

IMPLEMENTATION OF GAME BASED LEARNING IN SUPPORTING STUDENTS' CONCEPT UNDERSTANDING AT SMP MUHAMMADIYAH 18 SURABAYA

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Abstract

In this digital era, students generally like fun and creative things. The use of games as a learning tool not only improves conceptual understanding but also strengthens practical skills needed in the real world. In this context, GBL encourages students to learn through experimentation, reflection, and active interaction with the subject matter. This study examines the application of Game-Based Learning (GBL) to improve students' conceptual understanding at SMP Muhammadiyah 18 Surabaya. Using a qualitative method based on case studies, this study identified the impact of GBL on learning outcomes through observation, interviews with teachers and students, and documentation analysis. The results showed that GBL significantly increased students' motivation, participation, and conceptual understanding. In implementation, the use of platforms such as Kahoot facilitates an interactive and fun learning process. Challenges faced include limited resources and the need for teacher training to integrate GBL effectively. Thus, GBL is proven to be an innovative approach that not only strengthens students' cognitive skills but also develops social and collaborative abilities. This study provides insight into the potential of GBL in improving the quality of education through technology-based learning.

Keywords: Game Based Learning, Conceptual Understanding, Kahoot, Interactive Learning, Technology-Based Education

Abstrak

Pada era digital ini, peserta didik yang dihadapi umumnya menyukai hal yang menyenangkan dan kreatif. Penggunaan permainan sebagai sarana pembelajaran tidak hanya meningkatkan pemahaman konsep, tetapi juga memperkuat keterampilan praktis yang diperlukan di dunia nyata. Dalam konteks ini, GBL mendorong siswa untuk belajar melalui eksperimen, refleksi, dan interaksi yang aktif dengan materi pelajaran. Penelitian ini mengkaji penerapan Game-Based Learning (GBL) untuk meningkatkan pemahaman konsep siswa di SMP Muhammadiyah 18 Surabaya. Dengan menggunakan metode kualitatif berbasis studi kasus, penelitian ini mengidentifikasi dampak GBL terhadap hasil belajar melalui observasi, wawancara dengan guru dan siswa, serta analisis dokumentasi. Hasil penelitian menunjukkan bahwa GBL meningkatkan motivasi, partisipasi, dan pemahaman konsep siswa secara signifikan. Dalam implementasi, penggunaan platform seperti Kahoot memfasilitasi proses pembelajaran yang interaktif dan menyenangkan. Tantangan yang dihadapi meliputi keterbatasan sumber daya dan kebutuhan pelatihan guru untuk mengintegrasikan GBL secara efektif. Dengan demikian, GBL terbukti sebagai pendekatan inovatif yang tidak hanya memperkuat keterampilan kognitif siswa, tetapi juga mengembangkan kemampuan sosial dan kolaboratif. Penelitian ini memberikan wawasan tentang potensi GBL dalam meningkatkan kualitas pendidikan melalui pembelajaran berbasis teknologi.

Kata kunci: Game-Based Learning, Pemahaman Konsep, Kahoot, Pembelajaran Interaktif, Pendidikan Berbasis Teknologi.



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INTRODUCTION

Analysis shows that advances in information and communication technology contribute significantly to the development of educational technology. Ahmadi and Supardi noted that one of the prominent innovations in education is the use of Game Based Learning (GBL), where game elements are applied in the context of learning. This approach not only utilizes technology as a tool, but also as a medium. To improve the quality of the learning process, efforts need to be made to increase student engagement and motivation.¹ In GBL, games are designed with specific goals that are directly related to learning objectives, such as conceptual understanding, cognitive skill development, or mastery of academic content. This approach leverages the positive attributes of games, such as challenge, competition, and reward systems, to create a fun and engaging learning environment for students. Empirical research has consistently shown that integrating GBL into the curriculum can contribute significantly to student learning outcomes.²

Implementation of innovative learning is very important to meet the needs of today's generation who value creativity and fun. Learning must be based on technology and creativity to meet the expectations of today's generation. Game technology-based learning model.³ An innovative learning method that uses games as a learning tool is an innovative learning method that integrates game logic to achieve educational goals. Platforms such as (link unavailable) facilitate effective and enjoyable game-based learning.⁴

Using games as a learning tool Not only deepening the understanding of concepts, but also developing better skills. practical needed in the real world. In this context, GBL encourages students to learn through experimentation, reflection, and active interaction with the subject matter.⁵ Kiili highlighted that the use of GBL not only provides an immersive learning experience, but also opens up the potential for the development of social and collaborative skills. Nurul Hidayah and Siti Zubaidah showed that through games, students can learn to work together, solve problems, and

¹ Natalis Sukma Permana, "Game-Based Learning sebagai Salah Satu Solusi dan Inovasi Pembelajaran bagi Generasi Digital Native," Pendidikan Agama Katolik (JPAK) 9, no. 2 (2020): 110, <https://doi.org/10.12681/edusc.3109>.

² M. Syarif Hidayat and Muhammad Farchan Hamidi, "Meningkatkan Hasil Belajar Peserta Didik Dengan Model Game Based Learning Untuk Kelas X-E7 Sman 5 Surakarta Semester Ganjil Tahun 2023/2024," Geadidaktika 3, no. 2 (2023): 219, <https://doi.org/10.20961/gea.v3i2.78775>.

³ Permana, "Game-Based Learning sebagai Salah Satu Solusi dan Inovasi Pembelajaran bagi Generasi Digital Native."

⁴ Wawan Hermawan, "Sosialisasi Pemanfaatan Game Base Learning (GBL) Dalam Pembelajaran Di SMP N 2 Ngronggot," Community Development Journal 5, no. 1 (2024): 1263–69.

⁵ Siti Kurniati, Fadilah Nur Khasanah, and Muchamad Mufid, "Implementasi Strategi Games Based Learning (GBL) Dalam Pembelajaran SKI Di Mi al-Islamiah Gandekan Bantul Implementation of Games-Based Learning (GBL) Strategy in SKI Learning at Mi al-Islamiah Gandekan Bantul," *Journal of Elementary Educational Research* 3, no. 1 (2023): 12–20.

develop communication skills that are essential in everyday life and the future world of work.⁶ However, the implementation of GBL is not without challenges. Gee noted that one of the main challenges is ensuring that the games used truly support the learning objectives that have been set. In addition, adjustments are also needed in the instructional design so that the games can be effectively integrated into the existing curriculum. In this paper, we will analyze in depth the Implementation of GBL on student learning outcomes, highlighting the findings of various studies and identifying challenges that may be faced in its implementation. By understanding these dynamics, it is hoped that it can provide a more comprehensive view of the potential of GBL in improving the quality of education in the future.

The problem of learning motivation is an important aspect that needs to be considered in the context of mathematics in teaching and learning activities. The presence of strong motivation, both from internal and external factors, is the key to effective learning. If students do not have adequate learning motivation, they will potentially experience difficulties in achieving learning goals. Therefore, it is important for educators and parents to pay sufficient attention to students' learning motivation.

Solutions need to be found to overcome the problems encountered in order to increase motivation when learning. Efforts to increase motivation to follow student learning are closely related to the learning process, such as the approach used by the teacher, the method of delivering the material, the variety of questions that have been delivered, student involvement in the process, and other factors. Thus, it is hoped that teachers can apply learning methods that can provide stimulation so that students are motivated to learn.

Nowadays, with the development of technology, the education process also has an influence and implications for its progress. Therefore, every student is required to show creativity and innovation in developing learning models that are in accordance with the development of the times. Among the learning models that are appropriate for the digital era and focus on students is the Game Based Learning model.

RESEARCH METHODS

This study uses a qualitative research method with a case study approach to examine the implementation of *Game Based Learning* in supporting students' conceptual understanding at SMP Muhammadiyah 18 Surabaya. The main focus of this study is to understand how This study aims to analyze the effect of the application of Game-Based Learning on students' conceptual

⁶ Irwandi Andi, "Efektivitas Metode Pembelajaran Berbasis Permainan Dalam Meningkatkan Keterampilan Sosial Siswa Sd Inpres Pa'Baeng-Baeng Kota Makassar," *Jurnal Review Pendidikan Dan Pengajaran* 7 (2024): 5796–5801.

understanding in the context of learning. regarding the application of Game-Based Learning in the classroom. The sample of this study consisted of students and teachers at SMP Muhammadiyah 18 Surabaya who were involved in the learning process using this method.

The research procedure begins with data collection through observation of the learning process using *Game Based Learning*, followed by In-depth interview methods with teachers and students were used to collect their qualitative data regarding the implementation of this method and its impact on students' conceptual understanding. The collected data were then analyzed qualitatively with thematic analysis to identify emerging patterns and themes. It is hoped that the results of this analysis can provide insight into how Game-Based Learning can support the improvement of students' conceptual understanding and the challenges that may be faced in its implementation.

RESULTS AND DISCUSSION

Education plays a fundamental role in shaping students' character and cognitive abilities. An effective educational curriculum must be able to integrate learning approaches that are relevant to the times. One approach that is now increasingly popular is game-based learning (GBL). This approach integrates game elements to create an immersive and effective learning experience.

Game-based learning has become a global trend in the world of education because it is considered capable of...Increasing student engagement and conceptual understanding through innovative approaches. Prensky stated that "game-based learning is able to provide a relevant learning context and approach the reality of students". In this context, besides entertainment, games also have educational and developmental purposes, building students' understanding and skills in various fields.

In Indonesia, especially in SMP Muhammadiyah 18 Surabaya, the challenge in improving students' conceptual understanding is still a major concern. Based on the results of initial observations, Many students have difficulty in understanding abstract and complex concepts in Islamic Religious Education subjects. The lack of student interest factor can be associated with conventional learning methods that are less interactive and uninteresting. The game-based learning approach offers an innovative solution to overcome low student engagement in the learning process.

Implementation of Game Based Learning

Implementation game based learning involves several important stages to ensure its success in supporting learning. First, teachers need to design or choose games that are in accordance with learning objectives. The game must be relevant to the material being taught and have strong

educational elements. Kiili suggests that games also contain challenges that can stimulate students' critical thinking.

The second stage is the integration of games into the learning process. Teachers need to provide clear instructions on how to play and how it relates to the concepts being learned. During the game, teachers can act as facilitators who provide feedback and motivation to students. This is in line with the opinion put forward by Prensky who stated that teachers must be active in guiding students so that their learning experience remains focused.

Finally, evaluation of learning outcomes is a crucial stage. Teachers can use games as a tool to measure how far students understand the material. Evaluation can be done through assessing student performance during the game or reflection afterward. In this way, the application of game-based learning is not only fun but also has a real positive impact on student learning outcomes.

The following are the steps for implementing Game-Based Learning (GBL) at SMP Muhammadiyah 18 Surabaya using quizzes on the Kahoot application in learning:

1. Initial Preparation

Identify Learning Objectives: Determine the concept or material to be taught through the quiz. Make sure the material is appropriate to the students' level of understanding.

Register or Login to Kahoot: Create an account on Kahoot if you don't have one, or log in to an existing account.

Infrastructure Preparation: Students must be equipped with digital devices and adequate internet connection.

2. Create a Quiz

Click "Create" in the Kahoot dashboard to create a new quiz.

Enter a quiz title that is appropriate to the material. Add a description to explain the purpose of the quiz.

Add quiz questions with different question types, such as multiple choice, true/false, or polling.

Give time for each question according to the level of difficulty.

Include images, videos, or other visual elements to increase student engagement.

Save the quiz when finished.

3. Implementation of the Quiz

Select the quiz you created from your quiz list and click "Play".

Determine the game mode:

Live Game: For live class sessions.

Challenge Mode: For distance learning or individual assignments.

Share the game PIN with students so they can join using their own devices.

4. Implementation in Class

Guide students to enter the sitekahoot.it and enter the game PIN.

Start the game and follow each quiz question.

Students will answer questions with their devices, and scores are displayed based on the speed and accuracy of the answers.

Use leaderboards to motivate students and create a healthy competitive atmosphere.

5. Discussion and Reflection

After the quiz is completed, review the correct answers and discuss the questions that students answered incorrectly.

Provide feedback to students to reinforce conceptual understanding.

Ask students to share their experiences using Kahoot and how the quizzes helped their understanding.

6. Evaluation and Improvement

Analyze quiz results to evaluate students' level of understanding.

Use data from Kahoot to identify areas that need improvement or enrichment in subsequent learning.

Update quizzes based on student feedback and learning outcomes for upcoming sessions.

With these steps, Kahoot can be an effective tool to support Game-Based Learning, making learning more engaging, interactive, and fun for students.

The application of GBL in learning shows significant effectiveness in improving students' conceptual understanding. Based on this study at SMP Muhammadiyah 18 Surabaya, some results that can be obtained from the application of GBL include:

1. Increasing Student Motivation and Participation

Students involved in learning games tend to be more enthusiastic and active in following lessons. Games can motivate them to study harder because of their fun and competitive nature.

Students The application of game-based learning can significantly increase students' motivation and participation in the learning process. One of the main reasons is the interactive elements that make students feel more emotionally and cognitively involved. In a traditional learning environment, students tend to be passive, especially if the teaching method is only centered on the teacher. However, with game-based learning, students are given the opportunity to become active participants who contribute to the learning process.

The competitive and rewarding elements in game-based learning can be a major driver of student motivation. For example, when students successfully complete a challenge

in a game, they feel rewarded for their efforts, which motivates them to continue learning. In addition, student participation increases because game-based learning encourages collaboration and teamwork, which in turn strengthens social relationships among students.

From the results of research at Muhammadiyah 18 Middle School, Surabaya, it was found that GBL has a positive effect on students' motivation and learning quality. Thus, this approach is one of the effective strategies to create a fun and productive learning environment.

2. Deeper Understanding of Concepts

Through the game, students can apply the concepts learned in real situations. Simulations help students understand the material in an applicable and contextual way, so that even difficult concepts can be understood more easily.

Deep conceptual understanding is a crucial aspect in education, especially in Islamic Religious Education learning. Research shows that students with good conceptual understanding are able to relate Islamic Religious Education to phenomena around them, apply concepts in various situations, and solve problems more effectively. In contrast, students with weak conceptual understanding tend to rely on memorization without understanding the meaning behind the procedures they use.

Nastiti and Syaifudin's research emphasizes the significance of understanding mathematical concepts as a prerequisite for expanding PAI knowledge.

The results of this study support the importance of understanding basic mathematical concepts in achieving an understanding of advanced concepts.

Conceptual understanding is an individual's ability to understand and convey the knowledge they have acquired clearly and effectively. This ability allows someone to explain a concept well so that others can understand it.

3. Problem Solving Ability Improvement

Improving the ability to analyze and solve complex problems is an important focus in education, especially in mathematics. This ability allows students to analyze situations, design strategies, and find effective solutions to various problems. Brain-based learning models are an effective approach to developing problem-solving skills.

Nurjanah and Jusniani's (2020) research confirmed the effectiveness of the Brain Based Learning model in improving mathematical problem-solving abilities.

The results of the study showed that the Brain Based Learning model is more effective than conventional learning in improving mathematical problem solving skills. The study confirmed the effectiveness of the Brain Based Learning model in improving mathematical problem solving skills.

This study confirms that the Brain Based Learning approach is an effective learning strategy to improve mathematical problem solving skills.

Many games are designed with challenges or problems for players to solve. This encourages students to think critically, creatively, and develop problem-solving skills, which can be applied in other learning contexts.

4. Collaboration and Teamwork

Collaboration and teamwork are vital components in educational organizations, playing a significant role in improving the quality and effectiveness of the learning process. According to Cahyono et al., The analysis shows that effective teamwork dynamics are influenced by strategic factors such as leadership, curriculum and management. The combination of effective leadership style, structured curriculum development and appropriate strategic management will improve the performance of educational organizations.

In addition, Hasni and Jamilus emphasized the importance of intelligent collaboration in optimizing education through teamwork. The results of the study showed that collaboration skills training, multidisciplinary team formation and the use of collaborative platforms are strategic factors in improving team collaboration.

Optimal teamwork can be achieved through the implementation of strategies such as training, the formation of multidisciplinary teams and the use of collaborative platforms.

Thus, the development of solid and collaborative teamwork in educational organizations is essential to achieving optimal educational goals. The application of the right strategy in building and maintaining team dynamics can produce positive synergy that has a direct impact on improving the quality of education.

Some educational games require students to work in teams increases the efficiency and effectiveness of goal achievement. It can develop students' social and communication skills, which also supports conceptual understanding in a collaborative context.

5. Direct Feedback

Providing immediate feedback is very important in the effective learning process. Feedback that is given in a timely manner diagnosing students' strengths and weaknesses for academic development, and correcting mistakes before moving on to the next task. Effective feedback not only provides information about the final results but also ways to improve understanding during the learning process. According to BPMP Jakarta (nd), effective feedback should be given in a timely manner and suggest steps for improvement

during the process, not just at the end of the process. This aims to ensure that students can immediately make improvements and not repeat the same mistakes.

Meanwhile constructive and specific feedback can increase student motivation to achieve better academic achievement. As stated by Medcom.id, Effective feedback is an important strategy in increasing student motivation and achievement. In the field of health education, regular and measurable feedback also plays a very important role. In the study of the Thamrin Journal of Integrated Health Science, it was stated that effective feedback in the evaluation of laboratory and clinical practices can strengthen students' skills and improve their self-reflection abilities.

In games, students get immediate feedback on their actions, whether they are right or wrong. This feedback allows students to immediately recognize their mistakes and make improvements, thus accelerating the learning process.

The application of Game-Based Learning in learning has a significant positive impact on students' understanding of concepts. In this context, games do not only function as entertainment, but as an effective tool in building students' cognitive and affective skills.⁷

1. Learning Theories that Support GBL

Game-Based Learning is a learning strategy that utilizes game technology to improve learning efficiency. This approach is supported by several relevant learning theories, including:

- a. Constructivism Theory: According to this theory, learning occurs through students' active interaction with their environment, building knowledge based on experience. GBL provides a context that allows students to build knowledge through direct experience in games. As stated by Sampoerna Academy (nd), Game Based Learning has the flexibility to be applied to various types of academic materials.
- b. Social Learning Theory: Albert Bandura emphasized the important role of observation and social interaction in the learning process. In GBL, students often work in teams, interact with their peers, and learn from each other, which strengthens their understanding of the material. According to BINUS University (2021), 'The psychology of motivation in Game-Based Learning (GBL) enhances student engagement with educational materials through an innovative approach.'

⁷ Miftakhatun Riza and Suharso Jurusan Bimbingan dan Konseling, "Meningkatkan Kematangan Emosi Melalui Layanan Penguasaan Konten dengan Teknik Bermain (Games)" *Indonesian Journal of Guidance and Counseling: Theory and Application* 3, no. 1 (2014): 29–36.

- c. **Motivation and Reinforcement Theory:** This theory states that behavior is influenced by the consequences that follow the action. GBL uses a system of rewards and challenges that motivate students to continue learning and strive to achieve goals. As explained by BINUS University, "Game-based learning is an innovative learning strategy that utilizes games as a teaching medium."

Game-Based Learning is in line with several learning theories, such as the theory Constructivism and Social Learning Theory. In GBL, Active learning approach facilitates students to participate directly in the learning process through exploration, experience and collaboration. This is in line with the views of Piaget and Vygotsky who emphasize the importance of direct experience in building knowledge.

2. Factors Affecting GBL Success

Analysis of factors influencing the effectiveness of Game-Based Learning (GBL) shows a complex relationship. The success of GBL implementation is influenced by various interrelated strategic factors, including:

a. Game Design

The quality and relevance of game design greatly determine the effectiveness of GBL. The design of learning games must consider educational goals and student needs. According to research published in Khatulistiwa, good game design can increase students' learning motivation and affect their learning outcomes.

b. Instructional Support

The role of educators in facilitating and guiding students during the game-based learning process is very important. This support includes explaining concepts, directing during the game session, and post-game evaluation to ensure student understanding. Research published in Khatulistiwa emphasizes the importance of instructional support in implementation.

c. Motivational Aspects

Students' intrinsic motivation can be enhanced through game elements such as challenges, rewards, and immediate feedback. These factors contribute to increasing students' interest and engagement in the learning process. In Khatulistiwa, it is stated that GBL can enhance students' learning motivation and their literacy motivation.

The success of implementing Game-Based Learning depends on several important factors, such as game design that is in accordance with learning objectives, difficulty levels that are adjusted to students' abilities, and effective integration between games and learning materials. Games that are too easy or too difficult can reduce the effectiveness of learning.

3. The Role of Teachers in GBL

In the implementation of Game-Based Learning (GBL), the role of the teacher is very crucial to ensure the learning process runs effectively. To achieve the desired goals, teachers play an important role in the implementation of Game-Based Learning (GBL). Here are some roles of teachers in GBL:

a. Learning Designer

Teachers are responsible for selecting educational games that meet the learning objectives. Selecting the right game is a key factor in increasing student motivation and engagement.

b. Facilitator

In game-based learning, teachers act as facilitators who facilitate the teaching and learning process, provide clear instructions, and ensure students understand the rules and objectives of the game. Teachers must also be ready to provide assistance when students encounter difficulties.

c. Evaluation and Feedback

Teachers evaluate student performance during and after the game. Constructive feedback from teachers is an important component in improving student understanding and motivation. Teachers must provide effective feedback to strengthen the learning process.

d. Class Manager

Teachers must be able to manage classroom dynamics during the implementation of GBL, ensure that all students are actively involved, and create a conducive learning environment. This ability is important to maintain student focus and discipline during the learning process.

e. Motivation Booster

Teachers must have motivational competencies to increase student participation in learning games, overcome challenges, and achieve learning goals. High motivation can increase the effectiveness of learning and the results achieved by students. By carrying out these roles, teachers have a key role in optimizing the benefits of Game-Based Learning, creating a fun and effective learning experience for students.

Although games provide a fun learning experience, the role of the teacher remains crucial in guiding the learning process. Teachers must ensure that the games used support learning objectives and provide post-game reflection so that students can relate their experiences to the concepts being learned.

4. Challenges in GBL Implementation

One of the main challenges in implementing GBL is the limited resources, such as hardware or software needed to run the game. In addition, there is a need for training for teachers so that they can design and manage games effectively in learning.

CONCLUSION

Game-Based Learning is a very effective method in supporting students' conceptual understanding. Through games, students can learn actively, engage emotionally, and develop cognitive and social skills. With careful planning and proper implementation, GBL can improve the quality of learning and help students understand difficult concepts in a more enjoyable and applicable way. However, the success of GBL depends heavily on the right game design, the role of the teacher, and the availability of adequate resources.

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