Game-Based Instruction as a Pedagogical Innovation in Teaching GE7: Science, Technology, and Society

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ABSTRACT

This study investigated the effectiveness of game-based instruction in improving students' academic achievement in Science, specifically focusing on the topic Biodiversity and the Healthy Society. The results revealed that students exposed to game-based instruction achieved significantly higher posttest scores compared to those taught using traditional methods, indicating improved comprehension, retention, and active participation in learning. Furthermore, the findings suggested that game-based instruction fosters a more engaging and student-centered learning environment, enhancing motivation and collaboration among learners. These outcomes underscore the potential of game-based learning as a pedagogical tool to address difficulties in Science education and to improve achievement in complex topics such as biodiversity. The study concludes that integrating game-based instruction into Science teaching provides meaningful learning opportunities that positively influence student achievement. It is therefore recommended that educators adopt game-based strategies as a complement to conventional approaches to enhance both engagement and academic success in Science.

Keywords: Game-Based Instruction, Science Education, Student Achievement, Science, Technology, and Society, Biodiversity and Healthy Society, Active Learning

INTRODUCTION

Game-based teaching of Science boosts students' ability to reason, understand underlying concepts, and find solutions to complex Science problems. Educational games motivate students to find creative solutions and drive them to accelerate their learning, having fun all the while.

Educational games help the students understand Science concepts and remember them for a long time. During the discussion, students had with each other to create a long-lasting learning effect that enhanced their confidence. Together, it makes the student feel equal to their peers and empowered.

Science Education. Science is one of the most essential subjects in school due to its relevance to students' lives and the universally applicable critical thinking and problem-solving skills it uses and develops. These are lifelong skills that allow students to generate ideas, weigh decisions intelligently and even understand the evidence behind public policy-making. Teaching technological literacy, critical thinking and problem-solving through science education gives students the skills and knowledge they need to succeed in school and beyond (University of Texas at Arlington's online Master of Education in Curriculum and Instruction in Science Education, 2017).

Science education needs to be effective and relevant so learners may become actively engaged in their learning. To this end, there is a need to transform how students think so that they can understand and use science like scientists do. According to Rana & Relingo (2016), every learner is regarded as natural-born scientists because they are often curious and eager to learn. As such, teachers and parents have to support them through guidance and the provision of a more challenging learning environment.

The Science Education Institute-Department of Science and Technology (SEI-DOST) and the University of the Philippines – National Institute for Science and Mathematics Education Development (UP–NISMED) (2011) have stated that Science education should support the development of scientific literacy in all students as well as motivate and inspire them to pursue careers in science, technology, and engineering. According to Gordon, UWE, & Bristol (2008), science education is not just relevant for those who see their careers in the field of science, but it is also a vital component of core knowledge that every member of our society needs. Science is considered as the essential part of our culture where it gives an impact to our society.

Science, Technology, and Society Studies. Science, Technology, and Society Science, Technology, and Society (STS) is an interdisciplinary field of academic teaching and research, with elements of a social movement, having as its primary focus the explication and analysis of science and technology as complex social constructs with attendant societal influences entailing myriad epistemological, political, and ethical questions. As such, it entails four interlinked tenets or concepts that transcend simple disciplinary boundaries and serve as a core body of STS knowledge and practice. Several useful introductions to the STS field are available (Sismondo, 2004; Cutcliffe & Mitcham, 2001; Volti, 2001; Cutcliffe, 2000; Hess, 1997; Jasanoff et al., 1995).

According to CMO No. 20, series of 2013, the course deals with interactions between science and technology and the social, cultural, political, and economic contexts that shape and are shaped by them. This interdisciplinary course engages students to confront the realities brought about by science and technology in society. Such realities pervade the personal, the public, and the global aspects of human living and are integral to human development. Scientific knowledge and technological development happen in the context of society with all its socio-political, cultural, economic, and philosophical underpinnings at play. The course seeks to instill reflective knowledge in the students so that they are able to live the good life and display ethical decision-making in the face of scientific and technological advancement, including mandatory topics on climate change and environmental awareness.

The field of STS covers several basic themes (Encyclopedia of Science, Technology, and Ethics, 2022). Constructivism assumes scientific and technological developments to be socially constructed phenomena—value-laden and mediated by human cognition. Contextualism emphasizes that science and technology are historically, politically, and culturally embedded, meaning that they can only be understood in context. Problematization highlights the non-neutral nature of science and technology, requiring ethical and evaluative scrutiny of their societal impacts. Finally, democratization calls for participatory mechanisms to ensure that science and technology are shaped collectively for the benefit of society.

These tenets provide a strong conceptual bridge to Game-Based Instruction (GBI), a pedagogical innovation that has gained prominence in the 21st century. In the past three decades, teachers' instructional techniques have been viewed as one of the key components of the teaching-learning process and as critical tools for measuring academic gains (Rondina & Roble, 2019). Many pedagogies stem from constructivist theory, where learning is based on experience, and individuals construct their knowledge through meaningful engagement—an idea advanced by John Dewey, Lev Vygotsky, Jean Piaget, Paulo Freire, and David Kolb (Ruthburn, 2015). However, despite teacher training and standardized curricula, students' performance in high-stakes achievement tests remains low, suggesting that academic gain is also heavily dependent on the teaching strategies used in the classroom.

Studies indicate that many students develop negative attitudes toward Science early in their academic journey. By fifth grade, they often struggle because traditional methods rely heavily on rote memorization, whereas they learn better through exploratory, collaborative, and challenging processes (Kebritchi, Hirumi, & Bai, 2010; Leroy & Bressoux, 2016). As Boaler (2016) emphasizes, success in science is shaped not by innate ability but by opportunities to learn, the messages students receive about their potential, and their approach to challenges.

Here, GBI directly supports the aims of STS. First, GBI reflects constructivism by allowing students to build knowledge through immersive, interactive experiences. Second, it demonstrates contextualism as students engage with real-world challenges, such as biodiversity and ecological balance, in problem-solving game scenarios. Third, GBI fosters problematization by prompting learners to reflect on ethical, social, and environmental implications embedded within the challenges of gameplay. Finally, it embodies democratization by giving each learner an active role, ensuring knowledge construction is participatory rather than passively received.

As one of the most significant educational trends of the 21st century (Ahmad & Iksan, 2021), GBI captures students' natural inclination to play, making lessons engaging while fostering critical skills such as patience, focus, and resilience (Zou, 2020; Liu et al., 2021). By embedding scientific content into game-based contexts, instruction becomes exploratory, collaborative, and reflective of real-world issues—values central to the STS framework.

This study, which focuses on the topic Biodiversity and the Healthy Society, uses a quasi-experimental design to evaluate the effectiveness of game-based instruction compared to traditional teaching methods in enhancing students' achievement. In doing so, it situates GBI not only as a pedagogical tool but also as a realization of the principles of STS—democratizing learning, contextualizing knowledge, encouraging problematization, and supporting constructivist approaches to science education.

Research Questions

This study aimed to determine the effectiveness of game-based instruction as an approach to facilitating science learning.

Specifically, the study sought to answer the following:

1. How may the pretest and post-test scores of the subjects be described in terms of:
    1.1. conventional teaching; and
    1.2. game-based instruction?
2. Are there significant differences in the pretest and the posttest scores of the control consisting of conventional teaching, and the experimental group, consisting of game-based approaches?
3. Are there significant differences in the pretest and the posttest scores of the experimental group consisting of game-based approaches?
4. Are there significant differences in the pretest scores of the control consisting of conventional teaching, and the experimental group, consisting of game-based approaches?
5. Are there significant differences in the posttest scores of the control consisting of conventional teaching, and the experimental group, consisting of game-based approaches?
6. How do the subjects describe the usefulness of the game-based instruction as an approach and assessment in teaching and learning Science?

Hypotheses

The following hypotheses in null form were tested in this study:

1. No significant differences in the pretest and the posttest scores of the control, consisting of conventional teaching, and the experimental group, consisting of game-based approaches?
2. No significant differences in the pretest and the posttest scores of the experimental group, consisting of game-based approaches?
3. No significant differences in the pretest scores of the control consisting of conventional teaching, and the experimental group, consisting of game-based approaches?

4. No significant differences in the posttest scores of the control consisting of conventional teaching, and the experimental group, consisting of game-based approaches?

METHODOLOGY

This presents the details of the research methodology. It presents the type of research used, subjects of the study, sampling method, Proposed Innovation Strategy research instruments, data gathering procedure, and data analysis technique used in the study.

Research Design

The experimental method of research was employed in this study as the research design. This is a method or procedure involving the control or manipulation of conditions for the purpose of studying the relative effects of various treatments applied to members of a sample (Kendra, 2018). The control-experimental group design was also used since data were obtained through a series of experiments, and changes in both control and experimental variables were considered. As such, this research design is most appropriate for this study.

Purposive sampling was used in this study. It is a non-probability sampling method in which the researcher relies on their judgments when choosing members of the population to participate in the study (Crossman, 2018).

Subjects of the Study

The participants of this study are first-year Bachelor of Science in Environmental Science students enrolled in GE7: Science, Technology, and Society for the academic year 2024–2025. Two sections were purposively selected to serve as the respondents of the study. One section was designated as the control group, which received conventional instruction, while the other section was designated as the experimental group, which was exposed to game-based instruction.

The inclusion of participants from the same year level and academic program ensured uniformity in terms of background knowledge, curriculum exposure, and course requirements. This allowed the researcher to focus on the instructional method as the main variable of interest. Both groups were taught by the same instructor to minimize differences in teaching style and to ensure that the only significant variation was the method of instruction.

Instrument

To gather data, the researcher used two (2) instruments in the study: (1) a pretest/posttest for the subjects in the control and experimental groups, (2) a questionnaire to assess the flipped classroom, and (3) the teacher-made video.

The Science Achievement Test (SAT) with 25 multiple-choice questions was used as an instrument in this research study. The researcher used the Science, Technology, and Society (STS) reference material as a reference in developing the tests.

The questionnaire was used to gather the assessment of the subjects in the experimental group on the usefulness of the game-based instruction as an approach in teaching GE7: Science, Technology, and Society (STS) was adapted from the study of Parubrub, Padunan, Matutino, and Mangahas (2015). The questionnaire consists of three parts: the first part gathered the demographic data of the subjects; the second part assessed the degree of agreement of subjects to the statements that describes the effectiveness of game-based instruction in teaching Biodiversity and Healthy Society using a five-point Likert scale; and the third part of the questionnaire asked them to give their comments and suggestions regarding the use of game-based instruction.

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The two (2) instruments were shown by the researcher to the college instructors, and the professor of STS for comments and suggestions, and to establish content validity of the instrument that was used in the study.

The second part of the questionnaire used a five-point Likert scale for the subjects to indicate their degree of agreement with the statements in the research questionnaire. The subjects were asked to choose one (1) of the five (5) alternative responses every time they answered questions. The following descriptions were used:

Table 1 Five-Point Scale for Responses of the Questionnaire

Scale	Verbal Description
5	Strong Agree
4	Agree
3	Moderately Agree
2	Disagree
1	Strongly Disagree

Data Collection Procedure

The following procedures were followed in gathering the data for the study. First, literature and related studies were analyzed and reviewed to provide a strong foundation for the research. Based on the identified needs, the research instruments were developed, and the questionnaire, adapted from the study of Parubrub et al. (2015), was utilized. To ensure the accuracy and consistency of results, the validity and reliability of the research instruments were established. A course syllabus was then prepared to serve as a guide in classroom instruction. Furthermore, game-based learning materials focusing on the topic of *Biodiversity and the Healthy Society* were designed. Prior to the conduct of the study, permission was obtained from the Dean of the College of Arts and Sciences. The teaching of the subject was then carried out using both game-based instruction and traditional teaching methods in the experimental and control groups, respectively. Teaching materials from various sources were strictly followed and monitored by the researcher. To maintain fairness, both groups were taught in the same classroom setting, taking into account physical facilities and environmental conditions. Finally, a Science Achievement Test was administered to both the experimental and control groups as a pretest and posttest to measure students' performance.

Data Analysis

The data gathered were analyzed using the appropriate statistical tools to give a meaningful descriptive interpretation of the results and findings of the study. The following were:

Weighted Mean. This tool was used to analyze the gathered data regarding the effectiveness of Game-Based Instruction in Teaching GE7: Science, Technology, and Society (STS). It was also used to analyze the students' assessment of the perceived usefulness of the game-based instruction.

The weighted mean scores from each statement in the questionnaire were determined using the following scale:

Table 2 Scale for the Weighted Mean Scores from Each Statement

Scale	Verbal Description	Verbal Interpretation
4.20 – 5.00	Strongly Agree	Excellent
3.40 – 4.19	Agree	Very Satisfactory
2.60 – 3.39	Moderately Agree	Satisfactory
1.80 – 2.59	Disagree	Below Satisfactory
1.00 – 1.79	Strongly Disagree	Poor

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a) The average scores of students in the Science Achievement Test were obtained, and their level of academic performance in the conventional teaching and game-based instruction was described using the following scale:

Table 3 Scale for the Average Scores of Students in the Science Achievement Test

Scale	Verbal Description
90 – 100	Outstanding
85 – 89	Very Satisfactory
80 – 84	Satisfactory
70 – 75	Fairly Satisfactory
Below 75	Did Not Meet Expectations / Poor

t-test. The statistical analysis used to determine the effectiveness of game-based instruction in teaching GE7: Science, Technology, and Society (STS) is the t-test. The t-test assesses whether the means of two groups are statistically different from each other. This analysis is appropriate in the comparison of the means of two groups, and especially appropriate as the analysis for the posttest-only two-group randomized experimental design.

RESULTS AND DISCUSSION

On the Pretest and Posttest of the Subjects

The average scores of the control group and experimental group in the pretest and posttest are shown and discussed as follows:

Conventional Teaching (Control Group)

Table 4 shows the distribution of average scores in the pretest and posttest of the control group.

Table 4 The Distribution of Average Scores in the Pretest and Posttest of the Control Group

SAT Result	Average Score	Verbal Interpretation
Pretest	43.77	DNME
Posttest	47.54	DNME

Legend: 90-100 – Outstanding (O); 85-89 – Very Satisfactory (VS); 80-84 – Satisfactory (S); 75-79 – Fairly Satisfactory (FS); 74 and below – Did Not Meet Expectations (DNME)

In the pretest, section A, which represents the control group, got an average score of 43.77. In the posttest administered, the section A that represents the control group of the study gathered an average score of 47.54. The average scores of the pretest and posttest scores administered in the control group have a verbal interpretation of DID NOT MEET EXPECTATIONS. The results revealed that the control group had a poor performance before and after the implementation of the traditional/conventional teaching employed. The pretest and posttest were administered to the control group to determine the baseline knowledge of the students about the topic in science.

Game-based Instruction (Experimental Group)

The distribution of mean score results in the pretest and posttest of the experimental group is presented in

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Table 5.

Table 5 The Distribution of Average Scores in the Pretest and Posttest of the Experimental Group

SAT Result	Average Score	Verbal Interpretation
Pretest	44.19	DNME
Posttest	86.79	VS

Legend: 90-100 – Outstanding (O); 85-89 – Very Satisfactory (VS); 80-84 – Satisfactory (S); 75-79 – Fairly Satisfactory (FS); 74 and below – Did Not Meet Expectations (DNME)

In the pretest, section B, which represents the experimental group, got an average score of 55.44. In the posttest administered, the section B that represents the experimental group of the study gathered an average score of 86.89. The average scores of the pretest of the experimental group have a verbal interpretation of DID NOT MEET EXPECTATIONS. However, after the implementation of game-based instruction, the posttest scores were administered in the experimental group the average scores gathered have a verbal interpretation of VERY SATISFACTORY. The results revealed that the experimental group had a poor performance before the implementation of the game-based instruction teaching GE7: Science, Technology, and Society (STS). Whereas the experimental group had a very satisfactory performance when the game-based instruction was employed.

The average scores in the pretest and posttest indicate that the scores of the subjects increased. This implies that game-based instruction, as a strategic approach in teaching STS, can influence the scores of the subjects and their learning process. This teaching strategy can be used as an approach to shift from the traditional approach of teaching.

Significant Differences in the Pretest and the Posttest Scores of the Control Group

The results of the Science Achievement Test of the control group before and after the implementation of conventional teaching were compared using the paired samples test.

Table 6 Significant Differences in the Pretest and Posttest Scores of the Control Group

Source	*ρ*-value	Decision	Remarks
Pretest and Posttest	.097	Accept Ho	Not Significant

*If the p-value is less than or equal to the level of significance, which is 0.05, reject the null hypothesis; otherwise, fail to reject Ho.

Table 6 presents the results of the comparison of the pretest scores and posttest scores of the control consisting of conventional teaching. The ρ-value was computed using the paired sample test. Based on the result, the pretest and posttest result of the control group has a computed ρ-value of 0.097. Since the ρ-values computed were greater than the alpha level of 0.05, it can be concluded that the pretest scores and posttest scores of the control group have NO SIGNIFICANT DIFFERENCE in terms of the scores they obtained after the administration of the conventional teaching. In connection with this, the null hypothesis stating that there was no significant difference in the pre-test scores and posttest scores of the control experimental group is hereby accepted.

Significant Differences in the Pretest and the Posttest Scores of the Experimental Group

The results of the Science Achievement Test of the experimental group before and after the implementation of game-based learning were compared using the paired samples test.

Table 7 Significant Differences in the Pretest and Posttest Scores of the Experimental Group

Source	***ρ*-value**	**Decision**	**Remarks**
Pretest and Posttest	.000	Reject Ho	Highly Significant

*If the p-value is less than or equal to the level of significance, which is 0.05, reject the null hypothesis; otherwise, fail to reject Ho.

Table 7 presents the results of the comparison of the pretest scores and posttest scores of the experimental consisting of game-based learning. The ρ-value was computed using the paired sample test. Based on the result, the pretest and posttest result of the control group has a computed ρ-value of 0.000. Since the ρ-values computed were less than the alpha level of 0.05, it can be concluded that the pretest scores and posttest scores of the experimental group have a highly SIGNIFICANT DIFFERENCE in terms of the scores they obtained after the administration of the game-based learning. In connection with this, the null hypothesis stating that there was no significant difference in the pre-test scores and posttest scores of the experimental group is hereby rejected.

Significant Differences in the Pretest Scores of the Control Group and Experimental Group

The results of the Science Achievement Test of the experimental group and control group before the implementation of game-based learning were compared using the paired samples test.

Table 8 Significant Differences in the Pretest Scores of the Control Group and Experimental Group

Source	***ρ*-value**	**Decision**	**Remarks**
Pretest	.862	Accept Ho	Not Significant

*If the p-value is less than or equal to the level of significance, which is 0.05, reject the null hypothesis; otherwise, fail to reject Ho.

Table 8 presents the results of the comparison of the pretest scores of the control consisting of conventional teaching, and the experimental group, consisting of a game-based approach. The ρ-value was computed using the paired sample test. Based on the result, the pretest result of the control and experimental group has a computed ρ-value of 0.862. Since the ρ-values computed were greater than the alpha level of 0.05, it can be concluded that the pretest scores and posttest scores of the control group have NO SIGNIFICANT DIFFERENCE in terms of the scores they obtained after the administration of the conventional teaching. In connection with this, the null hypothesis stating that there was no significant difference in the pre-test scores control and experimental groups is hereby accepted.

Significant Differences in the Posttest Scores of the Control Group and Experimental Group

The results of the Science Achievement Test of the experimental group and control group after the implementation of game-based learning were compared using the paired samples test.

Table 9 Significant Differences in the Posttest Scores of the Control Group and Experimental Group

Source	***ρ*-value**	**Decision**	**Remarks**
Posttest	.000	Reject Ho	High Significant

*If the p-value is less than or equal to the level of significance, which is 0.05, reject the null hypothesis; otherwise, fail to reject Ho.

Table 9 presents the result of the comparison of the posttest scores of the experimental consisting of game-based learning, and the control group, which consisted of conventional teaching. The ρ-value was computed

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using the paired sample test. Based on the result, the pretest and posttest result of the control group and experimental group has a computed ρ-value of 0.000. Since the ρ-values computed were less than the alpha level of 0.05, it can be concluded that the pretest scores and posttest scores of the experimental group have a highly SIGNIFICANT DIFFERENCE in terms of the scores they obtained before and after the administration of the game-based learning. In connection with this, the null hypothesis stating that there was no significant difference in the posttest scores of the experimental group and control group is hereby rejected.

On the Usefulness of the Game-Based Approach

To determine the students' assessment of the usefulness of a game-based approach to Science learning, the questionnaire was given to the experimental groups. They were asked to give their honest appraisal of the usefulness game-based approach in Science Learning. For analysis, the researcher considered the grand mean rating of the responses of the seven groups, and also the weighted mean of each item in the questionnaire. The summary of their assessment is presented in Table 10.

Table 10 Distribution of Mean of the Students' Reaction in Using Game-Based Approach

Assessment Statement	**Mean**	**Verbal Interpretation**
1. The game-based approach arouses my interest in Biodiversity and the Healthy Society.	**4.65**	Excellent
2. I learn basic concepts in Biodiversity and the Healthy Society using the game-based approach.	**4.55**	Excellent
3. Practical illustrations of concepts in the game-based approach help me understand the subject matter.	**4.61**	Excellent
4. The game-based approach enhances lecture discussions.	**4.58**	Excellent
5. The game-based approach enhances my comprehension of Science concepts.	**4.57**	Excellent
6. The game-based approach helps me understand Science concepts in relation to the physical world.	**4.68**	Excellent
7. Learning Science becomes easier through the use of the game-based approach.	**4.59**	Excellent
8. The game-based approach provides meaningful examples.	**4.62**	Excellent
9. The game-based approach provides relevant information.	**4.65**	Excellent
10. The game-based approach provides presentation of Science t concepts.	**4.69**	Excellent
WEIGHTED MEAN	**4.62**	**Excellent**

Legend:4.20-5.00 – Excellent (E); 3.40-4.19 – Very Satisfactory (VS); 2.60-3.39 – Satisfactory (S); 1.80-2.59 – Unsatisfactory (US); 1.00-1.79 – Poor (P)

Table 10 presents the students' reactions toward the use of the game-based approach in teaching Biodiversity and the Healthy Society. The overall weighted mean of 4.62, interpreted as Excellent, indicates that students highly favored this approach. Among the statements, the highest rating was on the idea that the game-based approach provides presentation of Science concepts (M = 4.69, Excellent), suggesting that the method effectively delivers content in a clear and engaging manner. Closely following were statements on how the approach helps students understand Science concepts in relation to the physical world (M = 4.68, Excellent) and how it arouses their interest in the lesson (M = 4.65, Excellent), reflecting its strong motivational impact.

Moreover, students acknowledged that game-based strategies enhanced their comprehension (M = 4.57, Excellent) and made learning Science easier (M = 4.59, Excellent). The relatively high ratings across all indicators reveal that the integration of games not only sustains interest but also facilitates deeper understanding through practical illustrations and meaningful examples.

The consistently excellent evaluations imply that the game-based approach bridges abstract concepts with tangible experiences, promotes active participation, and enhances knowledge retention. This further suggests that learners respond positively when instructional methods go beyond traditional lectures and provide interactive, enjoyable learning experiences. Thus, the findings support the effectiveness of the game-based approach as a pedagogical tool in Science education, particularly in fostering student engagement, comprehension, and appreciation of the subject matter.

CONCLUSIONS

Based on the findings of the study, the following conclusions were drawn:

1. The control group has a poor performance before and after the implementations of the traditional/conventional teaching employed. The pretest and posttest were administered to the control group to determine the baseline knowledge of the students about the topic Biodiversity and the Healthy Society. The average scores in the pretest and posttest indicate that the scores of the subjects increased when game-based instruction, as a strategic approach in teaching STS, can influence the scores of the subjects and their learning process. This teaching strategy can be used as an approach to shift from the traditional approach of teaching.
2. The pretest scores and posttest scores of the control group have NO SIGNIFICANT DIFFERENCE in terms of the scores they obtained after the administration of the conventional teaching. In connection to this, the null hypothesis stating that there was no significant difference in the pre-test scores and posttest scores of the control experimental group is hereby accepted.
3. The pretest scores and post test scores of the experimental group have HIGH SIGNIFICANT DIFFERENCE in terms of the scores they obtained after the administration of the game-based learning. In connection to this, the null hypothesis stating that there was no significant difference in the pre-test scores and posttest scores of the experimental group is hereby rejected.
4. The pretest scores and post test scores of the control group have NO SIGNIFICANT DIFFERENCE in terms of the scores they obtained after the administration of the conventional teaching. In connection to this, the null hypothesis stating that there was no significant difference in the pre-test scores control and experimental group is hereby accepted.
5. The pretest scores and post test scores of the experimental group have HIGH SIGNIFICANT DIFFERENCE in terms of the scores they obtained before and after the administration of the game-based learning. In connection to this, the null hypothesis stating that there was no significant difference in the posttest scores of the experimental group and control group is hereby rejected.
6. The computed means of the items all fall within the EXCELLENT range, indicating that using the game-based approach in teaching the Science concepts arouse the interest of the learners, and enable them to learn basic concepts and practical illustrations to enhance lecture discussion and students' comprehension.

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