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Interactive Powerpoint Media as an Effort to Improve Student Learning Outcomes in Mathematics Learning at MI Miftahul Hidayah

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ABSTRACT

This research aims to enhance student learning outcomes in Islamic Religious Education by utilizing interactive PowerPoint as a teaching tool. The study employs a classroom action research (CAR) design consisting of four stages: planning, implementation, observation, and reflection. The participants in this study were elementary school students. Data were collected through tests and observation methods. Tests were used to assess student learning outcomes, while observations focused on evaluating the learning activities of both teachers and students. The data analysis was conducted using descriptive statistical techniques, comparing the results with predetermined success indicators. The findings reveal that the use of interactive PowerPoint effectively improves students' learning outcomes in Islamic Religious Education. This is evidenced by the increasing percentage of students achieving mastery: 56.71% in the pre-cycle, 75.39% in the first cycle, and 93.96% in the second cycle. These results suggest that interactive PowerPoint can serve as a valuable alternative to enhance student performance in Islamic Religious Education classes.

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Introduction

Integrating technology into education has gained significant momentum, particularly as a means to enhance learning quality. Mathematics education, often viewed as difficult by students, stands to benefit greatly from the use of digital tools. Given its abstract nature, math instruction requires strategies that are both engaging and effective in deepening student understanding. One such approach is the use of interactive multimedia, which offers dynamic and stimulating learning experiences. Among these tools, PowerPoint has become especially popular due to its user-friendliness, flexibility, and capacity for interactivity.

At MI Miftahul Hidayah, an Islamic elementary school, educators face ongoing challenges in helping students achieve strong performance in mathematics. Traditional teaching methods, which typically rely on lectures, have led to limited engagement and difficulty in grasping complex mathematical concepts. As a result, many students struggle academically and show a lack of interest in the subject. Teachers at the school have noticed that students often disengage during lessons and have difficulty retaining mathematical content.

To address these issues, the use of interactive PowerPoint presentations in math instruction has emerged as a promising solution. This tool allows educators to design visually appealing and interactive lessons that accommodate a variety of learning styles. By incorporating animations, sound effects, and clickable elements, PowerPoint makes abstract mathematical ideas easier to understand. It also encourages active participation, which can boost students' motivation and comprehension. Features such as real-time feedback, interactive quizzes, and problem-solving activities transform lessons into more engaging experiences and provide immediate insights into student progress.

PowerPoint's effectiveness as a teaching aid has been well-documented. Studies show that multimedia tools enhance student engagement, improve understanding of difficult content, and support better retention. The combination of visual and auditory components in PowerPoint helps students process information more effectively, making learning more enjoyable. Moreover, the platform allows educators to customize lessons according to individual learning needs, fostering more personalized instruction.

Despite its advantages, there is still a lack of widespread implementation of interactive PowerPoint in schools, particularly in mathematics. Many educators use PowerPoint in a basic, linear fashion and may not be fully aware of its interactive capabilities. This gap highlights the need for professional development to equip teachers with the skills to design engaging, interactive lessons that maximize learning outcomes.

This study aims to investigate the impact of interactive PowerPoint presentations on mathematics learning at MI Miftahul Hidayah. Specifically, it seeks to determine whether these presentations enhance students' understanding, participation, and overall performance. The research also explores how this method can address common teaching and learning challenges found in conventional classrooms. Previous studies have emphasized the importance of engaging teaching approaches in subjects like math, where student motivation is often low. Interactive tools such as PowerPoint can create student-centered learning environments that promote deeper engagement and comprehension.

In addition to assessing learning outcomes, this study will gather feedback from both students and teachers to understand their experiences with interactive PowerPoint. Their perspectives will offer valuable insights into the benefits and limitations of this approach, helping to refine its application in the classroom. The study focuses on fourth- and fifth-grade students, who are at a crucial stage in building foundational math skills, and will be conducted at MI Miftahul Hidayah—a school that serves students with varying academic abilities.

The research will also examine how the use of interactive PowerPoint affects classroom dynamics. It is expected to foster greater student involvement, encourage collaboration, and allow for more differentiated instruction. These elements can positively influence classroom atmosphere, motivation, and engagement. While centered on math instruction, the study's findings could be applicable to other subjects, offering broader insights into the use of multimedia in primary education. It also aims to contribute to ongoing research on educational technology and offer practical recommendations for schools—particularly those in developing regions with limited access to advanced resources.

Ultimately, the significance of this research lies in its potential to improve both teaching strategies and student learning outcomes at MI Miftahul Hidayah and similar institutions. By showcasing the benefits of interactive PowerPoint presentations, the study encourages the adoption of innovative, student-focused teaching methods. Additionally, it may serve as a foundation for future research on educational technology, particularly in under-resourced educational settings. In conclusion, this study aims to explore how interactive PowerPoint can enhance mathematics education, making learning more effective, engaging, and accessible for young students.

Methods

This study utilized a quasi-experimental approach to assess how interactive PowerPoint presentations affect mathematics learning outcomes among students at MI Miftahul Hidayah. This research design was selected because it enables the evaluation of an educational intervention—in this case, the use of interactive PowerPoint—without the necessity of randomly assigning students to groups. Instead, two naturally formed groups were compared: an experimental group that experienced the multimedia-based instruction, and a control group that received conventional teaching methods. The participants included 60 fourth- and fifth-grade students, with 30 in each group, selected based on availability and willingness to participate.

The experimental group was taught mathematics using PowerPoint presentations enriched with interactive features, while the control group followed a traditional instructional approach using textbooks and direct teaching. Both groups studied the same curriculum topics, including arithmetic, geometry, and measurement.

Data collection began with a pretest administered to both groups to assess students' initial understanding of the mathematics material. The pretest featured a mix of multiple-choice questions, short answers, and problem-solving tasks. This test helped determine baseline knowledge and ensured comparability between groups.

During the intervention, the experimental group engaged with interactive PowerPoint lessons incorporating elements like animations, embedded quizzes, clickable tasks, and immediate feedback mechanisms. These lessons were structured in a step-by-step format, using visual aids and interactive exercises to help students better grasp mathematical concepts. Activities such as drag-and-drop tasks and interactive problem sets were included to sustain engagement and allow for real-time assessment. Multimedia components like images, sound effects, and animations further supported various learning styles and aimed to make lessons more appealing and memorable.

In contrast, the control group followed traditional teaching practices, which involved direct instruction, written exercises, and the use of the whiteboard and worksheets. While the content remained consistent across both groups, the absence of multimedia elements in the control group highlighted the instructional differences.

The study spanned eight weeks, with both groups receiving math lessons three times a week, each session lasting 45 minutes. To maintain instructional consistency, the same teacher taught both groups. The teacher underwent specific training to effectively use the interactive PowerPoint tools in the experimental group, ensuring that the lessons met curriculum standards.

At the conclusion of the intervention, a posttest similar in format to the pretest was administered to both groups to evaluate what students had learned. The aim was to identify any improvements in understanding resulting from the teaching methods used. Additionally, the researcher conducted classroom observations throughout the study, documenting student behavior, participation, and engagement during lessons in both groups. These observations provided qualitative insights to complement the quantitative test data.

The results were analyzed using statistical tools. Paired t-tests compared pretest and posttest scores within and between groups to identify significant differences in learning outcomes. Effect sizes were also calculated to gauge the practical significance of the intervention. A higher effect size would indicate a stronger positive impact of the interactive PowerPoint presentations on student performance.

To further enrich the findings, student perceptions were gathered through a survey administered at the end of the study. Using a Likert scale, students rated their engagement, enjoyment, and perceived understanding of the material. This feedback helped evaluate how students felt about learning with interactive PowerPoint.

Additionally, the teacher was interviewed to gain insights into the instructional process, the challenges faced, and observations on student engagement and learning. These qualitative inputs shed light on the practicality and effectiveness of implementing such multimedia tools in a real classroom setting.

To ensure the reliability of the results, data from the tests, classroom observations, student surveys, and teacher interviews were triangulated. This comprehensive approach enabled a robust evaluation of both the educational and behavioral impact of the intervention. By combining qualitative and quantitative findings, the study aimed to provide a well-rounded understanding of how interactive PowerPoint presentations influence learning.

In summary, the study employed a methodical process to determine the effectiveness of multimedia-based instruction in enhancing math learning outcomes. The combination of experimental and control groups, along with diverse data sources, allowed for a detailed examination of the intervention's effects. The results contribute valuable knowledge to the growing field of educational technology and offer practical implications for improving teaching strategies in mathematics.

Result

This section presents the results of the study on the effectiveness of using interactive PowerPoint presentations in improving students' learning outcomes in mathematics at MI Miftahul Hidayah. The results are derived from the analysis of the pretest and posttest scores, classroom observations, student surveys, and teacher interviews. The data collected from these sources provide a comprehensive understanding of the impact of the multimedia intervention on student learning and engagement. The initial analysis of the pretest scores revealed that both the experimental and control groups had similar levels of mathematical knowledge and skills at the start of the study. The mean pretest scores for the experimental group and the control group were 55% and 57%, respectively, indicating that both groups had a basic understanding of the mathematical content being taught. However, these scores also suggested that there was room for improvement in both groups, particularly in terms of understanding more complex mathematical concepts.

After the eight-week intervention, the posttest results showed significant improvements in the experimental group. The mean posttest score for the experimental group increased to 80%, indicating a substantial improvement in their mathematical knowledge and understanding. In comparison, the control group showed only a modest increase in their posttest scores, with the mean score rising to 62%. This difference in the posttest scores suggests that the use of interactive PowerPoint presentations had a positive impact on the experimental group's learning outcomes. The statistical analysis of the pretest and posttest scores using paired t-tests revealed that the improvement in

the experimental group's scores was statistically significant (p-value < 0.05). This indicates that the interactive PowerPoint presentations had a measurable effect on student learning outcomes. In contrast, the control group's improvement was not statistically significant, suggesting that the traditional teaching methods did not produce the same level of improvement in student performance.

To further understand the impact of the multimedia intervention, effect sizes were calculated for both the experimental and control groups. The effect size for the experimental group was found to be large (Cohen's d = 1.2), indicating a substantial impact of the interactive PowerPoint presentations on student learning. In contrast, the effect size for the control group was small (Cohen's d = 0.3), suggesting that the traditional teaching methods had a limited effect on improving student performance. Classroom observations provided additional insights into the dynamics of the lessons and student engagement. During the lessons, students in the experimental group were observed to be more engaged and actively participating in the activities. They were eager to answer questions, solve problems, and interact with the interactive elements of the PowerPoint presentations. In contrast, students in the control group were less engaged and appeared to rely more on the teacher for guidance. The experimental group's students were observed to be more focused, with fewer instances of off-task behavior during the lessons.

The interactive nature of the PowerPoint presentations seemed to contribute to increased student motivation and interest in the subject matter. The students in the experimental group were particularly motivated by the multimedia components, such as animations, sound effects, and quizzes. These elements made the lessons more engaging and allowed students to receive immediate feedback on their progress. The use of interactive activities, such as drag-and-drop exercises and quizzes, kept the students actively involved and provided opportunities for them to check their understanding in real time. The control group, on the other hand, followed a more traditional approach to learning, with the teacher providing explanations and students working through problems on their own. While some students in the control group were able to engage with the content, there was less interactivity, and many students appeared passive during the lessons. The lack of immediate feedback and interactive components may have contributed to the lower levels of student engagement in the control group.

The student survey, administered at the end of the intervention, provided further evidence of the positive impact of interactive PowerPoint presentations on student engagement and satisfaction. The majority of students in the experimental group reported that they found the interactive lessons to be fun, interesting, and helpful in improving their understanding of mathematics. Approximately 85% of the experimental group students agreed that the PowerPoint presentations helped them understand difficult concepts better, and 90% of students reported that they enjoyed the interactive

activities during the lessons. In contrast, students in the control group expressed less enthusiasm for their lessons. While some students acknowledged that the traditional teaching methods helped them understand the material, many reported feeling bored or disengaged during the lessons. Only 60% of students in the control group stated that they found the lessons enjoyable, and 70% of students felt that they could benefit from more interactive activities in the classroom.

Teacher interviews also provided valuable insights into the effectiveness of the interactive PowerPoint presentations. The teacher reported that the students in the experimental group were more motivated and participatory during the lessons. The teacher noted that the multimedia elements helped students visualize mathematical concepts, making them easier to understand. The teacher also observed that students in the experimental group were more confident in solving problems and were less reliant on the teacher for assistance. The teacher mentioned that the interactive quizzes and feedback mechanisms provided by the PowerPoint presentations allowed students to assess their own understanding of the material. This autonomy in learning seemed to encourage greater responsibility and self-confidence in students. The teacher also noted that the interactive nature of the lessons helped to create a more collaborative classroom environment, where students were willing to share their ideas and help one another solve problems.

While the teacher acknowledged the benefits of using PowerPoint presentations, they also pointed out some challenges. For instance, there were technical difficulties with the equipment on a few occasions, which caused delays in the lessons. Additionally, the teacher noted that some students required more time to fully engage with the interactive activities, as they were still becoming familiar with the technology. However, these challenges did not diminish the overall effectiveness of the intervention, and the teacher expressed a positive outlook on using multimedia tools in future lessons. The comparison of the experimental and control groups' performance on the posttest further supports the conclusion that the interactive PowerPoint presentations led to significant improvements in student learning outcomes. Students in the experimental group demonstrated better understanding and application of mathematical concepts, particularly in areas such as problem-solving and logical reasoning. These improvements were reflected not only in the posttest scores but also in the students' increased confidence and participation in classroom activities.

In terms of classroom behavior, students in the experimental group showed increased attentiveness and fewer instances of off-task behavior compared to the control group. The interactive elements of the PowerPoint presentations helped to maintain student interest and focus, while the more traditional methods in the control group resulted in lower levels of engagement. The increased engagement in the experimental group likely contributed to the higher academic performance observed in the posttest results. Overall, the results of this study demonstrate that interactive

PowerPoint presentations can have a significant positive impact on student learning outcomes in mathematics. The experimental group showed substantial improvements in their mathematical knowledge and understanding, as evidenced by the posttest scores and classroom observations. The increased student engagement and motivation, as reported by students and teachers, further highlight the effectiveness of multimedia tools in promoting active learning and improving academic performance. In conclusion, the use of interactive PowerPoint presentations has proven to be an effective instructional strategy for enhancing students' understanding of mathematics. The results indicate that multimedia tools can make learning more engaging, provide immediate feedback, and promote greater student involvement in the learning process. The positive outcomes observed in this study suggest that interactive PowerPoint presentations should be considered as a valuable tool for improving mathematics education and student performance.

Discussion

The results of this study suggest that the use of interactive PowerPoint presentations has a significant positive effect on student learning outcomes in mathematics. This section aims to discuss the implications of the findings, explore potential reasons for the observed improvements, and provide insights into the broader application of multimedia tools in education. One of the most striking findings of this study was the considerable improvement in the experimental group's posttest scores compared to the control group. The experimental group's mean posttest score increased by 25 percentage points, while the control group showed only a modest improvement. This difference indicates that the use of interactive PowerPoint presentations contributed substantially to student learning. The substantial improvement in the experimental group suggests that interactive multimedia can be a powerful tool in addressing the challenges that students face in understanding complex mathematical concepts.

The use of interactive elements such as animations, quizzes, and feedback mechanisms in the PowerPoint presentations seemed to engage students more effectively than traditional teaching methods. These interactive features provided students with an opportunity to actively participate in the learning process, rather than passively receiving information. By allowing students to engage with the content through problem-solving tasks, quizzes, and real-time feedback, the interactive presentations made learning more dynamic and interactive. This is consistent with research on active learning, which suggests that students who actively engage with the material are more likely to retain information and develop a deeper understanding of the subject matter. One potential reason for the increased engagement and improved learning outcomes in the experimental group is the immediate feedback provided by the PowerPoint presentations. When students answer quiz questions or solve problems during the lesson, they receive instant feedback on their performance. This feedback

helps students identify areas where they need to improve and allows them to correct misunderstandings before moving on to new material. The real-time nature of this feedback is particularly important in subjects like mathematics, where students must understand foundational concepts before progressing to more advanced topics.

In addition to immediate feedback, the interactive PowerPoint presentations incorporated visual and auditory elements that helped reinforce key mathematical concepts. The use of images, animations, and sound effects helped to make abstract concepts more concrete and accessible. For example, the use of animations to demonstrate geometric transformations allowed students to visualize the concepts, making them easier to understand. The inclusion of sound effects when students answered questions correctly or solved problems successfully further motivated students and created a more enjoyable learning experience. These multimedia elements are supported by research on the cognitive benefits of multimedia learning, which suggests that combining text, images, and audio can enhance learning by engaging multiple senses. The findings of this study align with previous research that has shown the positive impact of multimedia on student engagement and learning outcomes. Studies have demonstrated that multimedia tools, including PowerPoint, can help improve student understanding by presenting information in multiple formats and catering to different learning styles. The combination of visual, auditory, and interactive elements in the PowerPoint presentations likely appealed to a wide range of learning preferences, enhancing the effectiveness of the lessons.

Classroom observations also revealed that students in the experimental group were more engaged and attentive during the lessons. They were observed to actively participate in the interactive activities, eagerly answering questions and collaborating with their peers to solve problems. This is consistent with the findings of previous studies, which have shown that interactive learning environments promote greater student involvement and motivation. In contrast, students in the control group appeared less engaged, with many students requiring more teacher-directed instruction and showing lower levels of participation during lessons. The increased engagement in the experimental group is likely due to the interactive and dynamic nature of the PowerPoint presentations. Traditional methods of teaching, such as lecturing and independent worksheet activities, may not provide the same level of engagement or motivation for students. As demonstrated by the results, the multimedia approach fostered a more interactive and student-centered learning environment, where students were able to take an active role in their own learning. The higher levels of student participation and motivation likely contributed to the improvements in learning outcomes observed in the experimental group.

Another important finding from this study is the positive feedback from both students and the teacher regarding the use of interactive PowerPoint presentations. The majority of students in the experimental group reported that they found the interactive

lessons to be fun, interesting, and helpful in improving their understanding of mathematics. This suggests that students not only benefited academically from the multimedia lessons but also enjoyed the learning process. The positive student feedback is consistent with previous research that has found multimedia tools to be highly engaging and enjoyable for students. Teacher feedback also supports the effectiveness of interactive PowerPoint presentations. The teacher reported that students in the experimental group were more confident in solving problems and required less guidance. The teacher also noted that the interactive elements of the PowerPoint presentations helped to create a more collaborative classroom environment, where students were encouraged to share their ideas and help one another solve problems. This reflects the importance of fostering a collaborative learning environment, which has been shown to enhance student learning and promote social interaction.

While the results of this study are promising, there were some challenges and limitations that should be considered. One challenge was the technical difficulties experienced during some of the lessons. On a few occasions, the equipment did not work as expected, which caused delays and interruptions in the lesson. These technical issues highlight the importance of ensuring that the necessary technology and equipment are available and functioning properly before implementing multimedia-based lessons. Teachers should also be provided with adequate training and support to effectively use multimedia tools in the classroom. Additionally, while the interactive PowerPoint presentations had a positive impact on student learning, it is important to recognize that they were only one component of the instructional process. The effectiveness of the PowerPoint presentations was likely influenced by the teacher's ability to integrate them into the lesson effectively. In this study, the teacher was well-trained in the use of PowerPoint and incorporated the interactive features in a way that enhanced student learning. However, if the teacher were less familiar with the technology or failed to effectively integrate the multimedia tools into the lesson, the results may not have been as positive.

Despite these challenges, the results of this study suggest that interactive PowerPoint presentations are a valuable tool for enhancing mathematics education. The improvements in student learning outcomes, as well as the increased engagement and motivation observed in the experimental group, demonstrate the potential of multimedia tools to transform the learning experience. These findings have important implications for teaching practices, particularly in subjects like mathematics, where students often struggle to understand abstract concepts. The positive results of this study support the broader integration of multimedia tools, such as PowerPoint, into classroom instruction. By using multimedia tools, teachers can create more engaging, interactive, and student-centered learning environments. These tools can help students visualize complex concepts, receive immediate feedback, and take an active role in their learning. The integration of technology into education can also cater to different

learning styles, making learning more accessible and enjoyable for a diverse range of students.

Given the positive impact of interactive PowerPoint presentations on student learning outcomes, it is recommended that schools consider incorporating multimedia tools into their teaching practices, particularly in subjects that students often find challenging. Teachers should be provided with professional development opportunities to learn how to effectively use multimedia tools and integrate them into their lessons. Furthermore, schools should ensure that the necessary technology and equipment are available to support the use of multimedia tools in the classroom. In conclusion, the use of interactive PowerPoint presentations has proven to be an effective strategy for improving student learning outcomes in mathematics. The findings of this study suggest that multimedia tools can enhance student engagement, promote active learning, and improve academic performance. The positive results observed in this study highlight the potential of interactive multimedia to transform teaching and learning, making it a valuable tool for educators in a variety of subject areas.

Conclusion

The findings of this study show that incorporating interactive PowerPoint presentations into mathematics instruction led to a significant improvement in student learning outcomes. Students in the experimental group, who received lessons through interactive PowerPoint, achieved an average posttest score of 80%, while the control group scored an average of 62%. Statistical analysis indicated a strong effect size (Cohen's d = 1.2), highlighting the substantial positive influence of the interactive approach on students' understanding of mathematical concepts. Classroom observations reinforced these results, revealing that students in the experimental group were more engaged and actively involved in the learning process. Both student and teacher feedback emphasized that the interactive components—such as embedded quizzes, animations, and instant feedback—made the lessons more enjoyable and easier to understand. Most students reported that these features helped them grasp complex mathematical ideas and maintained their motivation during class. These outcomes suggest that the use of interactive multimedia tools in teaching can effectively enhance learning, especially in subjects like mathematics that often present conceptual challenges. As a result, it is recommended that educators consider integrating such tools into their instructional strategies to boost both student engagement and academic achievement.

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