The Effects of Online Games on the Academic Performance of Pasian National High School Grade 9 Students

NORA C. CAÑARES
https://orcid.org/0009-0008-6581-5354
jessalynnetteq8@gmail.com
Assumption College of Nabunturan
Nabunturan, Davao de Oro

Gunning Fog Index: 14.89 • Originality 99% • Grammar Check: 99%
Flesch Reading Ease: 46.76 • Plagiarism: 1%

ABSTRACT

Online gaming has the potential and may be utilized effectively to enhance teaching and learning, engage students, encourage, and reinforce their learning, have an impact on students’ academic achievement, and support proficiency learning. This study used the quasi-experimental two-group pretest-posttest design to determine the effects of online games on the student’s academic performance. This research summarized the results from the experiment done to determine how online games affect students’ academic performance in Science 9. This research was conducted on the Grade 9 students at Pasian National High School, Pasian, Monkayo, Davao de Oro. T-test results revealed a significant difference between the experimental group, which received instruction through online games and obtained a mean score of 23, and the control group, which received a mean score of 13. The control group, which received the same Science 9 lessons but was spared the use of online games, scored poorly. The researcher proposed to the government to fund educational online games for secondary schools and encourage science teachers to change the talk-and-chalk teaching style in favor of using more advanced tools and experimenting with new methods of science learning.
KEYWORDS

Teaching methodology, teaching science, online games, academic performance, quasi-experimental two-group pretest-posttest, Philippines

INTRODUCTION

Today online games are very popular. Students are very susceptible to the gigantic influence of technology and occupy the most major portion of online gaming rather than their school performance. It could not be denied that with rapid growth in information communication technology, online games have gradually become part of the life of people. According to the Taiwan Institute for Information Industry in 2010, internet users most commonly use online gaming services, with 50.28%, the largest proportion of 12-19-year-olds (Lin, Wei & Hung, 2012).

The study conducted in China found that internet cafes have become masculine gaming playing various online games. From this study, negative impacts were revealed, such as most non-school hours being spent on the internet or playing online games, not keeping up with assignments, missing classes, falling asleep in school, declining grades, failing a course, missing a social engagement, and dropping out of other social groups (Huang et al., 2009). Thus, after a thorough analysis of the study, it was said that addicted players had lower school grades than their non-addicted peers. Further, it also revealed the relationship between internet use and the ability to focus attention which showed that amount of time spent using the internet by young people was significantly related to higher ratings of distractibility for academic tasks (Levine et al., 2007).

Online games are very popular in the Philippines, especially among young people. One of them is the DotA game that many young people enjoy today. DotA (Defense of the Ancients) is a pastime game with a few and often just fun with friends, especially boys. But sometimes, DotA is no longer a simple online game because most of its players are betting. There are other students who are starving because they miss regular eating time and even forget to eat their meals. Others could not sleep (Nano & Navales, 2014).

In Pasian National High School, where the researcher is currently teaching, online gaming is very prevalent in fact, it has already affected the performance of the students. With the use of their mobile phones, they play even during class hours. It is sad that students prioritized playing online games instead of focusing on class discussion. As observed, even during their break and spare time, they spent it playing online games rather than reviewing lessons and preparing for the next class. Others would skip classes to play games in the internet café, and as a result, they were behind in-class activities, including written outputs and performances. Therefore, with these observations, the researcher is compelled to conduct this study to determine the significant relationship of online gaming to students’ academic performance.
FRAMEWORK

This study was anchored on the Flow Theory of Mihaly Csikszentmihalyi (1975). This theory proposes that when one is actively engaged in an activity where the skills possessed are balanced to the challenge of the activity, he/she can approach an optimal state of experience called “flow”. The theory believes that when a person is totally immersed in an activity that has clear goals and requires specific responses, the students will experience a sense of joy, creativity, and an experience of total involvement. For the duration of an online game, they have concrete goals, allowing attention to be focused entirely on the game during the period of play, and they will forget to focus on their studies and other related school activities.

This theory will relate to the effects of online gaming. It intends to bridge the results of playing online games, the experiences of the students’ involvement when playing, and how it affects their studies. The researcher further believes that when the students continue to play online games, they will become addicted to them, and their academic performance will be affected.

OBJECTIVE OF THE STUDY

This study was conducted to determine the effects of online games on the academic performance of students who were enrolled at Pasian National High School, Pasian, Monkayo, Davao de Oro.

METHODOLOGY

Research Design

The study used a quasi-experimental two-group pretest-posttest design to determine the effects of online games on students’ academic performance in science 9. A quasi-experimental method was employed in this study, having the pre-test-post-test research design using two groups. Quasi-Experimental pre-test post-test research design looks like experimental research but is not true experimental research. Although the independent variable was manipulated, the subjects were not randomly assigned to conditions or orders of conditions (Cook, Campbell & Day, 1979). A pretest was given to both groups to see if they were of the same potential. The experimental group underwent the intervention by using online games in teaching Science, and the control group was given the traditional way of teaching without the use of online games.

Research Locale

The study was conducted at Pasian National High School, a school in the province of Davao de Oro.
The municipality of Monkayo is a first-class municipality in the province of Davao de Oro, formerly Compostela Valley. According to the 2015 census, it has a population of 94,908 people. It is an agricultural town with vast tracts of land planted with rice and bananas. The municipality is also host to the gold-rich barangay of Mt. Diwata, popularly known as Diwalwal, a 1,000-meter-high range known for its gold ore deposit.

Barangay Pasian is the second largest barangay and a place where the treasure of gold is found everywhere on its mountainside. In 1947, Pasian was inhabited by Mandaya and Manobo tribes who dwelt on primitive life and lived by hunting, fishing, and crude methods of farming like the “kaingin” system. In 1951, Pasian was a sitio of Barangay Haguimitan. In the same year, settlers from different places of Luzon, Visayas, and Mindanao like the Ilocanos, Ilonggos, Cebuanos, Warays, Boholanos, and Surigaonons, came in. Pasian was declared barangay in 1954, the same year when the Primary school was opened at Mr. Florencio Carpo’s house. In 1956, a chapel was constructed whose patron saint is Sta. Filomena, which was later changed to San Vicente Ferrer.

Pasian National High School was established on January 01, 1999. The relative distance of the school is 12 kilometers from the población and the district office. The relative distance of the school from the division office is 50 kilometers. The means of transportation are buses, tricycles, and single motorcycles. The enrollment of PNHS for the past 3 years since 2018 has a total of 458 students. The school implemented a selective feeding program out of the small amount of the share of the canteen’s income. One important factor that helps improve students’ academic performance is the presence of learning materials. Today, Pasian National High School has 26 teaching forces, 3 non-teaching personnel, and 700 students.

**Research Subjects**

The subjects of the study were the Grade 9 students from the two sections of Pasian National High School, Pasian, Monkayo, Davao de Oro, for the School Year 2022-2023. Students from these sections were heterogeneously grouped at the start of the school year. Both groups have the same number of students of 57.

**Research Instrument**

To achieve the research study’s goal, a 30-item test as its main instrument was adapted from Ready to Print Self Learning Modules from the DepEd’s National Education Portal for both control and experimental groups. A table of specifications was also prepared to determine the distribution of questions from the competencies taken. The questionnaire was checked by the panel of validators before its implementation. These modules were not given to the subjects of the study as to the validity of the results. After the experimental phase, a posttest was given to both groups. The coverage of the test was taken from the most essential competencies of science 9, Quarter 1 namely: Respiratory and Circulatory System, Effects of Lifestyle in the Function of Respiratory and Circulatory System, Non-Mendelian Patterns of Inheritance, Biodiversity and Evolution, and Ecosystem: Life Energy.
The results of the pretest and posttest were adapted by the descriptive equivalent from Deped Memo. No. 160, series of 2012.

**Research Procedures**

The following steps were followed in the gathering of data:

**Seeking Permission to Conduct the Study.** The researcher wrote a letter of permission to conduct the study to the Schools Division Superintendent, Division of Davao de Oro. A written letter of request was also given to the school head of Pasian National High School (PNHS) for formal consent. Upon receiving the confirmation from the authorities, a form explained the purpose of the study and assured volunteers that data collection, storage, and reporting techniques were protected by confidentiality and anonymity. The researcher took into consideration the standard health protocols following the advice of the local health officials to ensure the safety of the researcher, the students, and the parents as well.

**Administration and retrieval of the research instrument.** The researcher facilitated the distribution and administration of the pre-test, intervention program (game-based learning), and post-test. After which, the retrieval of the research instrument followed, and all responses would be encoded and stored in the personal computer of the researcher.

**Collection and tabulation of data.** The researcher collated and tallied all data and submitted it to the statistician for statistical treatment. Subsequently, the data would be subjected to analyses and interpretations.

**Statistical Treatment of Data**

The data obtained was tallied and tabulated. The statistical tools used to ensure the accuracy in the analyses and interpretations of the findings would be the following:

**Percentage.** This was used to determine the percentage distribution of the subjects.

**Mean.** This was used to determine the level of online gaming and the academic performance of students.

**T-test.** This was used in computing the significant difference between two groups of samples.

**RESULTS AND DISCUSSION**

Table 1. Academic Performance of the Students in the Pretest

<table>
<thead>
<tr>
<th>Group</th>
<th>Pretest</th>
<th>Descriptive Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>6</td>
<td>Very Low</td>
</tr>
<tr>
<td>Experimental</td>
<td>6.3</td>
<td>Very Low</td>
</tr>
</tbody>
</table>

Table 1 displays the academic performance of the experimental and control groups prior to the intervention.

The findings reveal that whereas the experimental group had a mean score of 6.3, the control group received a mean score of 6 on the pretest. Both groups are described as very low,
which also suggests that they have the same intellectual capacity.

Table 2. Academic Performance of the Students in the Post-Test

<table>
<thead>
<tr>
<th>Group</th>
<th>Pretest</th>
<th>Descriptive Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>13</td>
<td>Average</td>
</tr>
<tr>
<td>Experimental</td>
<td>23</td>
<td>Moving Towards Mastery</td>
</tr>
</tbody>
</table>

Table 2 displays the academic performance of the experimental and control groups following the intervention.

According to the findings, the experimental group had a mean score of 23, which is interpreted as moving towards mastery whereas the students in the control group received a mean score of 13, average.

Table 3. Pretest of Control and Experimental Group

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-Test</th>
<th>P-Value</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>6</td>
<td>0.635</td>
<td>Not Significant</td>
</tr>
<tr>
<td>Experimental</td>
<td>6.3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results show that the Control Group's mean in the pretest is 6, whereas the Experimental Group's is 6.3. The P-value is 0.635, greater than .05, this means that there is no significant difference between the pretest scores of both groups.

Table 4. Posttest of Control and Experimental Group

<table>
<thead>
<tr>
<th>Group</th>
<th>Posttest</th>
<th>T-Value</th>
<th>P-Value</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>13</td>
<td>-14.151</td>
<td>0.000</td>
<td>Significant</td>
</tr>
<tr>
<td>Experimental</td>
<td>23</td>
<td>-27.497</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

An independent t-test was performed to see if the control and experimental groups differed, and the results are shown in Table 4. The Experimental Group's mean is 23 with a T-Value of -27.497, and the Control Group's mean is 13 with a T-Value of -14.151, respectively, in the post-test. The P-value is 0.000 less than .05, this means that there is a significant difference between the post-test scores of both groups. The effectiveness of the online gaming intervention may be seen in the fact that the experimental group's post-test result was higher than the result of the control group. This suggests that playing online games has beneficial effects on students' academic performance.

Table 5. Difference Between Pretest and Posttest of Control Group

<table>
<thead>
<tr>
<th>Group</th>
<th>Gain Score</th>
<th>T-Value</th>
<th>P-Value</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7</td>
<td>-14.151</td>
<td>0.000</td>
<td>Significant</td>
</tr>
</tbody>
</table>
Table 5 presents the result of the independent t-test that was conducted to test if there is a significant difference in the gain score of the control group. The table shows that the gain score of the Control Group is 7. The P-value is 0.000, which is less than .05. This means that there is a significant difference between the gain scores.

Table 6. Significant Difference Between Pretest and Posttest of Experimental Group

<table>
<thead>
<tr>
<th>Group</th>
<th>Gain Score</th>
<th>T-Value</th>
<th>P-Value</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>16</td>
<td>-27.497</td>
<td>0.000</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Table 6 presents the result of the independent t-test that was conducted to test if there is a significant difference in the gain score of the experimental group. The table shows that the gain score of the Experimental Group is 16. The P-value is 0.000, which is less than .05. This means that there is a significant difference between the gain scores. The intervention, playing online games, is effective because the experimental group's gain score is greater than the control group. This indicates a significant increase in the academic performance of the experimental group. It also implies that online games can have a positive impact on the academic performance of students. Thus, we reject the null hypothesis.

Discussions

Academic Performance of the Control and Experimental Groups as Reflected in Their Pretest. The academic performance of the students before the implementation of playing online games reveals that the Control Group got a mean score of 6, and the Experimental Group got a mean score of 6.3. Thus, the academic level of both groups before the intervention is very low, and the academic performance of both groups is equal.

Academic Performance of the Control and Experimental Groups as Reflected in Their Posttest. The academic performance of the students after the implementation of playing online games reveals that the students in the experimental group got a mean score of 23, which is interpreted as moving toward mastery, whereas the students in the control group received a mean score of 13, average.

Thus, the academic performance after the intervention is in the moving towards mastery level. The study of Anand (2007) reveals that research suggests the use of interactive online games in teaching can increase students' academic performance. Also, Jackson et al (2011) found that using online games is related to an increase in visual-spatial skills, especially in the fields of Science, Mathematics, Technology, and Engineering. In contrast with these findings, the study of Leung and Lee (2012) found that the relationship between online gaming engagement and academic achievement among adolescents and university students is not beneficial to the users, and the results show that the addicted players had lower school grades.

Furthermore, it was mentioned by Snow (2016) that digital game-based learning is used to build learners' academic skills positively. Learning through digital games
may provide adult students with the opportunity to learn. Digital games provide personalized instruction, learning controlled by students, and learning in groups or teams (De Freitas, 2006). In business education, digital game-based learning provides a platform for communicating with nontraditional learners, empowering students to author their material and work collaboratively with other students in problem-solving (Levy & Pliskin, 2012). Researchers Ting-Ting and Yueh-Min (2017) also studied the implementation of the digital game in classroom instruction for students majoring in information management. Results of the study revealed that students who are using online games were classified as higher achievers, and they showed a higher level of interest in learning.

As discussed by Clark et al. (2015), game-based learning environments have more engagement on the part of the learners who prioritize their academic subjects, pedagogy, and problem-solving. Efforts to systematically review the game-based learning literature have found that digital games are often more effective than traditional instructional methods in terms of enhancing learning outcomes.

**The Difference in the Pretest of Experimental and Control Group.** There was no significant difference between the pretest scores of the student's academic performance in both the control and experimental group. The Control Group got a mean score of 6, and the Experimental Group got a mean score of 6.3. The P-value is 0.635, which is greater than 0.5. Thus, the academic level before the intervention is very low, and the academic performance of both groups is equal.

**The difference in the Posttest of Experimental and Control Group.** There was a significant difference between the post-test results of the student's academic performance. The Control group got a mean score of 13, and the experimental group got a mean score of 23. The P-value is 0.000, less than .05. Thus, playing online games is effective because the experimental group's post-test score is greater than the control group.

Digital games-based learning has increased student retention and improved teamwork skills and communication (Bodnar et al., 2016). Furthermore, Flores (2015) conducted an extensive analysis of digital games for every age group, including non-traditional adult learners, were analyzed using a literature-based framework of theory and research. Digital games promote a learner-centered approach, which relies on and supports intrinsic motivation when compared to traditional teaching methods that often undermine learning and decrease motivation.

As Chen and Law (2016) mention, “Soft scaffolds are dynamic, situation-specific aid provided by a teacher or peer to help with the learning process.” Soft scaffolds are provided to respond to the specific learning needs of students and are flexible and adaptable. The researchers concluded from their study that when both hard and soft scaffolds are present, they can result in a higher positive impact on student motivation and that collaboration (soft scaffold), in addition to the opportunity for students to make connections between the game and science content, increased student motivation.
Overall, the studies that looked at motivation found that digital game-based learning affected student motivation. Some studies found digital game-based learning to have a positive or significant impact on student motivation, according to the study conducted by Lee and Hao (2015). Several of the studies additionally focused on the effect of specific instructional techniques (Instructions, feedback, and scaffolds) on motivation.

There is no significant difference between the gain scores of the control and experimental groups. The results show that the gain score of the Control Group is 7, and that of the Experimental Group is 16. The P-value is 0.000, which is less than .05. This means that there is a significant difference between the gain scores of the control and experimental groups. Thus, online gaming is effective because the experimental group’s gain score is greater than the control group. It was presented Nadony and Halabi (2016) that online games were shown to increase the level of participation and engagement in the learning content, and students were motivated to engage and participate. Moreover, Anderson et al. (2009) stated that students in online games the students can modify and integrate new methods in reaction to new requirements or dynamic situations. Also, the students can use technology to generate new knowledge. Further, digital games provide learners the opportunity for a hands-on and real-life application which can lead to increased knowledge and awareness of issues, actions, and resolutions surrounding complicated issues.

As Chen et al. (2015) found in their study, learning is a result of exploration and thought. Game-based learning is the best practice using technology. Gamers will agree that video games and educational games cause players to discover and use critical thinking skills. Game-based learning (GBL) has become preferable in motivating students’ learning. It is suggested that it is of utmost important to innovate in the current teaching practices to enhance learner involvement, comprehension, cooperation, and motivation (Gil-Doménech & Berbegal-Mirabent, 2019).

Understanding how children process and store information is particularly important for educators. Game-based learning has paved the way for a new digital form of learning. Whitton (2012) states that game-based learning can be seen in both primary and secondary schools, universities, adult education, military training, and medical practice. Digital games create active engagement which supports problem-solving skills in learning environments. Digital games provide a safe environment of play that allows students to learn from their failures, scaffolding through life simulations that help students learn how to deal with possible real-life failures. Games are great educational tools used across content areas for review. Game-based learning is often associated with implementing educational games, understanding the impacts of GBL, and planning game-based educational approaches (Sadler et al 2015).

Brown et al. (2018) indicated that digital game-based learning (DGBL) is increasingly being used as an alternative learning tool for teaching science in higher education. To support this, Behnamnia et al. (2020) have stated that digital game-based learning (DGBL) is increasing; therefore, the application of DGBL technology (tablets
and smartphones) has the potential to influence biology students’ ability to develop creative and critical thinking skills. This is further supported through the process of digital game development for teachers to teach science in the school environment and the use of mobile smartphones as a tool that adds value to the world of education (Eichler et al., 2018); biology teachers included.

**CONCLUSION**

Based on the results of the study, the researcher concluded that playing online games is of great help in improving the academic performance of students, which is evident in the result that there is a significant difference between the posttest of the experimental group. There was an improvement in the performance of the students from the very low achievement level stepping three up higher to the moving towards mastery level. Furthermore, playing online games has indeed increased the students’ achievement level since it allows them to learn at their level to the complex one. The content of the game also influences the improvement of the students. Due to its convenience, playing online games on mobile devices is more popular than using computers and tablet devices.

With the development of educational technology, games are becoming more and more popular. It has improved the students’ understanding of concepts using games and questions that would gradually help them develop their critical thinking skills. It is effective as it has a high probability value <.000. The mean supported the evidence after the posttest has been conducted, which is 23.

**RECOMMENDATIONS**

Based on the findings, the following recommendations are hereby presented:

1. Teachers should utilize playing online games to give technical assistance to students in improving their academic performance. Teachers should identify the needs of the learners in their classes for an effective online game intervention.

2. Basic learning skills should always be taken into consideration; thus, it is not necessary to intervene in a complicated one. Teachers should be dedicated to conducting mobile games during face-to-face classes.

3. Teachers should be ready to ask any questions about the online game’s intervention when circumstances demand to answer the call of aiding students in playing difficulty.

4. Teachers should conduct playing mobile game remediation on a small group population to focus on monitoring and to have a heart in mentoring their students who are not able to navigate the game concept.

5. Student Activity Coordinators should implement gamification remediation to the identified students who learn best using mobile devices.

6. School heads should support financially and morally the implementation of the use of the devices and gamification program for more effectiveness of the program.
7. School authorities can seek parental assistance to solve problems in their children's learning. They could help in the development of the interest of their children in learning.

LITERATURE CITED


Elsevier Report (2017). Gender in the global research landscape: analysis of research performance through a gender lens across 20 years, 12 geographies, and 27 subject areas.


208-213. Springer, Cham.


