GAME-BASED SYNCHRONOUS ONLINE DISTANCE LEARNING: SUPPORT STRATEGY ON IMPROVING LEARNING DURING PANDEMIC

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Game-Based Synchronous Online Distance Learning: Support Strategy on Improving Learning During Pandemic

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Abstract

This study determined the effectiveness of Game-Based Synchronous Online Distance Learning (GBSODL) in improving the learning outcome of Grade 2 learners in Dipaculao Central School, Dipaculao, Aurora during Covid-19 pandemic. It employed a mixed method research. The questionnaires in the survey were utilized thru google drive via messenger. To determine if there is a significant difference between the performances before and after the utilization of the intervention, a pretest and posttest using a paired samples t-test was conducted. It was revealed in the result that the performance of Grade 2 learners significantly improved after the implementation of the Game-Based Synchronous Online Distance Learning; $t(25) = 23.08$, $\rho < .001$. Cohen's d was estimated at 4.32, which is a very large effect. The result suggested that the intervention used had a very large effect in improving the performances of learners. It was also found out that the strategy provided positive learning experiences needed to respond to current challenges brought by pandemic in the education system. The study also showed that through the intervention, the learners developed positive behavior towards learning Mathematics. Based on the computed tests result and scoring of the parents/pupils' survey of this game-based synchronous online learning strategy, it is categorized as very effective. Therefore, it can be concluded that this GBSODL is very effective to support Mathematics teaching during the Covid-19 pandemic. Furthermore, the study recommends testing the effectiveness of GBSODL in teaching Mathematics in the higher grade levels.

Key words: *game-based synchronous online distance learning, support strategy, learning outcome*

Introduction

The Covid-19 pandemic is a transformative challenge in the educational sector. Thus, it requires the department and the educators to innovate and must design carefully all of the response with specific context in mid.

DepEd Order No. (DO) 21 s. 2019 or the Policy Guidelines on the K-12 basic Education Program sets forth Flexible Learning Options (FLOs). In this time of pandemic, this FLO, distance learning, and Alternative Delivery Mode have been maximized and required to be implemented to ensure the safety of pupils while ensuring that education continues.Modular learning is a form of distance learning that uses Self-Learning Modules (SLM) based on the most essential learning competencies (MELCS) provided by DepEd. . While under blended learning, students are taught various means including using online, television, radio and printed materials.

Although some parents have been worried for the continued education of their children amid pandemic, DepEd assured that different Education Learning Continuity Plan will be implemented depending on learners' access to technology and the situation they are in. "Some of the lessons will be transmitted through different platforms and some activities will be done at home," Education Secretary Leonor Magtolis Briones said in a virtual press briefing. Educational units are struggling to find options to deal with this challenging situation. According to (Rieley,2020), these circumstances make us realize that scenario planning is an urgent need for academic institutions. This is a situation that demands alternative teaching strategies or techniques,interventions to be implied in the teaching-learning process to address the needs of learners during this pandemic.

Before the class starts this SY 2020-2021, Dipaculao Central School conducted a survey on parents on the preferred learning modality this time of pandemic. Modular learning, based on

the survey conducted is the most preferred learning delivery of parents for their children this school year. However, most parents from Grade2 FL class preferred to have Distance Blended Learning (combination of modular and online learning). Thus, Dipaculao Central School addressed and catered pupils who had chosen blended learning. Using synchronous online distance learning is a challenging delivery mode of teaching because teaching online without meeting my pupils directly is very difficult and hard to decide or select on what particular teaching strategy will suit my learners need, interest, abilities and can guarantee maximum retention and application of the learning that are achieved.

During offline learning, modular learning is really made for independent learning, thus, no constant motivation and support from teachers which sometimes learning becomes difficult, stressful, boring and uninterested among pupils. Most of pupils and parents complained on what and how to do the given tasks and teachers also complained on the decreasing pupil's learning achievement. Hence, the author as the Grade 2 FL adviser, started conceptualize of support teaching strategy that will enhance intellectually the learners and address pupils who will be struggling in learning Mathematics under blended learning modality. Although much of the research on the effectiveness of gaming on learning is inconclusive at this point (Fletcher &Tobias, 2006), there is strong evidence that appropriately designed educational games do have the potential to enhance children's learning of Mathematics (Simpson et al, 2006; Bragg, 2007; McGivern et al., 2007;).

According to a research, the use of educational games is an effective means of improving students‟ attitudes towards Mathematics. It has been shown that educational games attract and gain students‟ attention, contributing to their increased motivation and engagement with Mathematics (Squire, 2005; Young-Loveridge, 2005; Ke, 2008). Research indicates that games

are an effective way to train and reinforce children's skills with fundamental number facts. Playing games demands engagement. Successful mathematics teaching depends on the active involvement and application of the learner. Piaget, Bruner, and Dienes charge those games play a very important part role in learning mathematics. Dienes further suggests that all mathematics teaching should start with game playing (Baek, 2008). In playing games, children gain language from each other and improve their thinking capacities. Games help introduce new concepts to children, improve understanding of concepts and reinforce previous knowhow (Eastwood, & Sadler, 2013)

According to Kapp (2012), "Gamification is using game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems". It is a method used to create a meaningful and motivating experience through the integration of mechanical play in non-recreational environments and applications. Thus, game-based learning refers to the use of games to enhance the learning experience, while maintaining a balance between content and gaming and its application in the real world. Since pupils/ learners were so much engaged in using cellphone/laptops/tablets in this time of pandemic, the researcher believed that they will be more motivated to learn. This study is also supported by that of Horne Theory (2006) which states that learning will not take place unless the learner her/himself allows it to happen in his /her mind. So, it is important that the teacher must engage learners in activities that are connected to their lives. It is controlled by the learner's wants, interest and motivation. Without learners' motivation to learn, the willingness to exert an effort towards the acquisition of complex and even simple knowledge and skills is unlikely (Aguilar et al 2018).

Moreover, according to Aguilar (2018), there is no single best method of teaching. But there are teaching methods that are effective when employed in the right situations at the right

time with the right motivation .Since games are motivational and has the potential to create engaging and memorable learning experiences, the author conceptualize Game-Based Synchronous Online Distance Learning (GBSODL): Support Strategy On Improving Learning During Pandemic.Games-based synchronous online learning can be defined as "learning that is facilitated by the use of a game in an online platform" This can be at any academic level from preschool through to lifelong learning, from simple memorization and recall to high level learning outcomes such as evaluation or creativity. According to Del Blanco et al, this is related to the idea of games considered as an additional activity that is not isolated but linked to other activities and contents, and where the game's outputs can influence the development of the learning process. Robison (2013) noted that when using game-based learning environments, students tend to be less stressed than traditional environments due to the whimsical aspects of the games. De Freitas, et al (2010) explained that "the motivational capacities of game-play when brought together with the social interactions of online worlds may be a powerful teaching combination in the future". The teaching strategy and learning activities the way they are designed and aligned influences pupil's learning abilities. Moreover, this study also aims to identify the pupils' experiences and behavior towards learning after the intervention.

Research Questions

The main purpose of this study was to determine the effectiveness of the Game-Based Synchronous Online Distance Learning as support strategy during pandemic and identify pupils learning' experiences after the intervention. Specifically, it aimed to answer the following questions:

1. How effective is the Game-Based Synchronous Online Distance Learning in improving learning outcome of Grade 2 learners?

2. What are the experiences of Grade 2 Learner while learning through Game-Based Synchronous Online Distance Learning?

Hypothesis

Ho: Game-based synchronous online distance learning has no significant effect as a support strategy on improving the learning of grade 2 learners during pandemic

Ha: Game-based synchronous online distance learning has a significant effect as a support strategy on improving the learning of grade 2 learners during pandemic

Significance of the Study

The results of this study were deemed beneficial to the following, to wit:

Learners. This study will benefit primary the learners because the intervention will improve their learning outcome and gain engaging and memorable learning experiences

Parents. The parents, as the children's partner in learning, could supervise or assist learning at home more enjoyable for the child through games.

Teacher. This may be a basis for other teachers to conceptualize ways to make the learning more enjoyable to pupils even in pandemic time.

Department of Education. The results of this study may be utilized as basis for conducting trainings on developing educational games that would be relevant to the needs of the young children today.

Researchers. Results of this study may be used as reference for future studies

Scope and Limitation

The focus of this study was to determine the effectiveness of game- based synchronous online distance learning in learning outcome of Grade 2 FL pupils in Mathematics and identify

their experiences during their distance blended/online class. The respondents of this study were Grade 2 FL pupils and parents who preferred to have distance blended learning.

Methods

Type of Research

This study employed a mixed method of research. This research is a form of investigation designed used by researcher to attempt to address problems and enhance professional practices. It entails systematic observation and data gathering, which the researcher may then use to reflection, decision-making and the development of more effective teaching strategy in synchronous distance online learning.

Respondents

The respondents of this study were the twenty-eight pupils of Grade Two (2) FL for the school year 2020-2021 at Dipaculao Central School in the District of Dipaculao South, Schools Division of Aurora.

Sampling Method

Total enumeration or the total population sampling was used.

Proposed Innovation / Strategy

The proposed strategy was Game-Based Synchronous Online Distance Learning (GBSODL). This was a support strategy on improving learning during pandemic. Games-based synchronous online learning can be defined as “learning that was facilitated by the use of a game during synchronous online classes” GBSODL implied means including knowledge matter of subject into games through online platform. It offered variety of knowledge presentations and created opportunities to apply the knowledge or competencies indicated in MELC within a virtual world thus supporting and facilitating the learning process

The researcher first has the Lessons Game-based development planning. In this planning framework, the researcher has formulated different games as to support the online learning activities during the covid-19. The researcher developed games that were aligned with the different learning competencies in MELC and has specifications as mathematics game-based android. Mathematics games were developed by Microsoft PowerPoint software, Bamboozle and Word wall applications. The computer/ laptop was used as the facility and infrastructure in the development process and its application using an android smartphone/laptop as adopted to the study conducted by Graceota et al 2021.The games were used in eleven synchronous online distance learning sessions for the first quarter.

After the lessons game-based have been developed, the researcher then integrated games in her synchronous online distance classes as support to teaching - learning process or as an enrichment activity used during giving of technical assistance to support pupils with learning difficulties in Mathematics. The link of the game was sent via messenger and allows the pupils to open it directly and the game application was ready to play. The games can be played repeatedly for the mastery of the skills needed to be developed.

After the game-based synchronous online distance learning, the researcher tested the product/game effectivity in improving the learning outcome. This was done by analyzing and evaluating the scores they got and through pupils' responses in post evaluation.

Sessions	Objectives	Game / activity done online	Competency
Q1-Wk 1 Oct. 15,2020	Makilala/matukoy ang katumbas na bilang 101-1000 gamit ang larawan	Halina't Magbilang	Visualizes and represents numbers from 0-1000 with emphasis on numbers 101-1000 using a variety of materials
Q1-Wk 3 Oct.29,2020	Mapunan ang nawawalang bilang upang maisagawa ang pagbilang ng 10s,50s, at 100s	Door of Fortune	Visualizes and counts numbers by 10s,50s,and 100s

Q1-Wk 3 Nov.5,2020	Mabasa at maisulat ang bilang hanggang 1000 sa simbolo at salita	Number Hunting	Reads and writes numbers up to 1000 in symbols and in words
Q1-Wk 4 Nov.12,2020	Matukoy ang bilang at ang pinahaba nitong paraan ng pagsulat	Matching Pairs	Visualizes and writes three-digit numbers in expanded form
Q1-Wk 4 Nov.19,2020	Mapaghambing ang mga bilang sa pamamagitan ng tamang pagpili ng relation symbol	Esep-Esep	Compares numbers using relation symbols
Q1-Wk 5 Nov.26,2020	Matukoy at mabasa ang ordinal numbers mula 1st hanggang 20th	Number maze	Identifies,reads and writes ordinal numbers from 1st through the 20th object in a given set from a given point of reference
Q1-Wk 5 Dec.3,2020	Mabasa at maisulat ang pera sa simbolo at salita hanggang Php 100	Wheel of Fortune	Reads and writes money in symbols and in words through Php 100
Q1-Wk 2 Oct. 22,2020	Maibigay ang place value ng digit ng 3–digit na bilang		Gives the place value and finds the value of a digit in three-digit numbers
Q1-Wk 7 Dec.10,2020	Matukoy kung anong properties ng addition ang ipinakikita ng addition sentence o vice versa	Game Show Quiz	Illustrates the properties of addition (commutative,associative,identity) and applies each in appropriate and relevant situations
Q1-Wk 7 Nov.11,2020	Maisagawa ang pagdaragdag ng mga bilang na may kabuuan hanggang 1000 na mayroon at walang regrouping	Brigada Pagbilang	Visualizes,represents and add the following numbers with sums up to 1000 without and with regroupings
Q1-Wk 8 Jan.5,2021	Maisagawa ang pagdaragdag ng mga bilang gamit ang isip lamang	Mind Add Up	Adds mentally the following numbers using appropriate strategies

Sources of Data

The sources of data of this study were the results of pre-post-test assessment on competencies in Mathematics 2(1st Quarter) answered by pupils which will be used paired t-test and the pupils with the guidance of their parents answer in the survey form/questionnaires.

Instruments

The main instrument of the study was a 11-item teacher-made test composed of the different competencies in Mathematics 2 for the first quarter. This was used as pretest and as posttest

The second instrument was a survey questionnaire composed of 3 parts. Part A focused on the Games used in every competency where pupils with the guidance of their parent/guardian are to rate the eleven (11) indicators using the following scale: 4- Matinding Sang-Ayon, 3- Sumasang-Ayon, 2- Di Sang-Ayon, 1- Matinding Di Sang-Ayon. Part B was about pupils' learning experiences during the intervention. It had ten (10) indicators where respondents will check the column appropriate for their responses using the following scale: 4- Matinding SangAyon, 3- Sumasang-Ayon, 2- Di Sang-Ayon, 1- Matinding Di Sang-Ayon. Part C was the participants' behavior towards the intervention where respondents are to rate the ten (10) indicators using 4- Matinding Sang-Ayon, 3- Sumasang-Ayon, 2- Di Sang-Ayon, 1- Matinding Di Sang-Ayon.

The instruments were subjected to face and content validity by 4 master teachers and a school head. To test the reliability of the instruments, the 10-item test was run online to 26 Grade 2 pupils, and was re-run to the same pupils after 2 weeks. The questionnaire was given to 26 pupils during the posttest. The 10-item test got an overall reliability coefficient of .838 while the questionnaire got .867, which is good and consistent. Thus, the instruments were reliable and ready for data collection.

Data Collection Procedure

The researcher submitted the research proposal to the Schools Division Office- Research Evaluation Committee, for review and approval. Upon approval, the letter of consent/assent was

distributed to the parents to know if they will allow their children to become participants of the study. The questionnaire was floated or sent thru link via messenger. The pretest of assessment before using the intervention was conducted to pupils with parent's assistance or supervision and the post-test after the intervention. The questionnaires were disinfected first before the distribution and after retrieval. The responses were listed using appropriate coding system and data were tabulated for better presentation.

Ethical Considerations

Since the study was conducted during the COVID-19 pandemic, the researcher ensured the IATF protocols where the minimal health standards and minimal physical were observed. The questionnaires and survey forms were disinfected before distribution and after retrieval or sent through google links via messenger. Keeping of responses with utmost confidentiality were practiced.

The profile of the pupils was confidential; consent letters were provided in view of the approval request from the Schools Division Superintendent. Ensuring research ethics and rules were duly observed to avoid problems that may arise, namely: plagiarism, intellectual dishonesty and other related issues.

Data Analysis

To answer research question 1, mean, standard deviation and paired samples t-test were used to describe and determine the effectivity of the Game-Based Synchronous Online Distance Learning in improving learning outcome of Grade 2 learners.

To answer research question 2, mean and standard deviation were used to describe the experiences of learner while learning using the intervention.

Results and Discussion

This part of the study presents the gathered data, its interpretation and discussion

1.Effectivity of the Game-Based Synchronous Online Distance Learning among Grade 2 Learners

Table 1 shows the mean performances of Grade 2 learners before and after the intervention. It revealed that their performances improved after the implementation of the Game-Based Synchronous Online Distance Learning. The result suggested that this intervention had affected learners' achievement during the post-test.

Table 1
Performances of Grade 2 Learners Before and After the Intervention

	n	*M*	*SD*
Before	28	2.58	0.83
After	26	1.35	0.37

Then, to determine if there is a significant difference between their performances before and after the utilization of the intervention, a paired samples t-test was conducted. It was worth noting that during the posttest, 2 learners did not comply to answer the assessment, so they were not included in this analysis.

Prior to conducting a t-test, several assumptions were checked. No outliers were detected in the differences using the boxplot. Data of the differences was tested for normality using histogram, normal Q-Q plot and Shapiro-Wilk test (0.137) and found to be approximately normality distributed. Thus, no significant outliers and normality of the differences were confirmed and satisfied.

It was revealed in Table 2 that the performance of Grade 2 learners significantly improved after the implementation of the Game-Based Synchronous Online Distance Learning; t (25) = 23.08, ρ < .001. Cohen's d was estimated at 4.32, which is a very large effect. The result suggested that the intervention used had a very large effect in improving the performances of learners.

Table 2
Result of the Paired-samples t-Test on the Performances of Grade 2 Learners Before and After the Intervention

	M	*SD*	*t*	*df*	ρ
Before-After	6.42	1.42	23.08	25	ρ < .001

2.Experiences of Grade 2 Learner while Using Game-Based Synchronous Online Distance Learning

Table 3 shows the pupils' learning experiences while using game-based synchronous online distance learning. It is gleaned from the table that pupils/parents strongly agree that they attained the learning competencies /objectives using game-based strategy during synchronous online distance learning. The result of the effectiveness of the game-based learning strategy when used by the teacher in this time of pandemic was manifested on the student/parent responses in Table 3. This further supported the findings of Lach (2005) which described the effects that game playing had on students' learning: that the students did much better on learning after they had played game, thus suggesting mathematics teachers consider adding game-making to their strategies for practicing and applying mathematical concepts.

Table 3
Lessons and Games Played

	M	SD	Description
Nakilala ko ang bilang mula 101-1000 na may larawan sa Halina't Magbilang (Baamboozle)	3.81	0.40	Matinding Sang-ayon
Nakabibilang ako ng 10s,50s,at 100s gamit ang Door of Fortune (Microsoft Powerpoint0	3.69	0.47	Matinding Sang-ayon
Nakabasa at nakasulat ako ng bilang sa salita at simbolo gamit ang Number Hunting (Word wall)	3.62	0.50	Matinding Sang-ayon
Nakikila ko ang bilang sa pinalawak na pamamaraan gamit ang Matching Pairs (Word wall)	3.38	0.70	Sang-ayon
Napagkumpara ako ang bilang sa larong ESEP-ESEP (Baamboozle)	3.50	0.65	Matinding Sang-ayon
Natukoy ko ang ordinal na bilang 1^{st}-20^{th} sa larong Number Maze (Word wall)	3.69	0.47	Matinding Sang-ayon
Nakapagsulat ako ng pera sa simbolo at salita sa Wheel of Fortune (Word wall)	3.69	0.47	Matinding Sang-ayon
Natutukoy ko ang place value ng digit sa 3-digit na bilang sa Know my Place Value (Microsoft Powerpoint)	3.69	0.47	Matinding Sang-ayon
Nakilala ko ang mga properties ng Addition sa Game Show Quiz (Word wall)	3.62	0.50	Matinding Sang-ayon
Napagsasama-sama ko ang bilang ng walang pagpapangkat at may pagpapangkat sa Brigada sa Pagbilang	3.50	0.51	Matinding Sang-ayon
Napagsasama-sama ang mga bilang gamit ang isip lang sa larong Mind Add Up (Baamboozle)	3.47	0.51	Sang-ayon
Total	3.61	0.51	Matinding Sang-ayon

Table 4 shows the positive and negative experiences of pupils during game-based synchronous online learning. From the result of 3.53 Mean and 0.51 Standard Deviation for Strongly Agree implied that most pupils gained positive experiences rather than negative experiences in learning Mathematics during game-based synchronous online learning. It was revealed in their responses that GBSOL provided an effective, interactive and fun learning

experiences for students. This implication can be attributed to the fact that most students could learn better if the teacher makes use of game-based strategy in teaching. This further supported the study conducted by Hutchings (2012) and Aguilar (2018) which concluded that the use of games in education as a method of thinking and planning can greatly increase classroom effectiveness by bolstering the motivation of students and teachers in classroom tasks.

Table 4
Pupil's Experiences

	M	SD	Description
Gamit ang Game-Based Synchronous Online Learning, ako ay …			
lalong nag-enjoy mag-aral ng mga aralin	3.54	0.51	Matinding Sang-ayon
lalong sinipag magsagot ng modyul	3.50	0.51	Matinding Sang-ayon
napabilis sa pagkatuto	3.62	0.50	Matinding Sang-ayon
natutong sumunod sa panuto	3.58	0.50	Matinding Sang-ayon
natutong makapag-isa sa pagsagot ng modyul	3.42	0.50	Sang-ayon
nahihikayat mag-aral kahit tinatamad	3.50	0.51	Matinding Sang-ayon
Higit na natututo kapag may kasamang laro	3.54	0.51	Matinding Sang-ayon
Lalong nalilito sa pagsasagot sa mga tanong sa modyul	1.77	0.43	Di Sang-ayon
Lalong napatatagal sa pagsagot sa modyul	1.88	0.33	Di Sang-ayon
lalong nahihirapan sa pagsasagot/pag-unawa sa mga aralin	1.50	0.51	Di Sang-ayon
Total Positive Statement	3.53	0.51	Matinding Sang-ayon
Negative Statement	1.72	0.42	Di Sang-ayon

Table 5 shows the pupil's behavior during the game-based synchronous online distance learning. The result revealed that most pupils strongly agree for 4 out of 6 positive statement and some agree for the 2 out of 6 positive statements. while some pupils agree for 2 out of 4 negative statements and disagree for 2 out of 4 negative statements. This implied that game-based synchronous online learning when use as support strategy during pandemic has a potential to developed learner's positive behavior towards learning mathematical concepts and skills and have fun while learning.

Table 5
Pupil's Behavior

	M	SD	Interpretation
Gamit ang Game-Based Synchronous Online Learning, ako ay …			
eksayted matuto kasama ang mga kamag-aral	3.92	0.27	Matinding Sang-ayon
palaging masaya kapag nakikita ang mga kamag-aral sa cp/laptop	3.85	0.37	Matinding Sang-ayon
aktibong nakikisangkot sa mga laro	3.73	0.45	Matinding Sang-ayon
nakikipag-away kapag natatalo	1.69	0.79	Di Sang-ayon
nalulungkot kapag walang laro	2.96	0.77	Sang-ayon
nalulungkot kapag marami ang hindi nakapasok sa online class	3.19	0.57	Sang-ayon
nalilibang at nakaagapay na sa bagong sistema ng pag-aaral	3.46	0.51	Sang-ayon
nabigyan ng pagkakataon na magkaroon ng ibang batang makausap	3.46	0.71	Sang-ayon
masayang nakapaglaro sa online kasama ang mga kaklase	3.65	0.56	Matinding Sang-ayon
natakot/nahiyang magbigay ng sagot o sumali sa laro	2.00	0.80	Di Sang-ayon
Total Positive Statement	3.68	0.48	Matinding Sang-ayon
Negative Statement	2.46	0.73	Di Sang-ayon

Conclusion

Based on the findings tof the study, the following conclusions are drawn:

1. The intervention used had a very large effect in improving the performances of learners. Therefore, it can be concluded that GBODL is very effective to be in support Mathematics learning during the Covid-19 pandemic.

2. GBSODL provided positive learning experiences needed to respond to current challenges brought by pandemic in the education system.

3. using GBSODL, the learners developed positive behavior towards learning Mathematics

Recommendations

Based from derived conclusions, the following recommendations were raised.

1. The study recommends that game-based synchronous online learning should be used as support strategy in teaching competencies in Mathematics 2 during pandemic.

2. Similar and further studies should be conducted to find out the effectiveness of gamebased synchronous online learning strategy in teaching Mathematics in the higher grade levels.

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