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The Influence of the Gamification-Based OIDECCA Model on Student Achievement Motivation in Science Subjects in Class Vll At SMPN 6 Siak Hulu

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Abstract

The purpose of this study was to determine how the gamification-based OIDECCA learning model impacts student achievement motivation in Natural Sciences (IPA) in seventh-grade students at SMP Negeri 6 Siak Hulu, Kampar Regency, in the 2024/2025 academic year. The OIDECCA (Observe, Idea, Design, Create, Communication, Reflection, and Assessment) model is an innovative approach that combines gamification elements to create an interactive, engaging, and stimulating learning experience. The method used was a quasi-experimental design with a non-comparable control group design. The sample consisted of 54 students selected using simple random sampling. Data collection instruments included questionnaires, observations, interviews, and documentation. The results showed a significant increase in achievement motivation in the experimental class, with an average final score of 82.34%, compared to the control class, which obtained 81.46%. The indicator that increased the most in the experimental class was learning independence. These findings indicate that the implementation of the gamification-based OIDECCA model can increase students' achievement motivation and can be recommended as an innovative learning strategy in science learning.

Keywords: *Oidecca Model, Gamification, Achievement Motivation, Science, Interactive Learning.*

INTRODUCTION

Achievement motivation is the strong drive and desire in a person to achieve the best results, success, and recognition through effort and hard work. It involves mental and emotional processes that drive a person to strive to achieve goals, overcome challenges, and continually improve performance. This is the key to achieving success and building confidence. This is due to the desire to achieve goals, overcome difficulties, and get the best results. Factors such as personal ambition, self-pride, independence, and a supportive environment also affect motivation to achieve. With the motivation to excel, one can improve performance, develop skills and achieve success in various fields, such as education, career and personal life (Siahaan & Meilani, 2019).

One of the biggest challenges in education today is creating an engaging learning environment so that students want to actively participate. Gamification using game elements in non-gaming contexts has been shown to increase student engagement and desire to learn. It has the ability to make classes more engaging, interactive, and challenging, thereby increasing their natural desire to learn (Rachim et al., 2024)

Science learning usually consists of many things, such as students, teachers, and the learning environment. Some common problems include: Student Disinterest: Many students find science difficult because it requires an understanding of abstract concepts, such as ecology and biodiversity, that are difficult to understand without an engaging approach (Ichsan et al., 2018). Limited Facilities and Resources: Some schools still have limited laboratories or teaching aids. As a result, students have difficulty seeing and practicing the concepts of science that are learned directly. Students may be bored with traditional learning approaches, such as lectures or question-and-answers. This makes learning less effective and makes it more difficult for students to understand the material well (Primayana et al., 2019).

The OIDECCA (Observe, Idea, Designe, Create, Communication, and Reflection, Assessment) model can be used to design gamification-based learning. It has clear steps ranging from setting learning objectives to evaluating outcomes. Thus, this model can be applied effectively to design gamification-based learning. In the context of science learning, this model can be designed to help students understand gamification in learning (Hajar et al., 2024).

It is hoped that the application of the gamification-based OIDECCA model in science subjects at SMPN 6 Siak Hulu, Kampar Regency, will increase students'

motivation to excel. This more fun and game-based approach will encourage students to participate more actively in the learning process, improve their understanding of the material, and overall improve their academic achievement.

Research on ecology addresses the relationship between living things and their environment, which is important for increasing students' environmental awareness and its relation to the science curriculum of grade VII (Darmayani et al., 2021). This research material was chosen because of its relevance to students' daily lives, the complexity of the concept, and its relation to the science curriculum of grade VII. Innovative learning methods such as the gamification-based OIDECCA model can attract students to understand the material. According to Nikensasi and Hakim (Andini & Yunianta, 2018), game themes can be used because they have educational value, so games that originally functioned as entertainment can now be used as learning media. The results of the analysis show that the application of gamification can increase student motivation (Irnawati et al., 2024). In addition, another study by Marisa et al. (2022) found that gamification can improve student performance in a positive direction and also result in increased active participation and better understanding of the material in the learning process.

A survey conducted by the Indonesian Game Association in 2022 found that about 70% of students in Indonesia play games regularly, and 60% of them said that playing games helps them understand the subject matter. This shows that games have great potential to increase students' desire to learn, especially in subjects such as Natural Sciences (IPA). Students are expected to be more motivated to learn and excel by using the game element (Hamari et al., 2014). SMPN 6 Siak Hulu faces problems, especially related to science subjects. Teachers don't have a new way of teaching. Learning media has an important role as a teaching aid, but it also affects the learning environment designed and organized by teachers. Studies on the influence of gamification-based OIDECCA models on achievement motivation show that the use of these media during the learning process can significantly improve students' understanding.

Achievement motivation is an important psychological aspect in education related to students' motivation to achieve academic success through hard work and dedication (Permatasari et al., 2020). Ridha (2020) stated that the motivation for achievement arises from the need for competence, independence, and connectedness in the learning process. Therefore, learning strategies that are able to meet these needs have the potential to increase student motivation. Gamification is the process of applying game elements such

as points, levels, challenges, and rewards into non-game activities, including learning (Hamari et al., 2014). Research shows that gamification can increase students' intrinsic motivation, encourage active participation, and create a more enjoyable learning atmosphere (Surendeleg et al., 2017). In the context of science learning which is often considered abstract and difficult, the gamification approach is a potential solution.

The OIDECCA model is a systematic approach that encourages students to experience the learning process holistically: starting from observation, idea creation, design, product creation, communication, reflection, to assessment. When integrated with gamification elements, these models can create a dynamic learning environment and encourage students' cognitive and affective engagement (Hajar et al., 2024). Previous research by Pratama et al. (2019) and Cahya et al. (2019) showed that the use of game media in the learning process is able to increase student interest, independence, and learning achievement. Similar findings were also obtained in the context of other subjects, such as mathematics and languages, which show the great potential of gamification in increasing students' motivation to perform.

Based on this background, this study aims to examine the influence of gamification-based OIDECCA model on student achievement motivation in science subjects at SMPN 6 Siak Hulu, Kampar Regency. It is hoped that the results of this research can contribute to the development of more effective and interesting learning models, as well as provide solutions to increase student motivation and achievement in science learning.

RESEARCH METHODS

This study uses a quantitative approach with a quasi-experimental method, especially nonequivalent control group design. There are two groups: the experimental class uses the gamification-based OIDECCA model, while the control class uses the non-gamified OIDECCA model.

Population and sample

The population in this study is all grade VII students of SMPN 6 Siak Hulu which totals 199 students. The sampling technique was carried out by simple random sampling, and 54 students were obtained as samples, 27 students each in the experimental class and the control class. The design form used in this study is Nonequivalent control group design which can be described as follows:

Tabel 1. ***Nonequivalent control group design***

Group	Pretest	Treatment	Posttest
E	O1	X	O2
K	O3	-	O4

Sumber: Sugiyono (2019:79)

Information:

E = Experimental group

K = Control group

O1 = Pretest in the experimental group (in the form of a questionnaire)

O2 = Postest experimental group (in the form of a questionnaire)

O3 = Pretest control group (in the form of a questionnaire)

O4 = Postest control group (in the form of a questionnaire)

X = Treatment using the OIDECCA model with the Gamification

- = treatment using the OIDECCA model

Data Collection Techniques

1. Questionnaire: to measure achievement motivation, prepared on a Likert scale of 1-4, and has been tested for validity and reliability.
2. Observation: to see the activeness and response of students in learning.
3. Interview: conducted with science teachers to obtain supporting information.
4. Documentation: in the form of photos of learning activities and student worksheets.

In this study, it was collected using a non-test technique, namely a questionnaire. The purpose of this study was to determine the influence of gamification-based OIDECCA model on students' motivation to excel in science subjects. The data sources in this study come from primary data and secondary data. The primary data in this study are research questionnaires, interviews, and observations on resource persons. Secondary data in this study came from journals, and relevant research in the form of thesis, thesis and literature studies.

The sampling method in this study uses *a simple random sampling* technique . "It is said to be simple because the sample members of the population are considered homogeneous" (Sugiyono, 2019:120). Based on this, it can be concluded that *simple random sampling* is the collection of sample members from a population that is carried

out randomly without paying attention to the strata in that population. The population in this study was 199 students in class Vll. Sample selection was carried out using *a simple random sampling technique* with 54 students as a sample. The data collection technique used is a questionnaire. The questionnaire contains a list of questions that lead to students' motivation for achievement in science learning. The questionnaire submitted to the respondents contained 28 questions.

The observation that will be used in this study is non-participant observation, because in this study the researcher does not participate in the routine activities of the observed subject, but the researcher only plays the role of a spectator or witnesses the activities carried out by the teacher during class. Interviews were conducted with science teachers who had implemented an independent learning curriculum in the classroom. The questionnaire compiled by the researcher used a Likert scale of 1 to 4. The grid of research instruments is arranged according to predetermined research indicators. The questionnaire has gone through construct validation, empirical validation, and reliability tests before being distributed to respondents. The data analysis technique on the questionnaire used to convert it into a percentage value uses the Likert Scale percentage formula explained by Mirdanda (2019) as follows:

After the data from the questionnaire was obtained and the score value was calculated, the score criteria guidelines have been modified.

Table 2. Rating Categories

No	Percentage	Category
1.	75,01%- 100%	Highly Appropriate
2.	50,01% - 75%	Appropriate
3.	25,01% - 50%	Inappropriate
4.	0,00% - 25,00%	Very inappropriate

Modified from Mirdanda (2019)

RESULT AND DISCUSSION

The results of this study are presented in the form of a table to facilitate the analysis of the data obtained. The following table illustrates the results of the influence of the gamification-based OIDECCA model on students' motivation to excel in science class Vll at SMPN 6 Siak Hulu Kampar district which can be seen in the following table:

Table 3. Recapitulation of Experimental Class Indicators of Student Achievement Motivation Questionnaire

No	Indicator	Eksperimen			
		Beginning %	**Category**	**End %**	**Category**
1.	Learning Motivation	81,71 %	Highly suitable	82,33 %	Highly suitable
2.	Learning Independence	75,00 %	Appropriate	84,49 %	Highly suitable
3.	Interest in Learning	77,78 %	Highly suitable	80,21 %	Highly suitable
	Average	**78,16%**	**Highly suitable**	**82,34%**	**Highly suitable**

Source: Researcher's Processed Data (2025)

According to data from the table of the results of the initial questionnaire of the experiment, the learning motivation indicator produced a percentage calculation of 81.71%, which is included in the category of being very suitable. This indicator also produces the highest percentage results in the results of the initial questionnaire of the experimental class. Meanwhile, the average of all the results of the initial questionnaire of the experiment, which was 78.16%, was included in the category of very suitable.

According to data from the table of the results of the final questionnaire of the experiment, the indicators of learning motivation, learning independence, and learning interest received a category that was very similar to the results of the calculation of the highest percentage of 84.49% for the indicator of learning independence. The average result of all indicators in the final questionnaire of the experiment, which was 82.34%, was also included in the very appropriate category.

Table 4. Class Recapitulation of Control Indicators of Student Achievement Motivation Questionnaire

No	Indicator	Control			
		Initial %	**Category**	**End %**	**Category**
1.	Learning	79,09 %	Highly suitable	82,10 %	Highly suitable
2.	Motivation Learning	81,71 %	Highly suitable	81,71 %	Highly suitable
3.	Independence Interest in Learning	78,01 %	Highly suitable	80,56 %	Highly suitable
	Average	**79,60%**	**Highly suitable**	**81,46%**	**Highly suitable**

Source : Researcher's Processed Data (2025)

From the table data of the results of the initial questionnaire control of the learning independence indicator, the results of the percentage calculation of 81.71% of the results were included in the very appropriate category. This indicator of learning independence is the highest percentage in the initial questionnaire results of the control class. Meanwhile, the average obtained from all indicators in the initial questionnaire of the experiment, which was 79.60%, was included in the category of very appropriate.

From the data of the final questionnaire recap table of control, indicators of learning motivation, learning independence, and learning interest were categorized as very in accordance with the results of the calculation of the largest percentage of 82.10%. This indicator of learning motivation is the highest percentage in the final questionnaire results of the control class. Meanwhile, the average obtained from all indicators in the final control questionnaire of 81.46% was included in the category of very appropriate. The average achievement motivation score of students in the experimental class increased from 78.16% to 82.34%, while in the control class it increased from 79.60% to 81.46%. The highest increase in the experimental class was found in the indicator of learning independence at 84.49%.

Thus, it can be seen that overall, respondents or students show that the influence of the gamification-based OIDECCA model on students' achievement motivation in science subjects contributes positively to the achievement motivation of grade VII students. Hereby, the overall results of the recapitulation of the experimental class and the control of the questionnaire indicators obtained can be concluded in the following diagram:

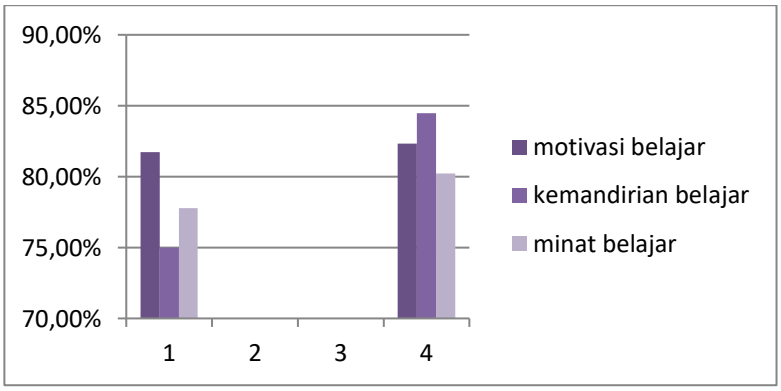

Figure 1: Overall Recapitulation of Indicators in the experimental class

In the figure above, the preliminary and final experimental class repitulation data is divided into three categories: learning motivation, learning independence, and learning

interest. These three indicators work together to support student learning success. Although the percentage of learning motivation is slightly lower, improving one indicator can help increase interest in learning and other independence. To improve an effective learning environment and support student growth, teachers and educational institutions must create a plan that proportionately improves all three components.

With a final percentage of 82.33% of the learning motivation indicators, learning motivation is included in the category of very appropriate. This suggests that learning motivation has already had a significant impact on improving students' ability to learn and that students may like new learning methods. However, some students are not motivated to learn consistently through gamification, which can be caused by other factors, such as their irregular travel style or the level of difficulty they have. Increased confidence in answering questions, a desire to try new things, and the ability to complete tasks within a set amount of time are some examples of students' motivation to excel. This shows that the gamification-based OIDECCA model is useful as a medium and assists students in learning. However, there are some issues with the model in the classroom. Some students say it's difficult.

Learning independence: The learning independence indicator shows that the final percentage of 84.49% is in the category of Very appropriate. This shows that using gamification-based OIDECCA models helps students learn independently. The interactive and challenging elements in this model can teach students to think critically, solve problems, and complete tasks without relying on the help of teachers. This independence is one of the important outcomes in learning.

Some of the game's components, the game's visual appearance, and an engaging plot increase students' interest in the learning material. This shows that the gamification-based OIDECCA model has succeeded in attracting students' attention and making them more interested in learning science, because the interest in learning with the category is very appropriate and the indicator of learning interest also obtained a percentage of 80.21%. Therefore, it is known that the use of gamification-based OIDECCA models in science learning can increase students' interest in learning. Most students rated the use of this model positively, especially in terms of increasing students' interest and their active participation during the learning process. This is in line with research conducted on the use of gamification-based OIDECCA models on student achievement motivation. This model helps students increase their interest in learning and increase their engagement.

Around 82.34% of students who fall into the Strongly agreed that the gamification-based OIDECCA model can help science learning, especially in increasing students' interest and independence. However, students who still have difficulty with this model indicate that the gamification model or design used needs to be further evaluated to get better results.

Games can be used in game themes because they have educational value, so games that originally function as entertainment can function as learning media (Andini & Yunianta, 2018). One of the innovations that will change the world is games (Novianti, 2013). The results of Cahya et al.'s (2019) research show that there is a relationship between the use of interactive games and students' ability to understand the subject matter. This research has shown that the use of game media during the learning process improves students' understanding of the material.

Game-based learning can indeed get students interested. This shows that toy-based learning is also successfully used in various fields, such as biology (ümit Yapıcı & Karakoyun, 2017)), Malay (Omar et al., 2019)), mathematics (Curto Prieto et al., 2019), and pharmacy (Tewthanom, 2019). The use of gamification-based OIDECCA models increases students' desire to excel. Students are more interested in learning science because of the game's elements such as challenges, rewards, and engaging visualizations. These findings are in line with the theory put forward by Ryan & Deci (2000) that intrinsic motivation is essential for learning. This research also supports the findings of Surendeleg et al. (2017), who stated that gamification can increase student engagement. However, adapting to the gamification model is still difficult for some students. This suggests that gamification design should be evaluated to better suit the characteristics of students.

CONCLUSION

According to the results of the research that has been conducted, it can be concluded that the gamification-based OIDECCA model in science learning increases students' motivation to excel. Most students love using this model as part of the learning process because it makes the lessons more engaging, fun, and interactive. Some of the main points that support this conclusion include: Increased learning motivation: the gamification-based OIDECCA model helps to increase students' involvement and interest in learning science, so that students are more enthusiastic about learning. Reinforcement of concepts: With a gamification-based approach, students can understand science

concepts more easily because the material is delivered in a more practical and engaging context. Influence on achievement: Increased motivation to learn has a positive impact on student learning outcomes, as evidenced by increased grades and active participation of students in the classroom. Keep in mind that the success of the gamification-based OIDECCA model also depends on game design that fits the curriculum and student needs. Teachers are very important to use gamification as a learning tool and not just entertainment. With the right approach, the use of this model can be one of the innovative strategies to increase student motivation and achievement.

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