The Effect of the Game Method on Students' Motivation and Cognitive Ability

Submitted 19 June 2023 Revised 29 June 2023 Accepted 30 June 2023

Ruth May1, Dian Rachmawati2*, Evi Amelia3

1,2,3Department of Biology Education, Faculty of Teacher Training and Education, Universitas Sultan Ageng Tirtayasa, Serang, Indonesia

Corresponding Email: *dian.rachmawati@untirta.ac.id

DOI: 10.30870/gpi.v4i1.20583

Abstract

This study aimed to the effect of the game method on motivation and cognitive capacities. The study employed a quasi-experimental approach with a randomized block design, with the game method as the independent variable and motivation and cognitive ability as the dependent variables. The research sample consisted of VIII C as the control class and VIII A as the experimental class. The sampling approach used was random sampling. A questionnaire was used to assess student motivation. A questionnaire was used to assess cognitive capacities, and an observation sheet was used to assess learning implementation. According to the findings, the average score of students' motivation in the experimental class was 61, placing them in the very high group. Students in the experimental class have a strong cognitive ability, scoring 72.36. The P value for the t-test was 0.05, showing that the gaming method influenced students' motivation and cognitive ability on human movement system concepts.

Keywords: Game method, Motivation, Cognitive, Human Movement System Concepts

INTRODUCTION

Learning is acquiring novel knowledge, skills, attitudes, interests, character, self-adjustment, and so on (Setiyowati & Arifianto, 2020; Qvurtrup et al., 2016). Within the confines of the school, instructors must employ proper strategies to promote a conducive learning environment for students to experience favorable changes (Parinussa et al., 2023). One strategy that the teacher must do is to select a learning method appropriate for the lesson, the subject, and the students' circumstances (Wasyik & Muhid, 2020). Implementing learning techniques to achieve learning goals, enhance student motivation, and assist teachers in creating effective and efficient learning is referred to as the learning method (Hodson, 2014). Learning may be complemented through the game technique. The game technique allows students to be more focused on learning, develop skills (Dankbaar et al., 2015), enhance discipline in following rules, and provide a demanding learning environment (Huang et al., 2010).

The objective of applying a learning approach is to enhance student motivation. Motivation is defined as "a change in a person's behavior that moves his heart to act and do something to achieve a result" (Rahardjo & Pertiwi, 2020). Purwanto (2007) defined motivation as "anything based on influencing a person's behavior so that he is moved to act or do something in order to achieve certain results or goals." Motivation is an aspect of the learning process that has an essential effect on student learning outcomes. Motivation in learning is important to enhance students' cognitive abilities (Nikou & Anastasias, 2016). According to Prayitno (1989),
students who are highly driven to more activities faster and have more significant learning outcomes than students who are less motivated to learn. Cognitive ability is one of the learning outcomes that students may develop during the learning process. Cognitive skills are students' knowledge or intellectual ability concerning the subjects they learn.

Understanding various systems in human life is one of the concepts learned by students in class VIII of junior high school with standard competence, and the basic competency describes the locomotor system in humans and its relationship to health. According to research conducted with an Integrated Science subject teacher at 9th junior high school in Serang City, Indonesia, human movement systems are difficult for students to remember and understand due to the many names of bones, joints, muscle types, and movement system disorders. Furthermore, the students' conditions when studying biology were not conducive because some students ignored the teacher when explaining the topic while chatting with their desk mates, and students went in and out of class for various reasons not to participate in the lesson as a whole. Such circumstances imply that kids are unmotivated to learn.

To address this, proper techniques for motivating kids to study and improve their cognitive capacities are required. The game involves students in the learning process by carrying out activities that employ toys or visual aids to assist students in achieving learning objectives. According to Sutrisno (2011), the efficacy of game learning approaches on learning outcomes is more significant than conventional ways among 4th-grade primary school students at Kedung Waringin 3 Bogor. Students would like to learn lessons through games, analyze the activities they encounter, and achieve learning goals, and students' knowledge, motor, emotional, social, intellectual, and creative may be refined (Asfandiyar, 2009). This study aimed to examine how the gaming approach affected students' motivation and cognitive capacities when applied to the concept of human movement system.

**METHOD**

In order to change every critical variable, pseudo-experiments are performed (Nazir, 2009). The research method applied was a randomized control group; that is, each member of the population included in the experimental and control classes was assessed for cognitive ability by working on posttest questions after learning (Nazir, 2009). The processes for conducting experiments with these designs include 1) implementing learning activities, 2) conducting a posttest to assess treatment results, and 3) data analysis. The random sampling was applied. The experimental group's study sample consisted of students from class VIII A. The control group's research sample consisted of students from class VIII C.

The posttest with a set of questions will be utilized in this study as a data-collecting technique or research instrument to assess students' cognitive capacities on the notion of the
human movement system. C1 (remembering), C2 (understanding), C3 (applying), and C4 (analyzing) are the cognitive levels examined. The posttest consists of 20 multiple-choice questions with four response alternatives. A Likert scale model questionnaire assessed student motivation during the experiment. The questionnaire was presented in the form of a statement, followed by responses of various degrees, including "strongly agree," "agree," "disagree," and 'strongly disagree" (Arikunto, 2009). The observation assessed individual students' behavior and learning settings and processes (Goh et al., 2018). Observers conducted the observations, and behavioral features were marked with a checkmark in the column for the observations' responses. The validity, reliability, level of difficulty and discriminating power of the posttest and questionnaire questions utilized in the study were all assessed previously (Taherdoost, 2016). The questionnaire, on the other hand, merely examined the validity and reliability. In addition, valid questions were chosen to assess students' cognitive ability.

According to Djamarah (2005), posttest score data processing results are classified into cognitive ability categories. Cognitive criteria are very good if in the 80-100 range, good if in the 70-79 range, fair if in the 60-69 range, poor if in the 50-59 range, and extremely poor if they are in the 50 range. In addition, the student's motivation was classed as very low if the questionnaire score was 15.2, low if the questionnaire score was 15.21-30.40, fair if the questionnaire score was 30.41-45.60, high if the questionnaire score was 45.71-60.80, and very high if the X questionnaire score was 60.80.

The t-test was used to test hypotheses in the SPSS Version 16.0 software, assuming that the data were normally distributed and homogenous. The following hypotheses were tested in this study:

H₀: There is no influence of the game approach on students' motivation and cognitive ability on human movement system concepts

H₁: The game technique affects students' motivation and cognitive ability on human movement system concepts

RESULTS AND DISCUSSION

Student’s motivation

The data collected from questionnaires on students’ learning motivation in the experimental and control groups are regularly and uniformly distributed. The t-test on questionnaire data from the experimental and control classes rejected the H₀, indicating that the questionnaire data from the two classes differ significantly. The results of statistical testing revealed that the gaming approach affected the students’ motivation to learn about the human movement system. Figure 1 illustrates the average value of student's motivation.
Students in the experimental class were more motivated than those in the control class ($61 > 50.91$) (Figure 1). Students' motivation in the experimental class was classified as very high, whereas in the control class, it was classified as high. Figure 2 shows the proportion of students' motivation in the experimental and control groups.

No students with low or extremely low learning motivation were in either the experimental or control classes during learning. In contrast, most students in the experimental class (52.78%) were highly motivated. This is likely due to the teacher's ability to give students an exciting impression of learning. Students' attention is focused on new things, and it can be observed. Therefore, they are excited about learning activities, according to Slameto (2010). From the beginning to the final stage, all students in the experimental and control classes can participate in learning in an organized way. Furthermore, because there were novel and engaging experiences in capturing a subject, students in the experimental class with learning experiences utilizing the game technique had better learning motivation. The gaming technique
may be used to reinforce previously learned concepts and build intrinsic motivation (Padmono, 2011).

The percentages of motivation, activity duration, and attitude orientation were all extremely high (84.2%), indicating that the snakes and ladders game used in the experimental class was a competitive game that encouraged students to study and compete in groups. This enhanced student excitement for learning as well as their readiness to engage, interact, and act. The games provided keep students from becoming bored, creating the learning process interesting and fun. Furthermore, a variety of game stages that students must complete in a limited period motivates students to concentrate when reading content and obey directions at each game level. According to the observations, students in the experimental class were more persistent in answering each issue and absorbed the content offered more quickly. This is evident in the indicator values of fortitude, perseverance, and ability to overcome obstacles, with the experimental class scoring better than the control class (78.29% > 69.44%).

Aunurrahman (2009) supports the findings of this study, stating that strong student learning motivation may be seen in the seriousness with which they engage in the learning process. Furthermore, the persistence indicator on activity objectives, which are in the very high category, suggests that students' perseverance in learning is enhanced since they believe they could achieve good learning results by employing the game approach. Another advantage of the game approach is the incentive provided to the winning group, which increases students' motivation to offer their best effort. This is confirmed by Sardiman's (1996) research, which discovered that competition and awards are extrinsic incentives that enhance the student's enthusiasm for learning.

Different things were noted in the control class with lectures, including high motivation (69.44%) and very high motivation (11.11%). This demonstrates that students are more passive in the lecture approach, do not focus on the teacher's explanation, and are bored easily. The activity duration indicator, which is lower than the experimental class, reflects this. Students in the control class pay less attention to their peers' replies during conversations, indicating reduced student motivation. According to Sanjaya (2007), the lecture technique has various weaknesses, including teacher-centered interactions; it does not allow students to voice their viewpoints, making it more difficult for students to absorb the subject matter provided.

**Student's cognitive ability**

The t-test results showed a significant difference in post-test scores between the experimental and control groups (P < 0.05). This indicates that the gaming approach affects
students' cognitive capacities in the human movement system. Figure 3 illustrates the average value of cognitive ability.

![Figure 3](image-url)

**Figure 3. The average of student’s cognitive score in experiment and control class**

The average value of students' cognitive skills assessed by posttest in the experimental group was higher than in the control group (72.36 > 56.39). Student's cognitive ability in the experimental class was classified as good, however, in the control class, it was classified as poor category. Figure 4 illustrates the percentage of students' cognitive categories in the experimental and control groups.

![Figure 4](image-url)

**Figure 4. Student’s cognitive percentage in experiment and control class**

The experimental class had the most significant percentage of students with very good cognitive abilities (38.89%), while the lowest was in the poor and extremely poor (5.56%) (Figure 4). According to the findings, the value of cognitive ability is directly linked to the value of the motivational indicator of persistence in activity objectives (85.76%). Students who are certain that their outcomes will be good also have high post-test scores. Students in the experimental class mastered four of the six learning markers. The four indicators that students can master in the experimental class are: mentioning the bones in a human skeleton,
distinguishing between cartilage and bone, explaining joints and types of joints, and explaining the types of disorders and abnormalities in the human movement system. The item indicator with the highest percentage of explanations (90.74%) indicated a variety of disturbances and anomalies in the human movement system.

The experimental class implemented the game learning approach, and a student's strong cognitive ability was suspected. Students became more interested and challenged through the competitive activities, allowing them to gain attention to think, resulting in a more enjoyable learning atmosphere. Students' thinking and logic are polished when answering questions or following directions provided at each level. Stiller & Schworm (2019) also reported that the gaming learning group showed a higher interest level, challenge, and anxiety of failing after introducing the task.

Furthermore, the ability for students to communicate, discuss, and collaborate can help to increase student knowledge. If one group uses the game method while studying, the other groups pay attention to the group playing so that all students in the class learn all the content in the game method. Students can be taught the concept of right and wrong using the game technique. If one group does not answer a question, the other group can answer the question, making students more motivated to focus on listening to the information provided. According to Tedjasaputra (2001), this exercise's findings show that understanding ideas is significantly easier to get through playing activities. Furthermore, using the game technique to study English in the 5th grade of elementary school can increase student learning results (Saefudin, 2012).

The fair category had the largest proportion of the cognitive ability category in the control class (38.89%), while the good category had the lowest score (8.33%) (Figure 4). This demonstrates that only a few students can understand learning indicators for human movement systems. Explaining joints and various types of joints had the highest mastery percentage, scoring 65.74%. This might be because the teaching technique applied in the control class has several weaknesses. Observations during learning revealed that students paid less attention to the teacher's explanation and rapidly became bored while studying. Students also do not participate actively in learning activities, as seen by the teacher's absence of students asking questions when given the opportunity. Students not asking questions may be due to a lack of knowledge of the content offered, shyness toward the teacher, or feelings of embarrassment if they are seen not comprehending the learning material (Suryosubroto, 2002). The results of this study are also supported by Asmani's (2009) explanation that the lecture method's weakness is that it makes students passive during learning activities, does not develop students' critical abilities, makes it difficult for teachers to control the extent to which student learning is acquired, and learning activities become monotonous. Another factor contributing to the low
The cognitive ability of students in the control group is the placement of learning time in the third hour or the afternoon. Students get tired during the day from studying and conducting activities. According to Slameto (2010), tiredness can impact student learning outcomes, making it difficult for students to focus when studying.

The game method, which has the features of learning while playing, is effective in building student learning motivation so that students make an effort to accomplish learning goals based on the concept of the human movement system. As a result, students who are motivated will influence their cognitive ability. This is related to Dimyati and Mudjiono's (2009) assertion that strong learning motivation will boost learning activities, improving student learning outcomes.

CONCLUSION
The findings revealed that the game method influenced students' motivation and cognitive ability on human movement system concepts. The average score for students' motivation was 61, while the average score for students' cognitive ability was 72.36.

SUGGESTIONS
The game method can be used as an alternative in the application of biology learning in schools because it is proven to increase students' learning motivation and cognitive ability. Teacher preparation is needed in applying game methods such as class arrangement and student sitting positions to create conducive classroom conditions. In addition, in applying the game method, the teacher is advised to pay attention to students having their turn to play and those who act as spectators. This is necessary so that learning materials can still be delivered and learning objectives can be achieved.

REFERENCES


