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Implementation of Constructivism-Based Game-Based Learning Model in Science Learning for Grade IV

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Abstract

This study aims to describe the implementation of a Game-Based Learning model grounded in constructivist theory in the teaching of Science and Social Studies (IPAS) in fourth-grade elementary school classrooms. This descriptive research explores the learning process that incorporates educational games to foster students' active engagement in constructing conceptual understanding. The participants of this study were fourth-grade teachers and students at SDN 6 Metro Pusat. Data collection techniques included observation and interviews. The findings indicate that the use of Game-Based Learning enhances student participation in learning activities, promotes collaboration, and strengthens conceptual understanding through real-life learning experiences. Data presentation shows that 83% of students expressed agreement with the constructivism-based Game-Based Learning approach, categorized as forceful. In addition, teacher interviews revealed a score of 79%, categorized as strong. Thus, the constructivist-based Game-Based Learning approach has been proven to create an enjoyable learning environment and stimulate students' intrinsic motivation. These findings suggest that the implementation of educational games integrated with a constructivist approach has the potential to be an effective learning strategy to improve the quality of IPAS education in elementary schools

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INTRODUCTION

Learning in elementary schools requires an approach that not only delivers material but can also actively involve students in the learning process. One of the main challenges in learning Natural and Social Sciences (IPAS) is the lack of student participation and interest in conceptual and integrated material. This observation is reinforced by the finding that many students are still passive recipients of information,

not active subjects who build their own knowledge (Suprapto, N., Kusumawardani, R., & Lestari, 2020). Based on the results of observations and questionnaires conducted in class IV SDN 6 Metro Pusat with a total of 21 students, it was found that only 6 students (28.6%) were actively involved in discussion activities or exploration of material during learning Natural and Social Sciences (IPAS), while 15 students (71.4%) tended to be passive and only took notes or listened to the teacher's explanation without fully participating. In addition, the results of the learning interest questionnaire showed that only 5 students (23.8%) stated that they enjoyed learning IPAS, while the rest considered the material too difficult to understand because of its conceptual and integrative nature.

This data reinforces the main challenge in science learning, namely the low participation and interest of students, which shows that most students still act as passive recipients of information, not as active subjects who build their own knowledge through meaningful learning experiences. One approach that is relevant to the needs of 21st-century learning and can answer existing problems is to apply the Game-Based Learning (GBL) learning model. GBL is an approach in education that utilizes game elements to create an engaging and interactive learning process so that it can increase student participation and motivation to learn. This approach involves the use of game elements such as challenges, point acquisition, and awards to support the achievement of learning objectives. Game-based learning can be applied in both digital and non-digital forms. Its success is influenced by factors such as proper game design, its relevance to the curriculum, the active role of teachers, the availability of adequate technology, and student involvement accompanied by constructive feedback (Gingga et al., 2024). In the context of elementary education, GBL has been shown to be effective in creating a learning environment that is both fun and cognitively challenging, which encourages students to think critically and solve problems. The constructivism-based learning model provides a strong theoretical foundation for the application of GBL. This theory emphasizes that knowledge is actively constructed by students through relationships with the environment and meaningful learning experiences (Widodo & Nurtanto, 2020).

In the application of constructivism-based GBL, students do not only play passively but are involved in learning activities that allow them to explore concepts, make observations, and draw conclusions independently. Several previous studies support the effectiveness of GBL in improving student activity and learning outcomes. For example, a study by Fitriyani, N., Suryani, N., & Hartati (2022) showed that the use of educational game media in science learning can significantly increase student engagement and understanding. In addition, Nugraheni & Setiawan (2023) found that the constructivist approach in GBL can shape collaborative attitudes and advanced thinking skills in elementary school students. Given the context, this study aims to describe how Game-Based Learning, grounded in constructivism, is implemented in science education for fourth-grade elementary school students. This study is expected

to contribute to developing an innovative, fun, and effective learning approach to be used in thematic learning at the elementary school level.

Based on the phenomena that occur, the formulation of the problem in this study is focused on how the application of the game-based learning model based on constructivism theory can affect the process of learning science in grade IV of elementary school. This study aims to describe the extent to which the learning model is able to increase students' active participation during the learning process and evaluate its influence on students' conceptual understanding in science subjects. Therefore, this study aims to investigate and elucidate the model's implementation process and its overall impact on student learning outcomes. Then the purpose of this study is to determine the impact of the application of the Game-Based Learning (GBL) learning model based on constructivism theory on the process of learning science in grade IV. Specifically, this study aims to examine how the application of the GBL model can increase student learning activity during learning tasks. In addition, this study also aims to determine the extent to which the application of the learning model can improve students' conceptual understanding in science subjects, based on the constructivism approach that emphasizes the importance of students' active involvement in building their own knowledge through fun and meaningful learning experiences.

METHOD

This study employs a descriptive method combined with a qualitative approach to provide an in-depth description of how the game-based learning model, grounded in constructivism, is applied in science learning for grade IV students. This method was chosen because it aims to obtain a real and in-depth picture of the activities, interactions, and responses of students and teachers related to the application of the game-based learning model based on constructivism theory in science subjects. According to Riduwan (2010), the qualitative descriptive method is used to examine and understand phenomena naturally without variable manipulation, with researchers as the main instrument.

The research activities were carried out at the State Elementary School 6 Metro Pusat, located in Metro City, with a focus on grade IV as the research sample. The school was chosen because it has the facilities to support game-based learning, such as internet access. The school chosen is a type of public school. The class taken, namely grade IV, totals 21 students. The instruments in this study include observation sheets and interview guides.

Data collection techniques using observation and interview techniques are then analyzed qualitatively through the process of data reduction, data presentation, and drawing conclusions. With this approach, it is hoped that a comprehensive understanding can be obtained regarding the effectiveness of the applied learning model and its impact on the involvement and understanding of teachers and students.

RESULT AND DISCUSSION

RESULT

The results of data processing show that the majority of students responded positively to the implementation of the game-based learning approach based on constructivism in learning Natural and Social Sciences (IPAS). Based on the results of the questionnaire, as many as 83% of students agreed with the statement indicating that learning using games makes them more interested and makes it easier to understand the material. One student said, "Learning with games makes me more enthusiastic." I understand the lesson better because I practice using the game directly." Another student also added, "If I learn using games, I don't get sleepy and can work together with friends." It's fun, like playing for real, but while learning. This finding shows that this method is able to increase learning motivation and encourage active student involvement in the learning process. Meanwhile, according to the results of interviews with teachers, as many as 79% stated that this approach has a positive impact on students' understanding of concepts in the IPAS subject.

Teachers feel that this model helps students link abstract concepts with direct experiences through educational games. One teacher said, "The children are all active; they are challenged to complete the missions in the game." I see that it is easier for them to understand the material because they learn while experiencing it directly." Another teacher added, “Usually concepts like plant parts are difficult for children to understand, but when it is wrapped in a game, they actually understand it faster.” The observation results also support this statement, showing students who are more focused, collaborative, and show high enthusiasm during the learning process. However, not all students feel comfortable with this approach. Around 17% of students stated that they did not like game-based learning. Some felt games made it hard to focus or were confused by the rules. One student said, “I prefer the teacher to explain in front. If I use a game, I am confused about what to do.” Another student also said, “Sometimes the game is too difficult, so I don’t understand the lesson.” This study shows that although most students responded positively, this approach still requires adjustments to the characteristics and learning needs of each student so that it can be applied effectively and evenly. The results of the questionnaire and interview observation data are as follows.

Table 1. Observation Response Results of 21 Students

Answer	Score	Percentage
Yes	105	83%
No	21	17%
Total	126	100%

Total answers: 21 respondents × 6 questions = 126 data points

$$Pr = \frac{A}{N} x100\%$$

Description:
Pr = Percentage of student responses
A = Proportion of students who chose yes or no
N = Number of students who filled out the questionnaire

Furthermore, the results of the percentage of student responses are converted with the criteria as in table 2.

Table 2. Student response criteria

Student Response	Percentage Response Criteria
0 – 20	Very Weak
21 – 40	Weak
41 – 60	Fair
61 – 80	Strong
81 – 100	Very Strong

Source: (Riduwan, 2010)

Based on the results of the questionnaire observation sheet above, a percentage of 83% was obtained and entered the Very Strong criteria. Thus, it can be concluded that the application of the game-based learning model based on constructivism can create student activeness in science learning.

Table 3. Interview Response Results of 15 Teachers

Answer	Score	Percentage
Yes	118	79%
No	32	21%
Total	150	100%

Total answers: 15 respondents × 10 questions = 150 data points

$$Pr = \frac{A}{N} x100\%$$

Description:
Pr = Percentage of teacher responses
A = Proportion of teachers who chose yes or no
N = Number of teachers who filled out the questionnaire
Moreover, table 4 converts the percentage of teacher responses into the criteria.

Table 4. Teacher response criteria

Student Response	Percentage Response Criteria
0 – 20	Very Weak
21 – 40	Weak
41 – 60	Fair
61 – 80	Strong
81 – 100	Very Strong

Source: (Riduwan, 2010)

Furthermore, based on the results of the interview sheet with the teacher, according to the results above, a percentage of 79% was obtained or had Strong criteria. Thus, it can be concluded that the application of the constructivist-based game-based learning model influences the understanding of the concept of learning science in grade IV.

DISCUSSION

The application of Game-Based Learning (GBL) in science subjects has been proven to increase students' learning activity and conceptual understanding. In line with the research results (Rahayu, Dayu, Rosniwaty, Khoiroh, 2024), the implementation of GBL for two weeks at SDN 6 Metro Pusat involving 21 students and 15 teachers showed an increase in student enthusiasm, especially through the interactive game media "Batang Bambu" and Wordwall. The results of the questionnaire showed that 83% of students felt that learning was more interesting and easier to understand. This finding strengthens the opinion (Zaini & Rahman, 2021) that GBL is suitable for implementation in elementary schools because it increases student focus and participation. However, the high enthusiasm needs to be reviewed critically. Students' interest may stem from the novelty effect rather than the game's content. Most students are not used to learning using interactive digital media, so positive responses could be triggered by different learning experiences than usual, not because learning is more effective in substance.

In addition, the implementation process in the field is not free from challenges. For example, teacher readiness in managing technology-based learning is still diverse. Several teachers admitted that they had difficulty adapting the curriculum to game media and needed more time in planning. Limited facilities, including unstable internet access in some classes, also posed technical obstacles that affected the smooth use of Wordwall. On the other hand, it is necessary to pay attention to the potential for bias in the data, especially from teacher responses. Knowing that they are being observed by researchers, teachers may give a more positive response than reality in order to appear to support the innovation being tested. Therefore, the validity of the findings must be interpreted carefully, considering the possibility of an observer effect.

From interviews with 15 teachers, 79% stated that the GBL model helps students understand science concepts more contextually. However, some also stated that the use of games is not always simple to do in everyday learning, especially when media is not optimally available or when students focus too much on the playing elements and ignore learning objectives. This assertion is in line with the view (Daryanto & Karim, 2017) that games can indeed make materials more contextual but still require the role of teachers in directing student focus so that learning remains meaningful. Science learning that integrates natural and social knowledge is indeed in line with the constructivist approach, as stated (Rusman, 2017), but the effectiveness of this model is highly dependent on supporting factors, such as teacher readiness, media availability, and consistency of implementation. Thus, although the game-based learning model based on constructivism shows promising results in increasing the activity and understanding of concepts, its success cannot be separated from the contextual conditions of the school and the readiness of its implementers.

CONCLUSION

The implementation of Game-Based Learning based on constructivism in learning science for grade IV shows very positive results in improving student learning activities. This approach presents an interactive, fun, and meaningful learning atmosphere, where students are not only recipients of information but also active subjects who build their own knowledge through direct experience. By combining educational game elements and constructivism principles, students are encouraged to participate more, discuss, work together, and think critically and creatively. Thus, the Game-Based Learning model based on constructivism is not only an alternative innovative learning strategy but also a relevant approach to support the achievement of science learning objectives more effectively and enjoyably. This model is highly recommended to be applied sustainably and further developed in various learning contexts in elementary schools.

REFERENCES

Alfansyur & Mariyani. (2020). Triangulasi metoda penelitian kualitatif. Borneo Novelty.

Bashooir, K., & Supahar, S. (2018). Validitas dan reliabilitas instrumen asesmen kinerja literasi sains pelajaran fisika berbasis STEM. Jurnal Penelitian Dan Evaluasi Pendidikan, 22(2), 219–230. https://doi.org/10.21831/pep.v22i2.19590

Daryanto, & Karim, S. (2017). Pembelajaran tematik terpadu. Gava Media.

Fitriyani, N., Suryani, N., & Hartati, S. (2022). Pengaruh penggunaan media game edukatif terhadap hasil belajar IPA siswa sekolah dasar. Jurnal Pendidikan Dasar Nusantara, 8, 55–64.

Hendryadi. (2020). Analisis validitas isi instrumen tes berpikir kritis ips kelas v sd kota yogyakarta. Jurnal Penelitian Dan Karya Ilmiah.

Nugraheni, R., & Setiawan, B. (2023). Implementasi pendekatan konstruktivisme dalam game-based learning untuk meningkatkan keterampilan berpikir kritis siswa SD.

Jurnal Inovasi Pendidikan Dasar, 11, 101–110.

Prananda, G., Judijanto, L., Ramadhona, R., & Lestari, N. C. (2024). Evaluasi literatur terhadap pengaruh game-based learning dalam meningkatkan motivasi belajar siswa. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, *9*(4), 388-401.

Rahayu, S. D., Dayu, D. P. K., Khoiroh, H., & Moeljaningsih, W. (2024). Penerapan game based learning educaplay untuk meningkatkan keaktifan belajar pada pembelajaran ipas sekolah dasar. *Didaktik: Jurnal Ilmiah PGSD STKIP Subang*, *10*(3), 511-519.

Riduwan. (2010). Skala pengukuran variabel-variabel penelitian. Alfabeta.

Rusman. (2017). Model-model pembelajaran: mengembangkan profesionalisme guru. Rajawali Pers.

Sahra & Aisiah. (2022). Validitas Isi Instrumen pengukuran literasi sejarah. Jurnal Family Education.

Suprapto, N., Kusumawardani, R., & Lestari, D. (2020). Membangun keaktifan belajar siswa melalui pembelajaran berbasis proyek dan konstruktivisme. 45–52.

Susanto, Risnita, & J. (2023). Tekhnik pemeriksaan keabsahan data dalam penelitian ilmiah. Pendidikan Sosial & Humaniora, 1.

Widodo, A., & Nurtanto, M. (2020). Pendekatan konstruktivistik dalam pembelajaran abad 21. Jurnal Pendidikan Karakter, 10, 10–20.

Zaini, M., & Rahman, M. T. (2021). Model dan strategi pembelajaran inovatif. FKIP Universitas Lambung Mangkurat.