# The Use of Microteaching and Game-Base Learning: A Strategies in Improving Science Performance Among Grade 8 Students

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*Abstract- This study investigates the impact of microteaching and game-based learning (GBL) on the science performance of Grade 8 students. It addresses the challenges of low academic motivation and engagement in science education. The research aims to determine whether these innovative teaching strategies can enhance students' understanding and performance in science. Microteaching involves brief, focused teaching sessions with small student groups, fostering active learning and critical thinking. Game-based learning integrates educational content into interactive games, promoting problem-solving skills and interest in STEM fields. The combination of these methods creates an engaging learning environment, potentially leading to better academic outcomes. The study utilized a pre-test and post-test design to measure students' performance before and after the intervention. Findings indicated significant improvements in students' post-test scores, suggesting that microteaching and game-based learning effectively enhance science learning outcomes. The study recommends the consistent application of these strategies in educational settings to improve student engagement and academic performance in science.*

*Indexed Terms- Microteaching, game-based learning, gamification in education.*

## I. INTRODUCTION

• *Purpose of the Study*

Students' global curiosity is encouraged and their aptitude for scientific thought is developed through science education. Students will build science process abilities to evaluate the effects of scientific and technological breakthroughs as well as a deeper understanding of science through the inquiry process. This equips students with the necessary skills to engage in public dialogue on scientific topics and pursue a lifelong interest in science and technology.

Learners can be drawn into the realm of learning through meaningful learning activities. In this type of learning environment, learners are fully involved in the learning process by engaging in learning activities. According to Al-Haroub (2016), teachers must be more innovative to provide engaging learning activities so that students become effectively skilled, prepared, and adaptable because education and knowledge are the instruments of transformation. The goal of science education is to increase students' scientific literacy through investigative tasks that require planning, testing, monitoring, data analysis, building and accessing processes and looking at the evidence.

Microteaching is a wonderful method that is applied in teaching-learning programs to give trained teachers beneficial possibilities to create efficient teaching methods. Micro-teaching involves the use of small groups of students in a collaborative learning environment that fosters learning through inquiry and critical thinking. The goal of microteaching is to improve the academic performance of students through active engagement in the learning process. Microteaching is a method used in teacher education to help students go from theory to practical teaching scenarios. These lessons should last five to ten minutes, be presented to a small group of students, and have fewer tasks and skill requirements.

Games-based learning (GBL) is thought of as a very engaging strategy for learning at a higher level, therefore it may be a good way to overcome some of

the issues with traditional methods for teaching required acquisition and analysis. Students are starting to give games and the unique environment linked with them the respect they need. If students are unable to demonstrate critical learning, teachers must give them additional chances. The primary responsibility of teachers is to support each student's work and individual effort while also offering direction in conjunction with parents.

A microteaching session is a 5-10 minute, one-on-one, or small group interaction that is focused on a specific skill, concept, or area of investigation. Microteaching is student-centered, engaging, and effective for teaching a variety of science and academic subjects to elementary students. This technique allows students to engage in active learning and make connections with real-world applications through activities such as group discussions, reading articles, solving math problems, and conducting experiments. In the game-based learning model, students engage with a game in which the curriculum is integrated into the game. Furthermore, the incorporation of game-based learning into the classroom can facilitate students' understanding of scientific concepts by improving their problem-solving skills and increasing interest in STEM-related fields. The interplay between these two modalities can have powerful effects on student learning as recent advances in educational technology have made it possible to incorporate both approaches into effective learning environments. Using these two methods together has the potential to increase student engagement and support deeper cognitive learning in science.

Inside a Grade 8 Science classroom, it is observed that students' academic motivation is alarmingly low. If these problems are not addressed appropriately, the students will have low academic performance, less interaction in class, and lack of interest in learning. This study's goal is to find out whether or not game-based learning activities may help Grade 8 science students perform better. This study attempts to give the empirical evidence required to comprehend the relationship between games, motivation, and learning through the creation and testing of this learning approach.

- *Statement of the Problem/Objectives*

The goal of this action research was to employ game-based learning and microteaching as an intervention to raise the students' science class performance in Grade 8. This research specifically aimed to respond to the following questions:

1. What is the performance of Grade 8 students in Science before and after the implementation of microteaching and game-based learning strategy?
2. Is there a significant difference in the performance of Grade 8 students in Science before and after the implementation of microteaching and game-based learning strategy?

- *Significance of the Study*

This study will be beneficial to the following:

Junior High School Students. The findings of this study may encourage students to become more engaged and responsive in their actual and virtual science classes. Aside from improving their academic motivation, this study will also help them improve their academic performance, which will be depicted in their assessment scores.

Junior High School Science Teachers. The use of microteaching and game-based learning as a strategy for enhancing students' outputs can be used as instructional material in their teaching of science. This can further develop and enhance the knowledge and understanding of the students in learning Science. It provides teachers with the opportunity to make their teaching effective and innovatively and learning sessions more engaging.

## II. LITERATURE REVIEW AND METHODOLOGY

- *Related Studies*

Gamification may play a significant role in both traditional and online learning, as seen by its rising popularity in recent years. As a way to include digital games into the teaching and learning process, several institutions have adopted a type of game-based teaching and learning. This is how e-learning connects theoretical and practical knowledge (Lengyel, 2020).

It's not a novel concept to incorporate play into learning and growth. In spite of this, video games are

becoming a common form of entertainment, which begs the question of how to best utilize their educational potential. Several intriguing studies on young people's use of digital games have been released. According to the Pew Internet & American Life Project study, 94% of girls and 99% of boys overall play video games (Lenhart et al., 2008). The same important studies found that kids can engage in and play digital games for roughly 7 to 10 hours per week (Lenhart et al., 2008), and more recent estimations show that this number is higher than ever. Advocates said that games are an effective learning medium due to the level of engagement that caters to a wide range of people and the types of social activities they engaged in (Gee, 2003, 2007; Prensky, 2003, 2005; Squire, 2011).

Game-based learning is defined as a form of gameplay with specific learning objectives (Shaffer, Halverson, Squire, & Gee, 2005). The majority of the time, people assume that the game is talking about a digital game, although this isn't always the case. According to this concept, the design of games for learning involves striking a balance between the desire to prioritize gaming and the necessity to educate the intended subject matter (Plass, Perlin, & Nordlinger, 2010). Play becomes more social, abstract, and symbolic as children progress through several developmental stages, according to Piaget (1962). Play helps kids transcend their immediate reality by activating schemas that support cognitive growth in children. For instance, while knowing that Eraser is not a car, a child can pretend that Eraser is a car. This type of play allows children to memorize multiple representations of the same object. This is a necessary skill for the development of symbolic reasoning (DeLoache, 1987). The concept of zones of proximal development arises naturally from Vygotsky (1978). Vygotsky (1978) called to play a "major factor" in child development and believed that play's key role was to create zones of proximal development for the child.

When choosing the right games for learning, it is important to think about why and how to choose the right games for learning. We present reports from practice that highlight ongoing research questions and activities and may encourage practitioners to include them in their classroom introductions. Topics include problem-based learning, classroom applications, developing games for teaching and learning, and quality issues in games.

One of the best methods for instructing student instructors is microteaching (Buyukkarci, 2014). Student instructors have the chance to plan and carry out instructional strategies when they are microteaching. As technology has advanced, microteaching as a technique of putting educational abilities to use has changed over time (Wilson & I'Anson, 2006). Microinstructions are crucial in helping student instructors become teachers because they preserve the connection between theory and practice. Additionally, microteaching offers a way to move from a theoretical to an actual teaching setting.

Microteaching methods have been used since the 1960s (Saban & Coklar, 2013). The prefix "micro" comes from the Greek word meaning "small". The practice of microteaching is referred to as Small His Teaching (cited in Külahçı 1994, Saban & Coklar, 2013) due to the small number of students and short duration (5-30 minutes). Benton (2001), Cruickshankk, and Metcalf (1993) affirm: From the definitions above, we can conclude that microteaching is an educational practice that is limited in time, participants, and educational context. Student-teachers are expected to learn several teaching skills and experience teaching and learning activities through micro-lessons, such as asking questions, having discussions, and applying classroom management principles. Additionally, microinstructions can encourage student teachers to reflect on classroom behaviors and skills rather than gaining experience through trial and error.

Trainees were more likely to conceive, create, and carry out learner-centered education, according to a study by Golightly (2010). Microteaching "provided students with opportunities to reflect and evaluate their own classroom presentations and those of other students, helping to develop teaching skills, and Golightly's research results showed that microteaching helps trainees bridge an important gap between theory and practice," according to another study finding.

Microteaching aids in the development of the abilities required for teaching by student-teachers. Enhance your critical thinking, classroom management,

observational, time management, and introspective abilities. Students have the capacity to interact with others, speak in front of groups, play many roles (including learner and teacher), share knowledge about presentations, and provide feedback to other students (Msimanga, 2021).

Microteaching can improve problem-solving skills, critical reasoning, questioning, and reflection. It enhances learning through practical applications. Additionally, this strategy included enhanced organizers, integrating lesson content with the application, integrating breaks with lectures, and translating difficult concepts into learnable components.

- *Scope of the Study*

This research was conducted specifically to improve students' academic performance and motivation in Grade 8 Science. Students in Grade 8 enrolled in a private school in Iloilo City and studying science was the selected section for the study. They comprised thirty (30) students in the section. The researchers observed students throughout their first and second grading periods, and they were taught by the same cooperating teacher as observers throughout the period. The microteaching and game-based activities covered both online and offline games that were connected to the topic.

- *Proposed Intervention and Strategies*

In this study, the proposed strategy was to use microteaching and game-based learning activities to enhance students' performance in science class. Integrating microteaching and game-based learning is a strategy that provides students with interactive activities in which they collaborated during the teaching and learning process. The students engaged in the activity to generate ideas and to further develop their critical thinking skills while learning the lesson in science. This activity encouraged students to participate in the class and to have an interest in learning. As a result of the activity, students achieved ideas and acquired abilities that allow them to activate concepts and make links between new and existing ideas. Students could acquire knowledge from their classmates, and as the discussion went by, a group of ideas and concepts were formed from the teaching and learning process. Furthermore, the performance of

students in Science through microteaching and game-based learning strategies may yield positive results and outcomes.

The study used the students' outputs to find out whether there was an improvement, specifically in the performance of the students in science. Students' outputs mostly refer to the work that students produced. It was also a result of what students created as part of the tasks that they are required to do. From the activity sheet given to the students, the outcome would serve as the basis to determine the performance of the students in terms of their outputs, whether they were enhanced or otherwise.

For the implementation of the proposed strategy, the researchers employed micro-teaching and game-based learning strategies to determine the performance of Grade 8 students in terms of their outputs in science. The study used a pre-test and post-test research design. This study did not use a control group and only observed one class. Table 1. demonstrates the pretest-posttest design diagram. Changes were seen in the group as a result of the intervention used during the teaching and learning processes. To show disparities in Grade 8 students' performance in terms of their outputs, the study's purpose was to employ a pre-test and post-test design as its research methodology. The pretest and posttest would reveal differences in students' performance in terms of their outputs.
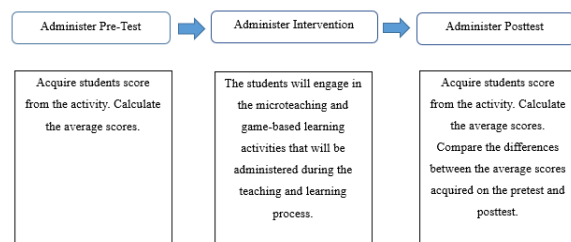


*Figure 1.* Pretest-posttest design

A pretest was administered before the intervention so that the pretest could accurately represent the group's initial performance. Microteaching and game-based learning were employed as the intervention. Following the intervention, a posttest was conducted on the group for the posttest to accurately represent the group's final performance. In the eighth grade, one class was used as a test subject. The research instruments employed

were a posttest and a pretest in the form of an activity sheet. Students' performance in science was analyzed before and after the microteaching and the game-based learning strategy was implemented by comparing their outputs.

### III. FINDINGS

• Data Collection and Analysis

The data gathered were described and analyzed in this section. The information concerned the science performance of grade 8 students, specifically with regard to The Digestive System. The descriptive analysis used tables and table legends so as to determine the scores and levels of the students' performances. It compares the performance of Grade 8 students in science, specifically on the topic of The Digestive System, before and after the implementation of MICRO TEACHING and GAME-BASED LEARNING.

Table 1. *Performance of Grade 8 Students in Pretest in Terms of Their Outputs in Science*

Table 1 displays the outcomes of the Grade 8 student's performance on the pretest in terms of their outputs.

Based on the findings, most of the Grade 8 students found fairly satisfactory results on their pretest in terms of their outputs, which were composed of thirteen (13) students. There are six (6) students who obtain satisfactory, and eleven (11) students who did not meet the expectation on their pretest. In addition, there is no number of students who obtain very satisfactory and outstanding. The result of the pretest is quite below what the researchers expected. The researchers have limitations in advising and monitoring students in answering the pretest. Hence, the majority of the Grade 8 students have poor performances in their pretest in terms of their outputs in science.

| Respondent | PRETEST SCORE | Respondent | PRETEST SCORE |
|---|---|---|---|
| Student 1 | 15 | Student 16 | 10 |
| Student 2 | 16 | Student 17 | 15 |
| Student 3 | 13 | Student 18 | 18 |
| Student 4 | 17 | Student 19 | 13 |
| Student 5 | 11 | Student 20 | 8 |
| Student 6 | 10 | Student 21 | 10 |
| Student 7 | 18 | Student 22 | 12 |
| Student 8 | 12 | Student 23 | 8 |
| Student 9 | 20 | Student 24 | 10 |
| Student 10 | 9 | Student 25 | 12 |
| Student 11 | 15 | Student 26 | 10 |
| Student 12 | 10 | Student 27 | 13 |
| Student 13 | 9 | Student 28 | 14 |
| Student 14 | 11 | Student 29 | 12 |
| Student 15 | 9 | Student 30 | 17 |

| Legend: | Score |
|---|---|
| Outstanding | 26-30 |
| Very Satisfactory | 21-25 |
| Satisfactory | 16-20 |
| Fairly Satisfactory | 11-15 |
| Did not meet Expectation | 1-10 |

Table 2. *Performance of Grade 8 Students in Posttest in Terms of Their Outputs in Science.*

Table 2 exhibits the outcomes of the Grade 8 student's performance on the post-test in terms of their outputs.

Based on the findings, most of the Grade 8 students found very satisfactory results on their posttest in terms of their outputs, which were composed of fourteen (14) students. On the other hand, there were twelve (12) students who obtained satisfactory, two (2) students who obtained fairly satisfactory, and there are two (2) students who obtained outstanding and on their posttest. Therefore, most of the Grade 8 students had good performances in their posttest in terms of their outputs in science.

| Respondent | POSTTEST SCORE | Respondent | POSTTEST SCORE |
|---|---|---|---|
| Student 1 | 17 | Student 16 | 18 |
| Student 2 | 20 | Student 17 | 21 |
| Student 3 | 22 | Student 18 | 20 |
| Student 4 | 15 | Student 19 | 17 |
| Student 5 | 23 | Student 20 | 21 |
| Student 6 | 17 | Student 21 | 19 |
| Student 7 | 21 | Student 22 | 22 |
| Student 8 | 23 | Student 23 | 23 |
| Student 9 | 30 | Student 24 | 25 |
| Student 10 | 17 | Student 25 | 19 |
| Student 11 | 24 | Student 26 | 20 |
| Student 12 | 19 | Student 27 | 23 |
| Student 13 | 22 | Student 28 | 22 |
| Student 14 | 15 | Student 29 | 24 |
| Student 15 | 19 | Student 30 | 27 |

| Legend: | Score |
|---|---|
| Outstanding | 26-30 |
| Very Satisfactory | 21-25 |
| Satisfactory | 16-20 |
| Fairly Satisfactory | 11-15 |
| Did not meet Expectation | 1-10 |

Table 3. *Scores of Grade 8 Students in Posttest in terms of their Outputs.*

Table 3 presents the significant difference between the pretest and posttest of Grade 8 students in terms of their outputs in science.

Base on the findings the majority of Grade 8 students performed well in their output in science. Following the implementation of the intervention, the students' post-test scores went up. Since the majority of the students performed poorly on their pretest but improved on their posttest, the intervention was more successful and attainable. Additionally, because of the

positive difference in scores between the post-test and pretest, which is shown in the table, the MICROTEACHING and GAME-BASED LEARNING strategies improved student outputs and teachers' instructional strategies. The results of the Grade 8 students' pretest and posttest in terms of their science outputs showed a substantial difference as a result.

| Respondent | PRETEST | POSTTEST | Differences |
|---|---|---|---|
| Student 1 | 15 | 17 | 2 |
| Student 2 | 16 | 20 | 4 |
| Student 3 | 13 | 22 | 9 |
| Student 4 | 17 | 15 | -2 |
| Student 5 | 11 | 16 | 5 |
| Student 6 | 10 | 17 | 7 |
| Student 7 | 18 | 21 | 3 |
| Student 8 | 12 | 23 | 11 |
| Student 9 | 20 | 30 | 10 |
| Student 10 | 9 | 17 | 8 |
| Student 11 | 15 | 24 | 9 |
| Student 12 | 10 | 19 | 9 |
| Student 13 | 9 | 16 | 7 |
| Student 14 | 11 | 15 | 4 |
| Student 15 | 9 | 19 | 10 |
| Student 16 | 10 | 18 | 8 |
| Student 17 | 15 | 21 | 6 |
| Student 18 | 18 | 20 | 2 |
| Student 19 | 13 | 17 | 4 |
| Student 20 | 8 | 21 | 13 |
| Student 21 | 10 | 19 | 9 |
| Student 22 | 12 | 22 | 10 |
| Student 23 | 8 | 23 | 15 |
| Student 24 | 10 | 25 | 15 |
| Student 25 | 12 | 19 | 7 |
| Student 26 | 10 | 20 | 10 |
| Student 27 | 13 | 23 | 10 |
| Student 28 | 14 | 22 | 8 |
| Student 29 | 12 | 24 | 12 |
| Student 30 | 17 | 27 | 10 |

Legend:

| | Score |
|---|---|
| Outstanding | 26-30 |
| Very Satisfactory | 21-25 |
| Satisfactory | 16-20 |
| Fairly Satisfactory | 11-15 |
| Did not meet Expectation | 1-10 |

- Strategies Implemented

This study employed MICROTEACHING and GAME-BASED LEARNING strategies. A technique known as MICROTEACHING and GAME-BASE LEARNING involves the teaching approach and students in group activities throughout the teaching and learning process. The Student engaged in the exercise in order to generate ideas and hone their critical thinking abilities while studying the science lecture. Since students had a limited attention span, the MICROTEACHING and GAME-BASED learning strategies enabled to assist teachers in improving their methods of instruction and in inspiring students to participate in class and be interested in learning. This approach had the ability to significantly increase student output while also enhancing students' performance and understanding of the subject matter.

- Proposed Solution

The researchers believe that utilizing this strategy can enhance both teachers' teaching methods and students' learning outcomes by combining MICROTEACHING

with GAME-BASE learning. Additionally, it might improve students' interest in, participation in, and performance in the subject. Learning activities are very important since learning is a process of obtaining knowledge, developing skills, and improving behavior and attitude.

CONCLUSION

- Outcomes

The results of the post-test show that using MICROTEACHING and GAME-BASE learning strategies helped the students become interested in and involved in their education. The students' post-test performance had improved, and they fared exceptionally well in terms of their scientific contributions. As a result, the MICROTEACHING and GAME-BASE learning strategies were advantageous for Grade 8 students because they afforded teachers with the tools they needed to create engaging lessons that would encourage students to learn science and improve their performance and output in the subject.

- Implications

The outcomes demonstrate that when the method was put in place, the students' post-test scores went up. On their posttest, the eighth-grade students performed well in terms of their science output. Because of this, Grade 8 students and teachers can improve their performance in science by using MICROTEACHING and GAME-BASED learning techniques.

- Further Recommendation

The following suggestions are made in light of the study's results and conclusions:

1. For educators. The study's findings demonstrated that the deployment of the MICROTEACHING and GAME-BASE learning strategies improved the students' performance in terms of their science outputs. The researchers advise educators to consistently apply these techniques to the teaching and learning process.
2. For students. The MICROTEACHING and GAME-BASED learning strategy is beneficial for students. The researchers recommend that students could further enhance their overall performance by

engaging with the strategy and with other materials that involve the strategy.

3. For future researchers. This action research study should be continued for more enhancements.

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