



THE EFFECTS OF ONLINE GAMES ON THE ACADEMIC PERFORMANCE OF PASIAN NATIONAL HIGH SCHOOL GRADE 9 STUDENTS

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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 academic performance of the students. This research summarized the results from the experiment done to determine how online games affect students' academic performance in Science 9. 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 advance tools and experimenting with new methods of science learning.

Keywords: Teaching Methology. Teaching Science, Online Games, Academic Performance, Quasi-Experimental, two group pre-test, post-test.

INTRODUCTION

Today online games are very popular. Students are very susceptible to the gigantic influence of technology, and they occupy the most major portion on the 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 the people. According to the Taiwan Institute for Information Industry in 2010, internet users are most commonly using online gaming services with 50.28%, which is the largest proportion of 12-19 years old (Lin, Wei & Hung, 2012).

In Pasion National High School where the researcher is currently teaching, online gaming is very prevalent in fact it already affected the performance of the students. With the use of their mobile phones, they play even during class hours. It is sad to note that students prioritized playing online games instead of focusing their attention 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 just to play games in the internet café and as a result, they were behind 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.

As with any other innovation in society, the introduction of online games brought the question "What are the negative effects or consequences?" Smyth (2007) notes that there seems to be an increased interest in research in video gaming to answer this question. And there does indeed seem to be much research on the topic in recent years. In overviewing the research, one main concern seems to be whether playing online games impacts academic performance negatively or positively and what those consequences are.

REVIEW OF RELATED LITERATURE

Games/Video Games. Playing video games is often associated in our society with poor academic performance. This anecdotal idea is supported by some research. The effect that interactive digital media has on the learning process is not completely negative. It is not that the medium itself is inherently flawed, but much of the information that gets transmitted through it may be. As was noted in a 2008 study on media attention and cognitive abilities, "content appears to be crucial" (Rivera, 2008). If the content being consumed is positive, then positive results can be expected. If it is negative, then negative results can be expected. The study examined research from many sources in arriving at this conclusion.

Prior research has speculated that specific applications, especially those entertainment applications with immersive or interactive features, appeared to play a significant role in the development of pathological internet use, and pose a great threat to the well-being



of the users (Kim et al., 2006). Online games are such entertainment applications online (Huang & Hsieh, 2011). Many recent games domain is the networked three-dimensional fantasy-themed first-person-view games with clear gaming narratives, where gamers are represented as versatile avatars who can walk, talk, take part in hunting, combat, or various economic activities, and may also make friends, form communities, and fall in love which all offer a sense of belonging (Chuang, 2006).

Certain specific aspects of online games facilitate excessive play to a high extent, such as role-playing, immersion, competition, interaction, realistic scenarios, and various in-game tasks. Online gaming can be extremely engaging and time-consuming and some gamers invest so much time and effort that they even neglect eating, sleep, hygiene, exercise, school, and work to stay longer in the pleasant, satisfying, and persistent virtual worlds (Hussain & Griffiths, 2009).

Given the amount of time young people spend playing online games, and their liking for the games, questions are raised about whether online games have a deleterious impact on youth and whether playing online games can lead to internet addiction. In massive news coverage, Chinese media metaphorically frame online games as internet opium or electronic heroin, especially for young people who are more vulnerable (Jiang & Leung, 2012).

On one hand, some studies suggest that the internet provides tremendous educational benefits, such as more information access, better visual intelligence skills, and enhancement of teacher-student communication (Ni et al., 2009).

On the other hand, many negative impacts are listed, 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 (clubs or sports) (Huang et al., 2009).

Research on the relationship between internet use and the ability to focus attention 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). Previous studies have investigated the relationship between online gaming engagement and academic achievement among adolescents and university students, and the results show that the addicted players had lower school grades than their non-addicted peers (Leung & Lee, 2012). Therefore, the present study attempts to investigate the addictive potential of online gaming as well as the possible deleterious effect on young people's school performance.

Game-Based Learning. The educational potential of games has garnered significant attention that has been directed toward appropriating the best features of games and transferring them to educational settings (Gibson et al. 2007). For example, several commercial games that focus on entertainment (e.g., Civilization,

SimCity, and Spore) have loosely incorporated educational themes into gameplay, including history, urban planning, and evolution. Game-based learning environments create engaging, situated learning experiences for students that prioritize 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 (Clark et. al., 2015).

By encouraging students to actively participate in situated problem-solving activities, game-based learning environments promote deep, meaningful student learning. Researchers have investigated game-based learning environments for a variety of educational domains, including anti-bullying (Aylett et al., 2005), science learning (Rowe et al. 2011), interactive health education (Marsella 2003), graphics design (Cutumisu 2018), mathematics (Mogessie et al. 2020), and computational thinking (Min et al. 2017). Efforts are now underway to leverage game-based learning to connect AI concepts, such as search, reasoning, and machine learning to high school math (Wang & Johnson 2019).

A broad range of computational frameworks has been investigated that can be used to enhance student interactions during game-based learning, ranging from predictive student models of engagement from gameplay data (Sawyer et al., 2018) to a better understanding of how players engage and disengage while playing games (Bertens et al., 2017), as well as student-adaptive experience managers for personalized gameplay (Kantharaju et al. 2018) and assessing student learning without interfering with gameplay (Shute & Sun 2019). Through these games and frameworks, effective and engaging learning experiences are being created for a broad range of subject matters and target student populations.

Motivation. Several studies measured motivation through surveys. Two studies used intrinsic motivation surveys to measure the effect digital game-based learning has on student motivation (Liao et al., 2019). Chen and Law (2016) used a survey to measure whether digital game-based learning, when combined with learning scaffolds (e.g., open-ended questions students were required to answer after gameplay and then they were allowed to go back to the game and instructional manual developed by two science teachers on force and motion) affects student motivation. They found that collaboration in addition to providing the opportunity to make connections between the game played and content can increase student motivation. **Collaborative.** The effect of collaboration during digital game-based learning was examined in a few studies. "Collaborative learning can generally be defined as an instruction method in which students at various performance levels work together in small groups or pairs toward a learning goal" (Chen et al., 2015). In this study, collaboration was used as a soft scaffold because it allowed students to communicate with one another by providing explanations, receiving explanations, asking questions, and working together to develop ideas and knowledge. Participants in the individual-



control group did not receive any scaffolds and played the game individually. 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.

OBJECTIVES OF THE STUDY

Objectives of the present study are

1. To study the academic performance of the control and experimental groups as reflected in their posttest?
2. To study the difference between the Pretest and Posttest mean scores of the control; and the Pretest and Posttest mean scores of experimental groups?
3. To study whether there exist a significant difference between the gain scores of the control and experimental groups?

METHOD

This study use a quasi-experimental two-group pretest-posttest design to determine the effects of online games on the academic performance of the students 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 potentials. 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.

The study was conducted at Pasion 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 Pasion is the second largest barangay and a place where the treasure of gold is found everywhere on its mountainside. In 1947, Pasion 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, Pasion was a sitio of Barangay Haguimitan. In the same year, settlers from different places of Luzon, Visayas, and Mindanao like the Ilocanos, Ilongos, Cebuanos, Warays, Boholanos, and Surigaonons, came in. Pasion 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, Pasion National High School has 26 teaching forces, 3 non-teaching personnel, and 700 students.

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 Pasion 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

The results were presented by a table and textual discussion follows. **Academic Performance of the Control and Experimental Groups as Reflected in Their Pretest**

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

Table 1 Academic Performance of the Students in the Pretest

Group	Pretest	Descriptive Equivalent
Control	6	Very Low
Experimental	6.3	Very Low

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.

Academic Performance of the Control and Experimental Groups as Reflected in Their Posttest

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

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

Group	Pretest	Descriptive Equivalent
Control	13	Average
Experimental	23	Moving Towards Mastery

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.

The Difference in the Pretest of Experimental and Control Group
Table 3 Pretest of Control and Experimental Group

Group	Pre-Test	P-Value	Decision
Control	6	0.635	Not Significant
Experimental	6.3		

As seen by the results, the Control Group's mean in the pretest is 6, whereas the Experimental Group's mean 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.

The Difference in the Posttest of Experimental and Control Group
Table 4 Posttest of Control and Experimental Group

Group	Posttest	T-Value	P-Value	Decision
Control	13	-14.151	0.000	Significant
Experimental	23	-27.497		

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 T-Value of -27.497 and the Control Group's mean is 13 with 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 posttest 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 have beneficial effects on academic performance of the students. **Test**

RESULTS OF HYPOTHESIS

There is no significant difference between the gain scores of the control and experimental groups.

Table 5 Difference Between Pretest and Posttest of Control Group

Group	Gain Score	T-Value	P-Value	Decision
Control	7	-14.151	0.000	Significant

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 lesser 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

Group	Gain Score	T-Value	P-Value	Decision
Experimental	16	-27.497	0.000	Significant

On the other hand, 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 lesser than .05, this means that there is a significant difference between the gain



scores. The intervention, playing online games, is effective because the gain score of the experimental group is greater compared to the control group. This indicates a significant increase in the academic performance of the experimental group. It also implies that online games can make a positive impact on the academic performance of students. Thus, we reject the null hypothesis

DISCUSSIONS AND CONCLUSION

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 at a very low level 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 towards 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. In the study of Anand (2007) reveals that there are research that suggest the use of interactive online games in teaching can increase the academic performance of the students. Also, Jackson et al (2011) found that using online games is related to an increase in visual-spatial skills, especially in the field of Science, Mathematics, Technology, and Engineering. In contrast with these findings, the study of Leung and Lee (2012) found out 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 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 which is less than .05. Thus, playing online games is effective because the post-test score of the experimental group is greater compared to the control group.

Digital games-based learning has been used to increase student retention, and build teamwork skills, and communication (Bodnar, Anastasio, Enszer, & Burkey, 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 that the use of specific instructional techniques (Instructions, feedback, and scaffolds) had 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 lesser 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 gain score of the experimental group is greater compared to the control group. It was presented by 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 are able to 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 with 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 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 to improve 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 made an impact in increasing the students' achievement level since it allows the students to learn at their level to the complex one. The improvement of the students is also influenced by the content of the game. 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 the students to develop their critical thinking skills of the students. It is effective as it has a high probability value <.000. The evidence had been supported by the mean 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 in giving 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.
4. Teachers should be ready to ask any questions about the online game's intervention when circumstances demand just to answer the call of aiding students in playing difficulty.
5. 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.
6. Student Activity Coordinators should implement gamification remediation to the identified students who learn best using mobile devices.
7. School heads should support financially and morally the implementation of the use of the devices and gamification program for more effectiveness of the program.
8. Parental assistance can be sought by the school authorities to solve problems in the learning of their children. They could help in the development of the interest of their children in learning.

Implications for Practice Based on the findings, the following implications for practice are offered. *On Experiences of the Severely Wasted Pupils.* After being enlightened by the severely



wasted pupils' dramatic experience, it is realized that malnutrition poses challenging effects on children's health and leads to poor academic performance. Hence, the school, parents, and the community should work hand in hand to provide a remedy for the identified malnourished children in school.

On Challenges encountered by the Severely Wasted in Learning. Difficulty in learning is the number challenge of severely wasted children. After providing them with a remedy for proper nutrition intake, academic remediation should also be done by the teachers with the support of their families.

On Effects of poor nutrition on the performance of severely wasted pupils. It is the primary role of the teachers to augment and bridge the learning gaps of the pupils. In the case of severely wasted learners, it is quite challenging for the teachers since their performance is affected by their poor nutrition. However, the teachers must be very patient and passionate in uplifting the morale of these learners. They must help them.

On Recommendations to lessen the negative impact of poor nutrition on the severely wasted pupils. Those recommendations are coming from the mind and hearts of the severely wasted pupils themselves. They are expressing a genuine call for help. Therefore, their recommendations should be provided by the school, their respective family, and any right individuals concerned. They must also be replicated in other schools with a similar case.

CONCLUSION

The case of the five severely wasted pupils in Proculo Fuentes Sr. Elementary School shed light that their lived experiences are very challenging. At an early age, they have to realize that they are different from others in terms of height and body weight. Despite that, they still have the desire to learn in school. However, they found it hard to learn in school especially in lesson comprehension as affected by poor nutrition. Thus, they should be provided with good nutrition by their family and supported by the school in terms of the feeding program.

REFERENCES

1. Aliyari, H., Sahraei, H., Daliri, M. R., Minaei-Bidgoli, B., Kazemi, M., Aghaei, H., Sahraei, M., Hosseini, S., Hadipour, M. M., Mohammadi, M., & Dehghanimohammadabadi, Z. (2018). "The Beneficial or Harmful Effects of Computer Game Stress on Cognitive Functions of Players", *Basic And Clinical Neuroscience*, 9(3), 177-186. <https://doi.org/10.29252/nirp.bcn.9.3.177>
2. Anand, V. (2007). *A Study of Time Management: The Correlation Between Video Game Usage and Academic Performance Markers*. *Cyberpsychology And Behavior*, 10(4), 552-559. <https://doi.org/10.1089/cpb.2007.9991>
3. Anderson, C. A., & Dill, K. E. (2007). *Video Games and Aggressive Thoughts, Feelings, And Behavior in The Laboratory and In Life*. *Journal of Personality and Social Psychology*, 78(4), 772-790. <https://doi.org/10.1037/0022-3514.78.4.772>
4. Anderson, C. A., Gentile, D. A., Yukawa, S., Ithori, N., Saleem, M., Ming, L. K., ... & Sakamoto, A. (2009). *The effects of prosocial video games on prosocial behaviors: International evidence from correlational, longitudinal, and experimental studies*. *Personality and Social Psychology Bulletin*, 35(6), 752-763. Aylett, R. S., Louchart, S.; Dias, J.; Paiva, A.; and Vala, M. (2005). *FearNot! -An Experiment in Emergent Narrative*. In *International Workshop on Intelligent Virtual Agents*, 305-316. Springer, Berlin, Heidelberg. Barrows, H. S. 1986. *A Taxonomy*
5. Behnamnia, N., Kamsin, A., Ismail, M. A., & Hayati, Si. (2020). *The Effective Components of Creativity in Digital Game-Based Learning among Youngchildren: A Case study*. *Children and Youth Services Review*. 116. 105227. [10.1016/j.childyouth.2020.105227](https://doi.org/10.1016/j.childyouth.2020.105227).
6. Bodnar, C., Anastasio, D., Enszer, J., & Burkey, D. (2016). *Engineers at play; Computergames as teaching tools for undergraduate engineering students*. *Journal of Engineering Education*, 105 (1)
7. Brown, C., Comunale, M. A., Wigdahl, B., & Urdaneta-Hartmann, S. (2018). *Current Climate for Digital Game-Based Learning of Science in Further and Higher Education*. *FEMS microbiology letters*. 365. [10.1093/femsle/fny237](https://doi.org/10.1093/femsle/fny237).
8. Chen, C.-H., & Law, V. (2016). *Scaffolding individual and collaborative game-based learning in learning performance and intrinsic motivation*. *Computers in Human Behavior*, 55, 1201-1212.
9. Chen, C.-H., Wang, K.-C., & Lin, Y.-H. (2015). *The comparison of solitary and collaborative modes of game-based learning on students' science learning and motivation*. *Educational Technology & Society*, 18(2), 237+.
10. Chuang, Y. (2006). "Massively Multiplayer Online Role-Playing Game-Induced Seizures: A Neglected Health Problem in Internet Addiction", *Cyberpsychology & Behavior*, Vol. 9 No. 4, pp. 451-456.
11. Clark, D. B., Tanner-Smith, E. E., & Killingsworth, S. S. (2015). *Digital games, design, and learning systematic review and meta-analysis*. *Review of educational research*, 86(1), 79-122 [0034654315582065](https://doi.org/10.3102/0034654315582065)
12. De Freitas, S. (2006). *Learning in immersive worlds: A review of game-based learning*.
13. De Grove, F., Bourgonjon, J., & Van Looy, J. (2012). *Digital games in the classroom? A contextual approach to teachers' adoption intention of digital games in formal education*. *Computers in Human behavior*, 28(6), 2023-2033.
14. Din, F., & Calao, J. (2001). *The effects of playing educational video games on kindergarten achievement*. *Child Study Journal*, 31(2), 95.
15. Eichler, M., Perry, G., Lucchesi, I., & Melendez, T. (2018). *Mobile Game-Based Learning in STEM Subjects*. [10.4018/978-1-5225-7365-4.ch064](https://doi.org/10.4018/978-1-5225-7365-4.ch064).
16. Flores, F. (2015). *Using Gamification to Enhance Second Language Learning*. *Digital Education Review*. Reviewed from <http://greav.ub.edu/der/>.
17. Gee, J. P. (2014). *What video games have to teach us about learning and literacy*. *Computers in Entertainment (CIE)*, 1(1), 20-20.
18. Gibson, D., Aldrich, C., & Prensky, M. (2007). *Games and Simulations in Online Learning: Research and Development*. Covent Garden, London. Glaser, B. G. 1965.



- Hart, G., Johnson, B., Stamm, B., Angers, N., Robinson, A., Lally, T., & Fagley, W. (2009). *Effects of video games on adolescents and adults*. *CyberPsychology and Behavior*, 12(1), 63-65.
19. Huang, L. Y. & Hsieh, Y.J. (2011), "Predicting Online Game Loyalty Based on Need Gratification and Experiential Motives", *Internet Research*, Vol. 21 No. 5, Pp. 581-598.
 20. Huang, R. L., Lu, Z., Liu, J.J., You, Y.M., Pan, Z.Q., Wei, Z., He, Q., and Wang, Z.Z. (2009), "Features and Predictors of Problematic Internet Use in Chinese College Students", *Behaviour & Information Technology*, Vol. 28 No. 5, Pp. 485-490.
 21. Hussain, Z., & Griffiths, M. D. (2009). *Excessive use of massively multi-player online role-playing games: A pilot study*. *International Journal of Mental Health and Addiction*, 7(4), 563–571. <https://doi.org/10.1007/s11469-009-9202-8>
 22. Jaaska, E., Aaltonen, K., & Kujala, J. (2021). *Game-based learning in project sustainability management education*. *Sustainability*, 13(15), 8204.
 23. Jackson, L. A., Von Eye, A., Witt, E. A., Zhao, Y., & Fitzgerald, H. E. (2011). *A Longitudinal Study of The Effects of Internet Use and Videogame Playing on Academic Performance and The Roles of Gender, Race, and Income in These Relationships*. *Computers in Human Behavior*, 27(1), 228–239.
 24. Jarrett, K., & Light, R. (2018). *The experience of teaching using a game-based approach: Teachers as learners, collaborators and catalysts*. *European Physical Education Review*. Jiang, Q. & Leung, L. (2012), "Effects of individual differences, awareness knowledge, and acceptance of internet addiction as a health risk on willingness to change internet habits", *Social Science Computer Review*, Vol. 30 No. 2, pp. 170-183.
 25. Kantharaju, P., Alderfer, K., Zhu, J., Char, B., Smith, B., & Ontanón, S. (2018). *Tracing Player Knowledge in a Parallel Programming Educational Game*. In *Fourteenth Artificial Intelligence and Interactive Digital Entertainment Conference*, 173-179