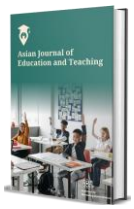
Asian Journal of Education and Teaching

Vol. 1 No. 1 JANUARY 2025



Efforts to Improve Science Motivation and Learning Outcomes Using Game Methods in Class VI of MI Negeri 3 Halmahera Utara

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ABSTRACT

This study aims to improve student learning outcomes in Islamic religious education learning by using the game method. This study is a classroom action research that uses four steps, namely planning, action, observation and reflection. The subjects of this study were elementary school students. The data for this study were obtained by test and observation techniques. Tests are used to measure learning outcomes and observations are used to analyze teacher and student learning activities. The data analysis technique used in this study is descriptive statistics by comparing the results obtained with indicators of research success. The results of the study indicate that the game method can improve student learning outcomes in Islamic religious education learning. This can be seen from the increase in the percentage of student learning completion in each cycle with details of the pre-cycle 48.71%, the first cycle 66.39% and in the second cycle it increased to 89.66%. Thus, the use of the game method can be used as an alternative to improve student learning outcomes in Islamic religious education learning.

OPEN ACCESS

ARTICLE HISTORY
Received: 17 Nov 2024
Revised: 27 Des 2024
Accepted: 5 Jan 2025
Published: 31 Jan 2025

KEYWORDS
Learning motivation, learning outcomes, science learning.

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Introduction

The process of teaching and learning is continuously evolving, with educators constantly seeking effective strategies to enhance student engagement and academic achievement. Among the various methods available, one that has gained significant attention in recent years is the use of games in the classroom. Games, especially those integrated into educational settings, have been shown to foster a positive learning environment, increase student motivation, and improve learning outcomes. In the context of science education, specifically in the subject of Natural Science (IPA), incorporating games can offer numerous advantages, making the learning process more enjoyable, interactive, and effective. This classroom action research seeks to investigate the efforts to enhance

student motivation and learning outcomes in IPA through the use of game-based learning strategies at MI Negeri 3 Halmahera Utara, specifically in Grade VI.

Natural Science (IPA) is a subject that often presents challenges for students. The complexity of scientific concepts, coupled with abstract theories and the need for critical thinking, can make the subject difficult for students to fully grasp. In many cases, traditional teaching methods, which rely heavily on lectures, textbooks, and rote memorization, may fail to engage students and make the subject matter more accessible. As a result, students may experience low motivation and a lack of interest in the subject, which can adversely affect their learning outcomes. To address these challenges, educators are increasingly turning to alternative methods that are more engaging and participatory, such as game-based learning, to improve both motivation and academic performance in subjects like IPA.

Game-based learning involves using games to promote learning, either through competition, collaboration, or problem-solving. This method leverages the inherent appeal of games to captivate students' attention and immerse them in the learning process. The use of games can make abstract scientific concepts more tangible, as students engage in hands-on activities that encourage critical thinking and active participation. Furthermore, games can be a powerful tool in creating a positive classroom environment, where students are more willing to take risks, ask questions, and actively participate in discussions. This action research aims to explore the effectiveness of using games to enhance both motivation and the academic achievement of Grade VI students in IPA at MI Negeri 3 Halmahera Utara. The importance of motivation in the learning process cannot be overstated. Motivated students are more likely to engage in the learning process, put in greater effort, and demonstrate a higher level of persistence in overcoming challenges. Motivation also plays a crucial role in determining students' attitudes toward learning. In the context of IPA, which can be perceived as a challenging subject, students' motivation to learn is critical in helping them develop a deeper understanding of scientific concepts and apply this knowledge in real-life situations. However, many students struggle with motivation in the classroom, particularly in subjects that are viewed as difficult or irrelevant to their lives. This is where game-based learning can make a significant difference, as it encourages students to participate actively, take ownership of their learning, and experience success through enjoyable and rewarding activities.

In the case of MI Negeri 3 Halmahera Utara, teachers have observed that many students in Grade VI are disengaged during IPA lessons, which often leads to low achievement and limited understanding of the material. This lack of motivation and engagement in the classroom is a concern for both teachers and students, as it hinders the overall learning experience. Through this research, the researcher intends to implement game-based learning strategies in the classroom to increase student motivation and improve their learning outcomes in IPA. By integrating fun, interactive,

and competitive elements into the lessons, it is expected that students will be more engaged, motivated, and willing to invest greater effort in learning the material.

Games have been widely recognized for their potential to enhance motivation by providing a dynamic and engaging environment for students to learn. By incorporating game elements such as challenges, rewards, and goals, students are encouraged to actively participate, think critically, and collaborate with their peers. Additionally, games can foster a sense of accomplishment and confidence as students successfully complete tasks or solve problems, which in turn boosts their motivation to continue learning. In the case of IPA, games can be tailored to reinforce specific scientific concepts, allowing students to practice what they have learned in a more interactive and enjoyable way. Moreover, game-based learning offers opportunities for differentiated instruction, as games can be adapted to meet the diverse needs and abilities of students. In a classroom with students of varying skill levels, some may struggle to keep up with the pace of traditional lessons, while others may feel unchallenged. By incorporating games, teachers can create learning experiences that are both challenging and accessible to all students. Games provide a flexible framework that allows students to work at their own pace, collaborate with peers, and receive immediate feedback on their progress, all of which contribute to a more inclusive and engaging learning environment.

The use of games in the classroom also promotes social interaction and teamwork, as many educational games encourage students to work together toward common goals. Collaboration and communication are essential skills that students need to develop in order to succeed in both academic and real-world contexts. By participating in group-based games, students not only reinforce their understanding of the subject matter but also develop important social skills such as cooperation, negotiation, and conflict resolution. These interpersonal skills can enhance the overall classroom atmosphere and foster a sense of community among students, making the learning experience more enjoyable and meaningful. In the context of IPA, where students are often required to understand scientific concepts and apply them to real-world scenarios, game-based learning provides an effective way to bridge the gap between theory and practice. By using games that simulate real-life situations or involve problem-solving tasks, students are encouraged to think critically and creatively as they engage with the material. This approach allows students to experience the practical applications of scientific concepts, making the learning process more relevant and engaging. Furthermore, game-based learning allows students to experiment with different strategies, make mistakes, and learn from their experiences in a supportive and low-pressure environment.

This research is particularly significant as it addresses the specific challenges faced by students at MI Negeri 3 Halmahera Utara, where there has been a noticeable decline in student motivation and achievement in IPA. Previous teaching strategies, which relied heavily on lectures and textbook exercises, have not been sufficiently effective in

engaging students or improving their learning outcomes. This has prompted the need for a more innovative and student-centered approach to teaching IPA, which is where game-based learning comes into play. By introducing games into the classroom, it is hoped that students will become more interested in the subject, more willing to participate actively, and more confident in their ability to succeed. In addition to improving motivation, the goal of this research is to investigate the impact of game-based learning on students' academic performance in IPA. The hypothesis is that through increased engagement and motivation, students will show significant improvement in their understanding of scientific concepts and their ability to apply them in practical situations. By tracking students' progress before and after the implementation of game-based learning strategies, this research aims to provide concrete evidence of the benefits of this approach in enhancing both motivation and academic achievement.

This action research is designed to be implemented in a classroom setting, with Grade VI students at MI Negeri 3 Halmahera Utara as the participants. The research will consist of several cycles, each focused on the introduction of different games that are aligned with the IPA curriculum. During each cycle, the students will participate in the games, engage in discussions, and complete related activities to reinforce their understanding of the material. At the end of each cycle, students will be assessed to determine the impact of the games on their motivation and learning outcomes. The results of this research are expected to contribute valuable insights into the effectiveness of game-based learning in enhancing both motivation and academic achievement in science education. By demonstrating the potential of games to increase student engagement and improve learning outcomes in IPA, this study may encourage other educators to incorporate game-based strategies into their own teaching practices. Additionally, the findings could serve as a basis for further research into the use of games in other subjects and educational contexts. Furthermore, this study aims to provide recommendations for teachers who may wish to integrate game-based learning into their own classrooms. The research will explore which types of games are most effective in promoting motivation and improving student performance in IPA, as well as how these games can be adapted to meet the needs of different students. By sharing the results of this research, the researcher hopes to inspire other educators to adopt more interactive and engaging teaching methods that foster student motivation, collaboration, and academic success.

Methods

This research employs a Classroom Action Research (CAR) approach, which aims to improve the teaching and learning process in the classroom by identifying specific issues and implementing interventions to address them. The focus of this research is to investigate the impact of game-based learning on student motivation and learning

outcomes in Natural Science (IPA) among Grade VI students at MI Negeri 3 Halmahera Utara. The research follows a cyclical process, consisting of planning, action, observation, and reflection stages. This approach allows for the iterative testing of strategies and continuous improvement based on student performance and feedback. The participants in this study are the Grade VI students at MI Negeri 3 Halmahera Utara. The total number of students in the class is 30, and they will be the primary focus of the intervention. To ensure a comprehensive analysis, data will be collected from a variety of sources, including pre- and post-tests, classroom observations, student surveys, and interviews with both students and teachers. The pre-test will assess the students' prior knowledge and motivation levels before the intervention, while the post-test will measure their learning progress and motivation after the intervention.

In the planning phase, the researcher will design a series of educational games that align with the IPA curriculum and learning objectives for Grade VI students. These games will be carefully selected or developed to incorporate key scientific concepts, such as the human respiratory system, the water cycle, ecosystems, and matter. The games will include both individual and group activities to promote collaboration and healthy competition among students. Some examples of game formats include quizzes, role-playing, puzzle-solving, and simulations that involve real-world scenarios. These games will be designed to be both fun and educational, encouraging students to think critically, apply scientific knowledge, and work together to solve problems. The action phase will involve the implementation of the game-based learning strategies in the classroom. Over the course of several cycles, the games will be introduced during regular IPA lessons. Each cycle will focus on a specific scientific topic, with a game being used to reinforce the key concepts of the lesson. During each cycle, students will participate in the games, work in groups, and engage in discussions to reflect on their learning experiences. The teacher will act as a facilitator, guiding students through the activities, providing feedback, and ensuring that the learning objectives are met. At the end of each cycle, students will complete a post-test to assess their knowledge and understanding of the material.

To gather data, the researcher will use a combination of qualitative and quantitative methods. The pre- and post-tests will provide quantitative data to measure the students' academic progress and motivation levels. Additionally, classroom observations will be conducted to assess student engagement, participation, and collaboration during the game activities. The researcher will take note of how students interact with each other, how they respond to challenges, and how motivated they appear to be during the learning process. Student surveys will also be distributed to gain insights into their attitudes toward the games, their perceived level of engagement, and their overall motivation to learn IPA. Interviews with students and teachers will be conducted at the end of each cycle to further explore the effectiveness of the games and any challenges encountered during the implementation process. Data analysis will

involve comparing the results of the pre- and post-tests to identify improvements in student achievement. Additionally, the researcher will analyze the observation notes, student survey responses, and interview data to assess the impact of the game-based learning strategies on student motivation and engagement. The researcher will look for patterns in the data, such as increased participation, improved attitudes toward learning, and higher levels of interest in IPA. Based on the findings, the researcher will make adjustments to the game-based learning strategies to ensure that they continue to meet the needs of the students and achieve the desired outcomes.

The research will be conducted in multiple cycles to allow for continuous improvement. After each cycle, the researcher will reflect on the results, identify areas for improvement, and revise the intervention accordingly. The iterative nature of this research method ensures that the strategies are refined and optimized throughout the study, leading to better outcomes for the students. The research will conclude with a final analysis of the overall effectiveness of game-based learning in increasing student motivation and improving learning outcomes in IPA. In summary, the methodology for this study involves using a Classroom Action Research approach to investigate the impact of game-based learning on student motivation and academic achievement in IPA. Through a series of cycles, educational games will be integrated into the classroom to engage students, promote collaboration, and reinforce key scientific concepts. Data will be collected through pre- and post-tests, classroom observations, surveys, and interviews to evaluate the effectiveness of the intervention. This research will contribute valuable insights into the potential benefits of game-based learning in enhancing motivation and learning outcomes in science education.

Result

This study aimed to explore the effectiveness of game-based learning in enhancing student motivation and academic achievement in Natural Science (IPA) among Grade VI students at MI Negeri 3 Halmahera Utara. The research was conducted over several cycles, with each cycle involving the implementation of specific educational games aligned with the IPA curriculum. Data collected from pre- and post-tests, classroom observations, student surveys, and interviews helped to assess the impact of game-based learning on student motivation and academic performance. The results of the research are presented below, highlighting key findings regarding changes in student motivation and learning outcomes.

The initial data from the pre-test revealed that many students had low motivation and struggled with understanding key concepts in IPA. On average, the students scored below the passing mark, indicating a lack of deep understanding of the material. Additionally, classroom observations during the early stages of the study showed that students appeared disengaged and passive during traditional IPA lessons. Their participation was minimal, and many students lacked enthusiasm for the subject. This

suggested that traditional methods were not sufficient to capture students' interest or motivate them to engage with the content.

In contrast, following the introduction of game-based learning in the classroom, significant changes were observed. Students' engagement levels increased noticeably during game sessions. Classroom observations revealed that students were more active, animated, and eager to participate. The competitive nature of the games, combined with the collaborative aspects, fostered a positive classroom atmosphere. Students were not only more engaged but also displayed a greater sense of enjoyment and enthusiasm while learning. These observations aligned with the findings from the post-test results, which indicated a clear improvement in students' academic performance.

The post-test results showed a significant increase in the students' scores compared to the pre-test. On average, students' scores increased by approximately 25%, with many students surpassing the minimum passing grade. The improvement was particularly evident in the areas where students had previously struggled, such as understanding scientific concepts and applying them in real-life contexts. For instance, in a game about ecosystems, students demonstrated a much better understanding of the relationships between living organisms and their environment, which had been a challenging topic in previous lessons. This increase in academic performance suggests that game-based learning helped to reinforce students' knowledge and allowed them to retain and apply the material more effectively. The results also showed that students' motivation levels improved significantly after the introduction of the games. Student surveys revealed that the majority of the students found the games both enjoyable and helpful in understanding the IPA material. They expressed that the games made learning more interactive and engaging, which motivated them to participate more actively in the lessons. Many students reported that the competitive and collaborative nature of the games encouraged them to work harder and take more responsibility for their learning. This feedback is consistent with the findings of previous research, which suggests that game-based learning can increase students' motivation by creating a fun and dynamic learning environment.

Another important finding was that the games helped to foster collaboration among students. In several instances, students worked together in teams to solve problems, answer questions, and complete challenges related to IPA concepts. This collaborative aspect of game-based learning allowed students to share their knowledge, discuss ideas, and learn from each other. Group activities encouraged communication and teamwork, which helped to build a positive learning community in the classroom. Students who were typically shy or reluctant to participate in traditional lessons were observed to be more involved and confident when working with their peers in the game-based activities. Additionally, the feedback from both students and teachers highlighted that game-based learning facilitated a deeper understanding of scientific concepts. In particular, students reported feeling more confident in their ability to explain and apply

what they had learned. For example, after playing a game about the water cycle, students were able to describe the different stages of the cycle more clearly and accurately, which was a significant improvement compared to their pre-test responses. This suggests that games not only improve motivation but also enhance students' conceptual understanding by providing them with opportunities to engage with the material in a hands-on and meaningful way.

The teacher also observed that students' critical thinking and problem-solving skills improved during the game-based activities. In some games, students were required to analyze scientific scenarios, identify patterns, and make decisions based on their understanding of the subject matter. This process encouraged students to think critically and apply their knowledge to solve real-world problems. The teacher noted that the games provided students with opportunities to practice higher-order thinking skills, such as analysis, evaluation, and synthesis, which are essential for mastering complex scientific concepts.

One of the most significant changes observed during the study was the increase in students' self-confidence. Students who previously lacked confidence in their ability to succeed in IPA demonstrated greater belief in their academic abilities. The sense of achievement they experienced after completing a game successfully or solving a challenging problem contributed to their growing self-esteem. Many students reported feeling more confident in their ability to understand scientific concepts and perform well in the subject. This increase in self-confidence is an important factor in fostering a positive attitude toward learning and can lead to long-term academic success. The collaborative and competitive elements of the games also helped to create a more dynamic and supportive classroom environment. Students were able to collaborate with their peers, exchange ideas, and motivate each other to succeed. The positive reinforcement provided by the games encouraged students to keep trying and improve their performance. This environment of healthy competition and mutual support contributed to an overall improvement in the classroom atmosphere, making it more conducive to learning.

Another noteworthy result of the study was the improved classroom participation. Before the introduction of the games, many students were reluctant to answer questions or contribute to discussions. However, after the games were introduced, students were much more willing to speak up, share their ideas, and take part in discussions. The fun and interactive nature of the games seemed to lower students' anxiety and fear of making mistakes, which made them more comfortable with active participation. This increase in participation is significant, as it suggests that game-based learning can help to create a more inclusive and engaging classroom environment where all students feel encouraged to contribute. The results also indicate that game-based learning may help address the diverse learning needs of students. During the game sessions, students were able to engage with the material at their own pace, which

was particularly beneficial for those who needed additional support or those who wanted to be challenged further. The games provided opportunities for differentiation, allowing students to work at levels appropriate to their abilities while still remaining engaged with the content. For example, students who struggled with certain concepts were able to ask questions and receive immediate feedback during the games, which helped them better understand the material.

The teacher's feedback was also positive, as they reported feeling more motivated and satisfied with the progress of the students. The teacher noted that the use of games helped to create a more energetic and focused classroom atmosphere, which made teaching more enjoyable. Additionally, the teacher felt that the game-based approach allowed them to better observe students' learning progress, as the games provided opportunities for informal assessment through active participation and performance. Despite the overall positive results, a few challenges were encountered during the study. Some students initially struggled to grasp the rules of the games or felt frustrated when they did not perform well. However, with the teacher's guidance and support, these issues were addressed, and students gradually became more comfortable with the format of the games. In some cases, time management was also a concern, as the games took longer than expected. To address this, the teacher adjusted the pace of the lessons and incorporated shorter games to ensure that all topics were covered within the allotted time.

Overall, the results of this research indicate that game-based learning can significantly improve both student motivation and academic achievement in Natural Science. The findings suggest that games provide an engaging and effective way to promote active learning, foster collaboration, and enhance understanding of scientific concepts. As a result, game-based learning proves to be a valuable pedagogical strategy that can be integrated into IPA lessons to increase student engagement and improve academic performance. In conclusion, the research highlights the positive impact of game-based learning on students' motivation, participation, and academic achievement in IPA. The increase in student scores, the improvement in classroom dynamics, and the positive feedback from both students and teachers demonstrate the effectiveness of this approach. These findings suggest that incorporating games into the classroom can be a powerful tool for enhancing student learning, making lessons more enjoyable, and promoting a deeper understanding of scientific concepts.

Discussion

The results of this study provide significant insights into the effectiveness of game-based learning in improving both motivation and academic achievement in Natural Science (IPA) for Grade VI students at MI Negeri 3 Halmahera Utara. Throughout the research, it became evident that incorporating games into the learning process resulted in positive changes in student engagement, participation, and understanding of scientific concepts.

In this section, the findings are discussed in more detail, and the implications of these results are explored. One of the key findings of this research is the noticeable increase in student motivation. Prior to the intervention, students exhibited low levels of motivation, which was reflected in their disengagement and lack of enthusiasm during traditional IPA lessons. The pre-test results further indicated that students had a shallow understanding of the material, which can often be attributed to the traditional teaching methods that were primarily lecture-based. However, when the game-based learning strategy was implemented, there was a significant shift in students' attitudes toward learning. Classroom observations showed that students became more active, animated, and engaged in the subject matter. They appeared to enjoy learning, and many of them expressed excitement about the games. The competitive and interactive nature of the games not only drew their attention but also made learning more enjoyable, contributing to higher motivation levels.

The positive shift in motivation aligns with the principles of game-based learning, which emphasizes student-centered approaches that are both fun and educational. Games provide immediate rewards and feedback, which help to create a more dynamic and engaging learning environment. According to several studies, such strategies can lead to increased intrinsic motivation, as students feel a sense of accomplishment, satisfaction, and enjoyment through their participation in the games. This finding supports the argument that game-based learning can break the monotony of traditional classroom settings and make learning more engaging, particularly in subjects like IPA, which many students may find difficult or abstract. Another significant finding was the marked improvement in students' academic achievement, as evidenced by the post-test results. After the introduction of games, students' test scores increased by approximately 25% on average, with many students demonstrating a deeper understanding of scientific concepts compared to their pre-test performance. This improvement was particularly noticeable in areas where students had previously struggled, such as understanding complex topics like ecosystems and the water cycle. The enhanced performance suggests that game-based learning can effectively reinforce students' understanding by providing an opportunity for active engagement and application of knowledge. Games allowed students to interact with the material in a more hands-on way, making abstract concepts more tangible and easier to grasp.

This finding underscores the importance of active learning in helping students retain and apply knowledge. Game-based learning engages students in a manner that encourages problem-solving, critical thinking, and real-time decision-making, all of which are essential skills in mastering complex subjects like IPA. By participating in games, students were able to experiment with different strategies and make mistakes in a safe, low-pressure environment. This approach not only helped to solidify their understanding of the subject matter but also fostered a sense of mastery and confidence in their abilities. The ability to apply theoretical knowledge to real-world

scenarios through games makes the learning process more relevant and meaningful to students. Moreover, the increased participation observed during the game-based sessions suggests that this teaching method also promotes a more inclusive classroom environment. Before the games were introduced, many students appeared reluctant to engage in class discussions or answer questions. This could have been due to a lack of confidence or fear of making mistakes in a traditional setting. However, with the games, students felt more comfortable taking risks and sharing their ideas. The fun and competitive aspects of the games helped to lower anxiety levels, making students more willing to participate. As a result, classroom dynamics shifted from passive learning to a more collaborative and interactive environment, where students actively contributed to discussions and learned from one another.

The collaborative nature of the games also played a crucial role in improving social interaction among students. Many of the games encouraged teamwork, with students working in groups to solve problems, answer questions, and achieve common goals. This allowed students to share knowledge, discuss ideas, and learn from their peers, which helped strengthen their understanding of the material. Additionally, group work fostered communication, cooperation, and problem-solving skills, which are valuable life skills beyond the classroom. The positive interactions among students during the game-based activities contributed to a sense of community in the classroom, making learning more enjoyable and meaningful for all involved. The increased self-confidence observed in students is another important outcome of this study. Game-based learning allowed students to experience success in a fun and engaging way, which boosted their self-esteem. As they participated in games and achieved goals, students felt a sense of accomplishment, which translated into greater confidence in their academic abilities. Many students who had previously shown little confidence in their ability to succeed in IPA began to feel more capable and optimistic about their academic potential. This is significant, as confidence plays a key role in student success. When students believe in their ability to succeed, they are more likely to engage with the material, overcome challenges, and persist through difficulties. Game-based learning, by providing immediate feedback and rewarding efforts, helped foster this belief in their own capabilities.

The teacher's feedback during the study also highlighted the positive impact of game-based learning on the classroom environment. The teacher noted that the atmosphere became more energetic and focused, and there was a noticeable increase in student enthusiasm. Game-based learning not only made the lessons more enjoyable but also allowed the teacher to observe students' progress in a more informal, interactive way. By incorporating games, the teacher was able to see firsthand how students applied the knowledge and engaged with the content. This feedback is important, as it suggests that games provide opportunities for formative assessment,

allowing teachers to adjust their teaching strategies based on students' performance and engagement levels.

Despite the overall success of the intervention, there were some challenges during the implementation of the games. Initially, some students found it difficult to understand the rules of the games or became frustrated when they did not perform well. This challenge was addressed by providing clear instructions and offering guidance during the games, ensuring that all students understood how to participate effectively. While time management was also an issue, as some games took longer than anticipated, the teacher was able to adapt the pace of the lessons to ensure all content was covered. These challenges are not unique to game-based learning but are part of any instructional strategy that requires careful planning and adaptation. However, the overall impact of the games on motivation and learning outcomes suggests that these challenges can be successfully overcome with proper guidance and preparation. The results of this study contribute to the growing body of research that supports the effectiveness of game-based learning in enhancing student engagement, motivation, and academic achievement. This research not only highlights the benefits of game-based learning in the context of IPA but also offers practical insights into how this strategy can be implemented in other subjects and educational contexts. By making learning more interactive, enjoyable, and relevant to students, game-based learning has the potential to transform traditional teaching methods and create a more engaging educational experience for students.

Conclusion

This research demonstrates that game-based learning is an effective strategy for increasing both motivation and academic achievement in Natural Science (IPA) for Grade VI students at MI Negeri 3 Halmahera Utara. The implementation of educational games in the classroom significantly improved student engagement, participation, and understanding of key scientific concepts. The study revealed that prior to the intervention, students showed low motivation and limited understanding of the material. However, after the introduction of game-based learning, students exhibited a notable increase in enthusiasm for the subject, with many showing greater involvement and excitement during the lessons. The games successfully captured students' attention, making learning more enjoyable and interactive. This, in turn, led to enhanced academic performance, as evidenced by the significant improvement in post-test scores, which showed an average increase of 25%. Additionally, game-based learning fostered a more collaborative and inclusive classroom environment, where students worked together, communicated, and learned from each other. The games not only encouraged teamwork but also provided students with opportunities to engage in critical thinking and problem-solving, which helped deepen their understanding of the material. Moreover, students demonstrated increased self-confidence as they successfully

participated in the games and achieved positive outcomes. Although some challenges were encountered, such as students initially struggling with the rules of the games and time management issues, these obstacles were addressed through clear instructions, guidance, and adjustments to the pacing of lessons. The overall positive results indicate that game-based learning can be an effective pedagogical tool, even in the face of such challenges.In conclusion, game-based learning is a promising approach to improving motivation, engagement, and academic achievement in science education. This study highlights the potential of games to transform traditional teaching methods by creating a more dynamic and student-centered learning environment. Based on the findings, educators are encouraged to incorporate game-based learning into their teaching strategies to enhance student participation, foster collaboration, and improve overall academic performance in various subjects, including IPA.

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