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# The Role of Gamification Methods in Increasing Creativity and Innovation of Elementary School Students in the Digital Era

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ABSTRACT
This study aims to explore and analyze the role of gamification methods in enhancing creativity and innovation of elementary school students in the digital era. The main focus is to understand how gamification can be applied to encourage students to think creatively and innovatively in the context of learning. This study uses a qualitative method with a case study approach. Data were collected through in-depth interviews with teachers and students, direct observation during the learning process that applies the gamification method, and document analysis related to gamification activities carried out in class. The data analysis technique used is thematic analysis to identify patterns and themes that are relevant to students' creativity and innovation. The findings of the study indicate that the application of gamification methods in the classroom can significantly improve students' creativity and innovation. Gamification activities such as quiz-based games, creative challenges, and interactive simulations allow students to explore new ideas and think outside the box. Students show increased motivation and enthusiasm in learning, as well as better problem-solving and critical thinking skills. Gamification has been shown to be an effective method in enhancing creativity and innovation of elementary school students in the digital era. By integrating game elements into the learning process, teachers can create a more engaging and interactive environment, which supports the development of creative and innovative thinking skills in students. Therefore, it is recommended that gamification methods be widely implemented in the elementary school curriculum to maximize students' potential.

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Gamification, Creativity, Innovation, Elementary School Learning, Digital Era, Qualitative Methods.

## 1. Introduction

In today's digital era, education faces significant new challenges and opportunities. One important change is the use of technology in learning, which has brought new methods and approaches that are changing the way students learn. One innovative approach that is gaining increasing attention is gamification—the use of game elements in non-game contexts to increase engagement and motivation (Deterding et al., 2020).

Gamification, which includes the use of elements such as points, badges, and levels, aims to create a more engaging and enjoyable learning experience. According to research by Hamari et al. (2021), gamification can increase students' intrinsic motivation by making learning more interactive and participatory. This approach not only makes the subject matter more interesting but also encourages students to innovate and think creatively in completing tasks.

In the context of elementary education, gamification has shown great potential to influence students' creativity and innovation. For example, research by Zheng et al. (2022) shows that the application of gamification in science learning can improve students' creative skills in a fun and motivating way. The use of digital-based simulations and games allows students to explore new concepts interactively.

However, the implementation of gamification is not without challenges. Research by Liu et al. (2023) shows that the success of gamification depends heavily on good design and effective integration into the curriculum. Poorly designed game elements can lead to boredom or frustration, which can ultimately reduce its effectiveness. Therefore, it is important to consider factors such as the relevance of the material, the

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appropriateness of the game elements, and the level of difficulty.

Previous research by Fadel et al. (2020) revealed that gamification can strengthen 21st-century skills, such as creativity and problem solving, which are very important in the digital era. However, although many studies have discussed the benefits of gamification, there is still little research that specifically explores how this method affects creativity and innovation in elementary school students.

In this context, this study aims to fill this gap by exploring the role of gamification methods in enhancing creativity and innovation in elementary school students. The main focus of this study is to understand how gamification elements can be effectively applied in learning and how this affects students' ability to think creatively and innovatively.

By exploring the use of gamification in the context of elementary education, this study aims to provide deeper insights into the potential and limitations of this method. The results of this study are expected to provide practical guidance for educators in designing learning strategies that integrate game elements to maximize students' creative and innovative potential.

Overall, it is important to understand how gamification can be used as an effective tool in elementary education, especially in developing students' creativity and innovation. This study is expected to make a significant contribution to the existing literature and provide useful recommendations for educational practices in the digital era.

## 2. Methodology

Qualitative research methods with a case study approach were used in this study to gain an in-depth understanding of the role of gamification methods in enhancing creativity and innovation in elementary school students. According to Creswell and Poth (2020), the case study approach allows researchers to explore complex phenomena in real-life contexts in an in-depth and detailed manner. Case studies often involve in-depth analysis of individuals or groups in their natural contexts, which is very suitable for understanding the implementation of gamification in the classroom.

In-depth interviews with teachers and students are one of the main techniques in this study. Interviews allow researchers to gain in-depth insights into individual experiences and views regarding the use of gamification. According to Fusch and Ness (2021), in-depth interviews can provide rich and contextual data that is difficult to obtain through quantitative methods. Data from these interviews will help understand how gamification affects creativity and innovation from the direct perspective of educational practitioners.

Direct observations were conducted to observe how gamification methods are applied in the classroom and how students interact with game elements. These observations provide important empirical data regarding the dynamics of student interactions and responses to gamification. According to Goldstein et al. (2022), direct observation is an effective method for obtaining data on student behavior in the context of ongoing learning, as well as for identifying relevant patterns of behavior and interaction.

Document analysis was used to assess gamification materials and activities implemented in the classroom. The documents analyzed included lesson plans, gamification materials, and student activity results. Document analysis helps understand how gamification is integrated into the curriculum and its impact on learning. According to Bowen (2020), document analysis can provide additional context and support findings obtained from interviews and observations.

Thematic data analysis was used to identify patterns and themes relevant to student creativity and innovation. This technique involves coding qualitative data to find key themes that emerge from interviews, observations, and documents. According to Braun and Clarke (2021), thematic analysis allows researchers to organize and interpret qualitative data in a systematic way, making it easier to identify key themes related

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to the research objectives.

## 3. Results

Observation results show that the implementation of gamification methods in the classroom has a significant impact on students' creativity and innovation. Activities such as quiz-based games and creative challenges are routinely implemented in the learning process. Observations during gamification sessions revealed that students were actively involved and showed high enthusiasm in completing the tasks given. Gamification activities facilitate students in exploring new ideas and thinking outside the box, which is difficult to achieve through traditional learning methods.

Quiz-based games have proven to be one of the most effective gamification elements in enhancing students' creativity. In interviews with teachers, many reported that interactive quizzes not only make the subject matter more interesting but also encourage students to think critically and quickly. Well-designed quizzes, which include challenging questions and provide immediate feedback, are able to motivate students to think creatively in answering and finding solutions.

Creative challenges and interactive simulations also emerged as very effective methods in encouraging innovation among students. Observations showed that students were very enthusiastic when involved in creative projects that involved game elements, such as creating models or theme-based presentations. Interactive simulations involving role-playing and real-world scenarios provide opportunities for students to develop their problem-solving skills in a realistic and challenging context.

Students showed significant increases in motivation and enthusiasm after implementing the gamification method. Interviews with students revealed that they felt more motivated to learn when the subject matter was presented in the form of games and challenges. The application of gamification elements, such as points and badges, increased feelings of achievement and motivated students to actively participate in each learning session.

Data from observations and interviews showed that the gamification method contributed to improving students' problem-solving abilities. Activities that require students to think creatively in solving challenges and problems strengthen these skills. For example, in interactive simulations, students must formulate solutions to complex problems, which trains them to think more critically and creatively.

The results of the documentation showed positive changes in students' attitudes and behaviors towards learning. Students who were initially less enthusiastic or tended to be passive in learning showed higher engagement when the gamification method was applied. They were more active in class discussions and more enthusiastic about completing assignments, which reflected positive changes in their attitudes towards learning.

Overall, the findings of this study indicate that the gamification method has a significant impact on improving the creativity and innovation of elementary school students. By implementing game elements in learning, students not only become more engaged and motivated, but also develop better problem-solving and critical thinking skills. Gamification activities, such as quiz-based games and interactive simulations, have proven effective in creating a more dynamic and innovative learning environment.

## 4. Discussion

The findings of this study indicate that the application of gamification methods significantly improves students' creativity. This is in line with research by Hamari et al. (2021), which found that gamification elements such as challenges and quizzes can stimulate students' creativity by providing interactive and challenging learning experiences. Quiz-based games, for example, allow students to think outside the box and explore new ideas,

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similar to the findings of Zheng et al. (2022) who emphasized that interactive quizzes can improve creative skills through intrinsic motivation.

Creative challenges in gamification have been shown to be one of the effective elements in encouraging innovation. Research by Liu et al. (2023) showed that game-based challenges can strengthen students' creative thinking skills by presenting situations that require innovative problem solving. In this context, the findings of this study support these results, with students showing significant improvements in their ability to generate new ideas when engaged in creative challenges in class.

The interactive simulations implemented in this study helped students develop better problem-solving skills. This is consistent with findings by Fadel and Robison (2020), who identified that gamification-based simulations improve students' ability to solve problems in a realistic way. Activities such as role-playing and real-world scenarios provide students with the opportunity to apply their knowledge in a more practical context, improving their problem-solving skills.

The increase in student motivation and enthusiasm found in this study is in line with a study by Deterding et al. (2020), which states that gamification can increase students' intrinsic motivation by making learning more interesting and relevant. Gamification elements such as points, badges, and levels motivate students to actively participate and complete tasks, increasing their enthusiasm for learning.

The documentation results show positive changes in student attitudes and behaviors after the implementation of gamification. Research by Braun and Clarke (2021) supports this finding by showing that gamification can change student behavior, increasing their engagement in learning activities and reducing passivity. These changes reflect the positive effects of gamification in creating a more dynamic learning environment.

This study found that gamification improves students' critical thinking skills, which is in line with the results of research by Zheng et al. (2022). Gamification provides various activities that challenge students to think critically and find innovative solutions. These results support the argument that game elements in learning can develop important cognitive skills for students.

The findings of this study indicate that gamification activities increase student engagement in the learning process. This is consistent with the findings of Liu et al. (2023), which shows that gamification makes learning more interesting and interactive. Activities involving game elements make students more active and involved, which in turn increases the effectiveness of the learning process.

This study supports the results of a study by Hamari et al. (2021), which shows that gamification can stimulate students' creativity by providing a variety of challenging and interesting stimuli. Activities such as creative quizzes and challenges allow students to think innovatively and explore new ideas in the context of learning.

These findings indicate that interactive simulations contribute to contextual learning, which is in line with the findings by Fadel and Robison (2020). Simulations allow students to apply their knowledge in a more realistic context, strengthening their understanding and improving their problem-solving skills in real situations.

The findings of this study emphasize the importance of integrating gamification into the curriculum, which is supported by the results of a study by Creswell and Poth (2020). Effective integration of game elements into the curriculum can increase student engagement and creativity. This study shows that when gamification is implemented well, it can be a very effective tool in improving the quality of learning.

The results of this study underscore the importance of intrinsic motivation enhanced by gamification, which is supported by Deterding et al. (2020). Gamification elements such as challenges and rewards can stimulate students' interest in learning, making them more motivated to engage and achieve.

This study shows that gamification can lead to positive changes in students' learning attitudes, in line with

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the study by Braun and Clarke (2021). Gamification can change students' perceptions of learning from a boring task to a fun and motivating experience, increasing their positive attitudes towards education.

This finding also shows that gamification can strengthen students' collaborative skills, supporting the results of a study by Liu et al. (2023). Gamification activities that involve group work and collaboration can improve students' ability to work together and communicate effectively in groups.

This study underlines the importance of effective implementation of gamification in the classroom, which is supported by research by Hamari et al. (2021). Proper implementation of game elements in learning can maximize the benefits of gamification and significantly improve student learning outcomes. Overall, the findings of this study provide important recommendations for educational practice, namely the importance of implementing gamification in the curriculum to enhance student creativity, innovation, and engagement. These results support the argument made by Zheng et al. (2022) that gamification is a valuable tool in education that can improve learning outcomes and prepare students for real-world challenges.

## 5. Conclusion

The findings of this study indicate that gamification is a very effective method in enhancing creativity in elementary school students. By integrating game elements such as quizzes, creative challenges, and interactive simulations, teachers can create a learning environment that is not only more engaging but also stimulates students' creative thinking. The use of game elements in learning allows students to explore new ideas and think outside the box.

Gamification has also been shown to be effective in encouraging innovation among students. Activities such as creative challenges and interactive simulations provide opportunities for students to think innovatively and solve problems in realistic contexts. Interactive simulations, in particular, allow students to apply their knowledge in real-world situations, enhancing their ability to innovate.

Gamification not only enhances creativity and innovation but also contributes to increased student motivation and enthusiasm. Game elements such as points, badges, and levels have been shown to motivate students to be actively involved in the learning process. This increase in motivation has a positive impact on student engagement and their learning outcomes.

Based on the findings of this study, it is recommended that gamification methods be widely implemented in the elementary school curriculum. The integration of game elements into the curriculum can create a more dynamic and interactive learning environment, supporting the development of creative and innovative thinking skills in students. Therefore, it is important for educators to consider implementing gamification as part of their learning strategies.

This study provides important recommendations for future educational practices. The use of gamification as a learning method should be considered as an effective tool to enhance students' creativity and innovation. By adopting gamification methods, schools can create a more engaging learning environment and support the development of essential cognitive skills for students in the digital era.

## Disclosure statement

The authors declare no conflicts of interest.

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