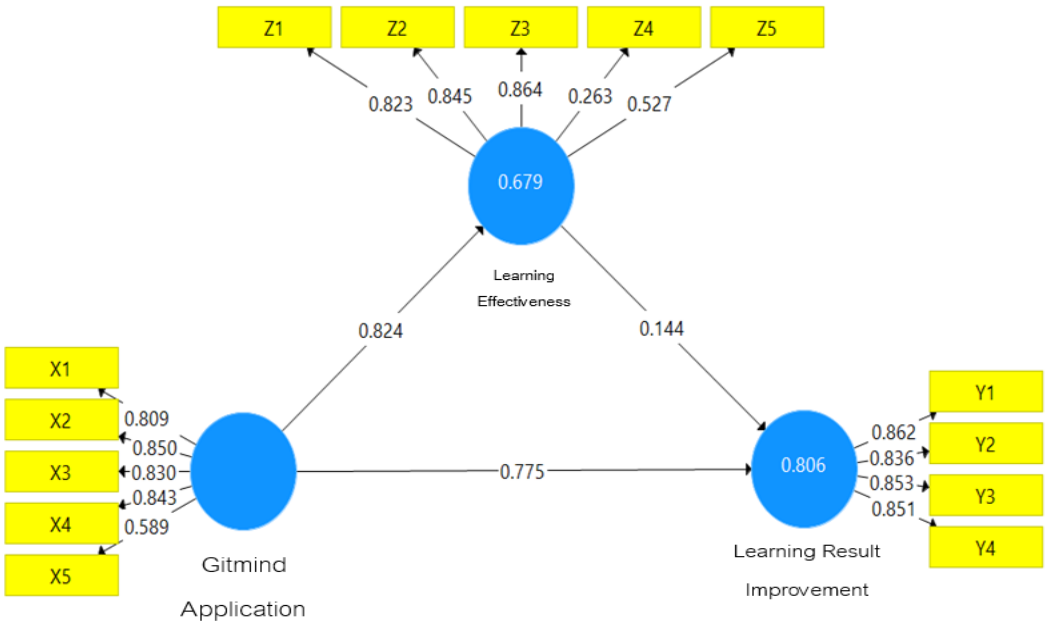

Figure 1. Outer Model before elimination

When an indicator's outer loadings value is greater than 0.7, it is considered genuine; however, if it is less than 0.7, it will be removed or removed from the analysis. A new outer model will be created as a result of the elimination of several variables, as shown in Figure 2.

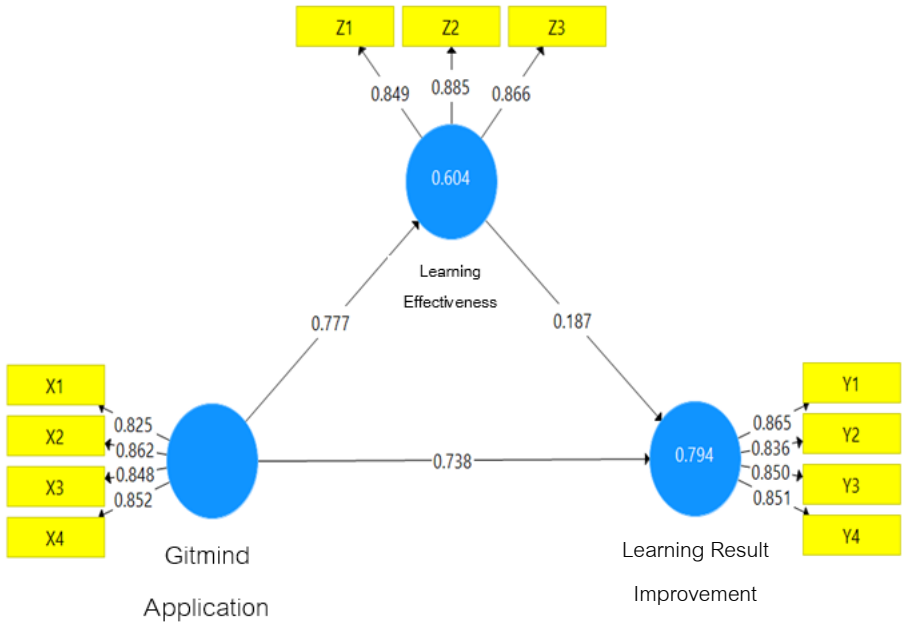

Figure 2. Outer Model after elimination

Convergent Validity

Convergent validity is considered and evaluated to check the logic of an indicator. Factor loading values should more than 0.7 and Average Varience Extracted (AVE) above 0.5. This is displayed in Table 1.

Table 1. Outer Loadings before elimination

Indicator	Learning Effectiveness	Gitmind Usage	Improved Learning Outcomes
X1		**0,809**	
X2		**0,850**	
X3		**0,830**	
X4		**0,843**	
X5		0,589	
Y1			**0,862**
Y2			**0,836**
Y3			**0,853**
Y4			**0,851**
Z1	**0,823**		
Z2	**0,845**		
Z3	**0,864**		
Z4	0,263		
Z5	0,527		

(Tables 1) Some indicators are X5, Z4, Z5 with outer loadings below 0.7 and must be removed/discarded. Next a new table, called Table 2 is created.

Table 2. Outer Loadings after elimination

Indicator	Learning Effectiveness	Gitmind Usage	Improved Learning Outcomes
X1		0,809	
X2		0,850	
X3		0,830	
X4		0,843	
Y1			0,862
Y2			0,836
Y3			0,853
Y4			0,851
Z1	0,823		
Z2	0,845		
Z3	0,864		

Because the outer loadings value in Table 2 is less than 0.7, the indications X5, Z4, and Z5 are removed from the table, indicating their invalidity. ln order to determine whether indications that are still included in Table 2 are legitimate or satisfy the requirements of Convergent Validity.

Average Variance Extracted (AVE)

According to, the average variance of a variable is called Average Variance Extracted (AVE) and is considered legitimate if (AVE) > 0.5. Table 3 presents the outcomes (AVE) of this investigation for a clearer understanding.

Table 3. Average Variance Extracted Results

Indicator	Average Variance Extracted
Learning Effectiveness	0,751
Gitmind Usage	0,718
Improved Learning Outcomes	0,723

There are no issues with the data because the indicators in the table result (AVE)> 0.5. Thus, it may be said that Table 3's variables satisfy the requirements for convergent validity. Because of this, researchers will test issues with discriminant validity in the following stage.

Discriminant Validity

How to cross-load for testing Discriminant Validity, we report the results of discriminant validity on indicators in Tables, while Table, all loadings outside of the construct loadings (bold numbers) should be larger than the cross-loading value outside in other constructs (non-bold numbers). See Table 4 below for more details.

Table 4. Cross-loading

Indicator	Learning Effectiveness	Gitmind Usage	Improved Learning Outcomes
X1	0,613	**0,825**	0,697
X2	0,738	**0,862**	0,787
X3	0,606	**0,848**	0,727
X4	0,667	**0,852**	0,775
Y1	0,634	0,822	**0,865**
Y2	0,596	0,686	**0,836**
Y3	0,613	0,683	**0,850**
Y4	0,734	0,795	**0,851**
Z1	**0,849**	0,564	0,585
Z2	**0,885**	0,602	0,617
Z3	**0,866**	0,811	0,748

It can be seen that a data or indicator is said to be valid if the outer loading is> than the Cross Loading value.

Reliability Test

A reliability test is a measurement method that is used to establish whether or not the independent and dependent variables are connected. If a variable has a Composite Reliability of 0.7 or a Cronbach's Alpha of 0.6, it is considered dependable. For ease of comprehension, Table 5 illustrates it.

Table 5. Reliability Test Results

Indicator	Cronbach's Alpha	Composite Reliability
Learning Effectiveness	0,837	0,901
Gitmind Usage	0,869	0,910
Improved Learning Outcomes	0,873	0,913

Based on Table 5 of the reliability test results, Cronbach's Alpha and Composite Reliability are shown to be reliable.

Inner Model

Inner models "It is a type of model analysis which serves for forecasting or also investigating a link between unobserved variables, or factors that are not directly measurable". According to the researcher Inner Model is constructed of Hypothesis Test and R Square.

R Square

To explain how much an independent variable influences a dependent variable at the same time, one measures the coefficient of determination, or R Square. R square has three classifications: > 0.67 (strong), 0.33 - 0.67 (moderate), and 0.19 - 0.33 (weak), and has limitation requirements. Table 6 provides further information.

Table 6. Test Results of the Coefficient of Determination

Indicator	R Square	R Square Adjusted
Learning Effectiveness	0,604	0,601
Improved Learning Outcomes	0,794	0,791

As can be seen from the above table, Q2 represents the quality of fit and is as follows: $Q^2 = 1-(1-R1^2)\ (1-R2^2) = 1-(1-0.604)\ (1-0.601) = 84\%$, indicating that the data can account for 84% of the factors mentioned above, of which 60% are related to learning effectiveness and 79% to enhancing learning outcomes. and other factors have an impact on the remainder. This demonstrates that both improved learning outcomes and the efficacy of learning are impacted by the independent variables in the data.

Hypothesis Test

The below hypothesis testing was conducted through the Direct Effect Test (see table 7) and the Indirect Effect Test (see table 8) of this study. The hypothesis is accepted when the P Value is < 0.050 and the T statistics is > T table (1.96); the closer the original sample value, the greater the influence.

Table 7. Direct Effect Test

Indicator	Original Sample	Sample Mean	STDEV	T Statistic	P Values
Learning Effectiveness -> Improved Learning Outcomes	0,187	0,191	0,075	2,493	0,013
Gitmind Usage -> Learning Effectiveness	0,777	0,777	0,040	19,622	0,000
Gitmind Usage -> Imrpoved Learning Outcomes	0,738	0,732	0,065	11,399	0,000

Table 8. Indirect Effect Test

Indicator	Original Sample	Sample Mean	STDEV	T Statistic	P Values
Gitmind Usage -> Learning Effectiveness -> Improved Learning Outcomes	0,146	0,149	0,060	2,436	0,015

5. Discussion

The purpose of this research is to assess the effectiveness of applying Gitmind technology in the mind mapping application on learning efficiency and students' learning achievements. The major issue that informed this research is the low engagement and creativity of students in social studies classes of UIN Jakarta class 2021. The findings revealed that the learning effectiveness enhanced the learning accomplishment of the students majoring in Social Studies Education in the class of 2021 at the UIN Jakarta. Considering the successful application of Gitmind in learning, there is no doubt in stating that the use of the tool enhances the creativity levels of students together with their levels of participation. This is important because the effectiveness of learning and the outcomes of learning are two essential components that define the quality of learning in higher education institutions.

Besides, the findings of this study also showed that students who used Gitmind in the learning activities were able to organize the information acquired better. They also possessed a higher level of study plan-creating and intricate content comprehension. This may have been due to the interactive and visual aspect highlighted in the use of Gitmind by the students in establishing relationships between the concepts taught.

In this regard, this finding shows there is a clear possibility of better quality learning through formal academic establishments aided by digital technologies. Applying Gitmind can serve as one of the approaches in attempts to update the teaching practices to the needs of the current generation. However, implementation of this technology can also contribute to aversion to certain problems that are associated with conventional teaching for instance; lack of student engagement and lack of concentration in learning as well as complications in the comprehension of certain lessons.

5.1 Learning Effectiveness and Improved Learning Outcomes

The results of this research show that learning effectiveness greatly improves the outcomes of learning of a cohort in 2021. The evidence for this is in direct effect test results (Table 7). The results of this study are in accordance with the hypothesis proposed, where the use of Gitmind as a learning tool increases the effectiveness of learning and student learning outcomes. It also confirms findings from previous research done by (Khotimah & ., 2019; Maisyarah, 2018; Oktavian, 2023), which revealed that effective classroom instruction directly can lead to increased student outcomes. It has already been tried out and confirmed by the effect of such learning strategies as active, collaborative activities, and formative assessments on deeper understanding and retention rates (Wulandari et al., 2020).

This result also agrees with our first assumption that digital technology can enhance student engagement on learning. By its interactive features, Gitmind really supports a more active and engaging learning class. Since in the modern education, the use of technology to facilitate learning is unpreventable.

However, some were a little different from what I thought initially such as the level of student engagement which turned out to be higher than expected. It's higher than I expected and that means Gitmind is effective in their learning but it also creates an interactive learning experience, collaborative. So we could use this to integrate into the teaching and learning process.

The researches, when put together, thoroughly point out that the major agents of improving pupils' performance are the teaching strategies that teachers employ. The meta-analysis conducted by (Aini et al., 2018) in the visible learning approach, for example, highlights the fact that teaching quality holds the key to students' success. This, in turn, gives the importance of the professional development of the teachers by which they renew their methods and interact with the enlarging impact of education. Also, (Nasution & Ritonga, 2019) researched whether the instructional strategies were specific or not i.e. setting clear objectives, giving feedback, and maintaining cooperative learning, were the ones through which learning could definitively be done.

In addition, the inclination towards learning effectiveness and education is in line with the theory of constructivism in education, that is learners themselves construct the knowledge they should acquire, doing so through the experiences and interactions (Sugrah, 2019). It is demonstrated by the assumption that the otherwise appropriate methods of teaching should be the designed ones that can help students to be actively involved in the learning process, which, in turn, can make the students understand and remember the material. This situation is particularly true for social science subjects where the depth of concepts is high and one cannot successfully interact only by being passive learners.

In the constructivism theory line, using Gitmind as a tool for learning means making the process of students' learning. Because students create mind maps themselves and connect what they learn, by using Gitmind, more concretely. They make use of visuals and interaction to construct their knowledge on a deeper and more meaningful level.

This also supports the results of the previous studies which stated that digital technology can increase the effectiveness of learning itself. For example, research conducted by Wulandari et al. (2020) found that the use of a visual aid is possible to improve student's understanding of difficult material. A similar result was also found in this study. It turned out to be that Gitmind helped students in increasing their understanding and remembering information.

Moreover, apart from the constructionist version, Vygotsky's Zone of Proximal Development (ZPD) concept also asserts why effective teaching is given high preference. The ZPD is based on the argument that the learner, when assisted and guided by another person, who is a better speaker of knowledge than him/her, can upgrade his/her level of understanding (R. Sari, 2018). This also points out the teachers' contribution to learning through scaffolding and the provision of modest yet appropriate challenges that will ingrain learners' minds.

5.2 Impact of Gitmind Usage on Learning Effectiveness

The most recent survey results have demonstrated that the utilization of the Gitmind application has a very significant impact on the learning effectiveness of social science education students (Table 7). The results of this study are also in accordance with the hypothesis proposed, namely the use of Gitmind as a learning media can increase the effectiveness of learning and student learning outcomes. (Agustina et al., 2024; Asrori et al., 2023; Nurlia, 2023) have also written articles supporting these research results and stating that the use of tools such as virtual mind mapping like Gitmind can be helpful in the process of acquiring social science concepts. In addition to their main purpose, which is to visual thinking Gitmind and similar apps provide various ways to present learning information, making the presentation of difficult subject matter easily understandable and thus effectively aid students' learning.

The correlation between this particular technology known as Gitmind and enhanced students' learning outcomes can be explained by the fact that it helps to facilitate a more effective organization of the learning process. The patterns derived from it also represent the picture that students who use Gitmind participate

more in the learning activities. More often, they are actively involved in the classes and seem to have more concern about the course under study.

Additionally, the collected data also indicated an intriguing link between GitMind usage and increased student potential involving creativity. Students managed to come up with more original notions and enhance their overall learning strategy when they used GitMind. That way, the positive impact of gitmind is very useful for increasing creativity and innovation in education. Any of us could infer from the statement of such a collage that the primary area of research is the field of Social Studies. It is evident that students are willing to use digital tools like Gitmind for learning and that using such tools results in consistent pupil' achievement in class. Among other aspects, the learning of social science as well as others would get a further leap if these techies focused on such useful things. The relationship built through the use of digital tools would provide students with the environment to learn.

Services for mental mapping such as Gitmind can encourage the cognitive theory of multimedia learning developed by Mayer. This view assumes that people could better understand and retain information if the text was shown both visually and orally at the same time (Kustandi et al., 2021). Presently, using Gitmind to map out ideas can help a student in knowledge organization which is a tool for for understanding and retaining knowledge (Nurlia, 2023). The utilization of this technology is especially beneficial for teaching and learning in social sciences. Students' comprehension of the topic relies on their ability to connect the concepts. It is, therefore, crucial in such subjects as social sciences.

In addition, the positive contribution of Gitmind to learning efficiency is that it develops active learning. Active learning, involving students in the learning process through activities such as discussions, problem-solving, and collaboration, has been proven to boost the comprehension and memorization of information (Alimuddin et al., 2024). The fact that students are allowed to create and manipulate the mind map on Gitmind provides the possibility to get more involved in the learning process. This, in turn, serves as the springboard to their better learning.

The affordances of Gitmind are such as to show its congruence with the educational concepts of experience learning as outlined by Kolb's research (Rosidin, 2017) which draws attention to the significance of concrete experiences, reflective observation, abstract conceptualization, and active experimentation. Gitmind not only aspires to reach this level of learning but also to connect the main conceptual foundations that students acquire in real practice, thus reinforcing the actual comprehension they get.

5.3 Direct Impact of Gitmind on Learning Outcomes

The immediate influence of the use of Gitmind on the improvement of learning outcomes is considerable (Table 7). The research conducted by (Nurseto et al., 2020; Oktavianti et al., 2022; Widodo et al., 2016) all prove this claim, stating that digital technologies have "locked" the curriculum and have currently shifted students further forward to higher academic performance. Thus, boosting students' performance. This also fulfills the purpose of technology to replace old education methods with new ones that are more effective and interesting.

Although the results of the study indicate the positive effects of Gitmind use, other possible alternative explanations such as teacher involvement and quality of learning material, etc. can be posed for discussion. However, it could reasonably be claimed that Gitmind makes use of a structured and interactive design that helps students understand and remember the lesson. Other alternative reasons may explain the better performance of the intervention group, i.e. teacher's role in supporting and facilitating Gitmind use. Teachers who were more encouraging and supportive of Gitmind use could have indirectly enhanced students' learning outcomes too. Nevertheless, Gitmind has tools and functionality that allow students to learn by themselves and more effectively.

Moreover, the learning materials quality employed in this study might also lead to different results. Good-designed materials, which are based on student needs, will increase learning achievement no matter what tools are used. However, Gitmind facilitates to organizing and integration of information more meaningfully, which enriches learning.

Gitmind, the Digital solution, not only manages to make learning easier but also actualizes the activation of students' attention as well as their engagement. According to (Juliane et al., 2017), the current times have students who are born digital natives who are more reactive to interactive and technology-driven learning methods. Learning with Gitmind has been very helpful in influencing learning outcomes, however, it can be said that it became the vehicle to fulfill the students' preferences including the increase of the level of interaction, and self-engagement as well as making the learning process more fun. Furthermore, a study carried out by (Umar, 2024) shows that technology proves to be the primary driver of problem-based learning transforming the learning space of the students, and guiding the application of knowledge in real-world settings.

In addition, Gitmind is in line with Universal Design for Learning (UDL), which is a framework that emphasizes the necessity of presenting multiple ways of representation, engagement, and expression

to address different learning needs (Oyarzun et al., 2021). Gitmind, as a tool that uses visual and interactive modes, helps a child's information organization abilities, thus helping children who have an array of learning style requirements achieve success in their learning.

Moreover, the direct effect of Gitmind is quite closely associated with the humanistic theory of self-regulated learning. Through Gitmind, learners can create, execute, and appraise their learning effectively, which is one of the career success skills. This tool is dedicated to enabling students to grasp where they are and the path they need to follow to achieve their individual learning goals, hence promoting autonomy and responsibility in students.

5.4 Indirect Effects through Learning Effectiveness

In a separate analysis (Table 8) significant results of indirect effects were presented, clearly showing that the use of Gitmind has a positive impact on learning outcomes through the improvement of learning effectiveness. The verification by mediation of the effect is very clear, with affirmation from Agustina et al. (2024), Nurlia (2023), and Maisyarah (2018) being present. The mediational analysis, thus, suggests that the influence of this program is both direct in the form of enhancing learning and indirect through making the learning process more effective totally.

Some unexpected results indicate that the mediation effect is bigger than what we thought which implies that Gitmind can have a larger proportion of improving in student engagement compared with the traditional way of teaching and it indicates that it is necessary to use more innovative ways of teaching for students learning better.

These unexpected results also pointed to the potential of Gitmind as a tool for learning in the context of fostering collaborative learning. Students exposed to Gitmind were more likely to cooperate and talk with other groups. This was an important finding because it implies that Gitmind not only can support an individual but also may help in changing a classroom climate.

Besides, the mediation effect that is stronger than expected indicates that maybe there are some added values of Gitmind we haven't discovered yet. For instance, Gitmind may help students to develop their critical thinking and analytical thinking. So the adoption of this tool may have a positive influence on students' academic and career development in the long run.

This finding aligns with the concept of the Technology Acceptance Model (TAM) by Davis in research (Wida et al., 2016) that shows that perceived ease of use and perceived usefulness of technology determine users' attitudes towards its use, thus, it affects their performance. The use of Gitmind in this experiment, perhaps, contributed to students' prudential self-views of their learning product-teaching kids which leads to improved learning outcomes. Likewise, (Lai et al., 2023; Liu et al., 2010) anticipated TAM by bringing to the fore the function of outside variables, for instance, training, and support, in the involvement and the effective utilization of technology in educational settings.

In addition, this study showed the indirect effects of the importance of the overall impact of digital tools on the learning environment. For example, Gitmind may have contributed to a more collaborative and supportive classroom atmosphere, which has been indicated as one of the key factors that enhance student motivation and engagement (Handayani, 2023). By creating a community space, digital tools such as Gitmind can optimally aid the entire learning process.

Moreover, the influence of the learning effect should be seen as a mediator in the relationship between the use of Gitmind and learning. This strengthens the significance of students' self-awareness skillset development in learning. Metacognition which involves examining and controlling own learning process is of prime importance for academic accomplishment (Danial, 2010). It is Gitmind or the like of the Gitmind tool that can be used for metacognitive processes which can help students develop thinking through such activities as organizing their ideas, planning their study sessions, and tracking their learning progress.

5.5 New Insights and Implications

These findings are a new way of learning digital times, they are more focused on social sciences. Gitmind had a great effect on the learning process as a whole when it was used (Asrori et al., 2023). This suggests the teaching should think about various tools and techniques like the one used in equipment. Empirically, it was found that the mediation effect is based on the idea of applying such teaching strategies to enrich learning effectiveness and ameliorate the student's progress (Hidayatullah & Alsa, 2019).

This study has very important ideas. All teachers should be more and more inspired via the usage of digital teaching tools both for their activities and for making the studying process an outgoing and lively one (M. Sari et al., 2024). An excellent way to train teachers would be by organizing training programs and workshops where they could learn more practically about how these things work, as well as exchange methods for the better use of technology in the classroom (Chinny, 2023). Furthermore, schools should put money into the facilities needed to run technology solutions in the classroom (Andri, 2017).

Future research must delve into the implications of integrating digital tools in the learners' activities over a longer period and also investigate their influence depending on the educational settings and subjects. Besides, there is a call for investigating the possible issues that might arise in the process of using these devices as well as finding possible solutions to address them. For instance, concerns about the digital divide, access to technology and teacher readiness ought to be treated to ensure that equitable and effective implementation of digital tools in education is achieved (Iskandar et al., 2023; Wahyuni et al., 2022).

Moreover, future studies could investigate the specific features of digital tools that contribute to their effectiveness It is worth researching if students have the opportunity to find out which particular features of the likes of Gitmind (among other interactivity, visual representation, and ease of use) are most successful and, that way, the educators are capable of making informed decisions about their adoption and the use of the tools (Nurlia, 2023). Moreover, follow-up research could emphasize how digital tools are mostly combined with other training strategies such as the application of flipped classrooms and blended learning to make the impact of the tools on student outcomes bigger.

What is more, the findings of this study also have serious consequences for educational policy and practice. The decision-makers should get overwhelmed with the truth behind integrating digital tools into education and provide money to help support their migration, why This should include making provisions for technology infrastructure, training teachers to use the technology, and research projects to check if these digital tools are effective (Mukhid, 2023). Technology can change numerous aspects of teaching and learning when support policy makes it to be a reality (Wyman et al., 2023).

As well as the policy implications, the passing of this survey brings up the need for a continuous collaboration of the stakeholders—educators, researchers, and technology developers. In unity, they can ensure that the introduction of digital tools and their design will comply with the student's needs in the school (Wibowo et al., 2023).

Also, Gitmind brings about a positive result in terms of learning outcomes, a situation emphasizing the need to develop digital literacy among students (Pratama et al., 2022). Digital literacy encompasses more than just basic computer skills; it consists of a person's ability to (a) critically evaluate digital content, (b) communicate and collaborate effectively by using digital tools and (c) adapt to new technologies (Cynthia & Sihotang, 2023; Kusumastuti et al., 2021; Nugraha, 2022). Technology-based tools such as Gitmind can be infused into the course of study to help the students become proficient in these essential skills that in turn enable them to face the challenges of the modern work environment.

There is also some speculation that digital tools are greatly beneficial in fostering differentiated instruction (Muhasim, 2017; Nadila, 2024). The differentiation of instruction involves customizing the teaching practices so they fit the various learning needs of students (Isrotun, 2022). With the provision of various representations of information and giving students time to interact in different ways with the content, tools like Gitmind can help in the implementation of differentiated instruction and the attainment of the potential of all students.

6. Conclusions

This study addresses the issue of students struggling to understand and retain information from social studies lessons due to conventional mind mapping methods. By introducing the Gitmind application for mind mapping, the research aimed to enhance learning effectiveness and student outcomes in social studies. The findings demonstrate that Gitmind significantly improves learning effectiveness and student outcomes by fostering better comprehension and memory retention through interactive and dynamic mind mapping. This study confirms that technology integration, specifically through Gitmind, effectively resolves challenges in social studies learning by boosting student engagement and creativity. The novelty of this research lies in its focus on Social Science Education and the innovative application of Gitmind, highlighting its potential as a valuable educational tool. Future research should explore the application of Gitmind across diverse educational contexts and populations, examining its long-term impacts and potential to address various educational challenges.

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