

The Collaboration Of Audio-Visual Materials And Instructional Digital Games In Half-Day Instruction Program In Mathematics

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Abstract

The purpose of the study is to determine the impact of collaboration of instructional digital games and audio-visual materials in “Half-day” Instruction Program to the performance of grade six students in Mathematics at Balanac Elementary School, Magdalena Laguna.

Specifically, it sought to respond the following: (1) the level of the half-day instruction program in mathematics in terms of instructional digital games and audio-visual materials. (2) the learner’s performance in mathematics in terms of Pretest and Posttest. (3) if there is a significance difference on learners’ performance in terms of pretest and posttest. (4) If there is a significant effect of the Half-day instruction program in mathematics on the learner’s mathematical performance.

The researcher prepared the necessary materials that will used to enhance the learner’s performance in mathematics. The use of audio-visual materials and digital games were presented to the experimental group in a half-day scheduled and tradition teaching for the controlled group. The pretest and posttest were administered before and after the presentation of the lesson.

The level of perception of the learners on the use of instructional digital games was Very High. And the level of perception of the learners on the use of audio-visual materials was High. This indicates further the usefulness of the Half-day Instruction Program in Terms of instructional digital games and audio-visual materials help the learners to continue the education and motivates to attain the desired competencies for a specific learning area. The instructional digital games and audio- visual materials has significant effect on the learner’s mathematics performance. Therefore, the null hypothesis of the study is hereby rejected. This implies also that the Use of collaboration of the instructional software games in the half day instruction can help the students to improve their performance.

Keywords: Audio-visual materials, Instructional digital games, half-day instruction program in Mathematics and Mathematics Performance

1. Main text

Introduction

Learning Mathematics in the part of the students seems to be a big problem for them to deal with. Most of the 21st century learners felt that learning math is stressful, confusing, and boring. For them it is quite easy to use gadgets like calculator, computer, and cellphone in dealing math problems. They are no longer interested in the traditional method which is supposed to be implemented in teaching elementary grade pupils. They think that learning about numbers, figures and mathematical problems is not important anymore because of those gadgets.

In part of the teacher, teaching math is one of the most difficult subjects to teach aside from English and Science. Nowadays most of the teachers create and use different interventions just to sustain the interest and meet the expectations of the 21st century learners in dealing math. Even some of the school heads in Department of Education are required to make an action research, thesis, project and even dissertation just to provide a new intervention and strategy for math and as part of their School Improvement Plan (SIP). Board works, flash cards, books and even modules are not enough.

The key strategy in teaching math should focus on keeping the learners’ attention and interest on the subject itself through different interventions like using technologies and doing other activities related to math. If the students are interested in learning Mathematics, then the teacher’s task become easier, and the learners will learn a lot. However, if the teacher uses these interventions, it seems that the allotted time in math class is not enough and that is why most teachers go back to the traditional method.

In this research paper, the researcher provides an opportunity to come up to a possible way to give quality education for elementary learners. The researcher come up to the idea of using the audio-visual materials and instructional

digital games in half-day instructions to the grade six (6) learners in Balanac Elementary School to improve their mathematics performance.

Background of the Study

A schedule consists of the instructors, courses, period, and time specified for each period and day. As schools struggle to find ways to improve students' academic achievement, class scheduling has become the main topic in this study. The focus in this study provides a unique opportunity to examine the half-day instruction of mathematics subject.

The class schedule for the Department of Education specifically for elementary education were equally divided based on the time allotted per day per grade level based on the DepEd memorandum no.20 s. 2022. So that the classroom teacher was deciding the transitions of the subjects. Unlike in College Degree, the number of hours per subject was based on the weight of its unit.

In K to 12 curriculum there is only 50 minutes allotted time for math class. Even the teacher uses the traditional method, the time is not enough especially when the topic is new to the learners. Most of the teachers skip the evaluation part of their lesson plan and convert their quizzes into assignments just to make on time for other subjects. Now that there is a "No Assignment Policy" act in the Department of Education, learning and teaching math became more difficult and complicated not only for the learners but also for the teachers.

There are a lot of quality and proven interventions especially in Mathematics that become worthless because teachers have no other choice but to rely on traditional method such as board works and purely discussion in teaching Mathematics. For example, the average duration of an audio-visual material is twenty (20) to thirty 30 minutes, it can be used in motivation or in the presentation of the lesson, but the problem is the remaining minutes of the class time is not enough to continue with analysis, abstraction and application of the lesson especially when the teachers used another intervention or instrument such as abstract instructional materials, modules, games etc. at the same time. There is also a scenario, when the momentum of a teacher who is vigorous in his/her class and the learners who learned step by step interrupt and disturb due to the insufficiency of allotted time in class.

The class program in K to 12 curriculum is very flexible particularly in elementary. It can be change and revise depends on the current situation of the school especially when there is a seminar for the teacher or activity outside the school; meetings like learning action cell (LAC Session); even when there is a class suspension due to the bad weather condition. Based on the DepEd Order 31, s. 2012, as long as the objectives in the lesson from the Daily Lesson Log (DLL) achieved, it doesn't matter if the class program change from time to time particularly if there is a memorandum/permission from the supervisors or from the school head.

The schedules taken in totality does not show an improved student academic performance based on the schedule under which instruction occurred, the individual course analysis reflected statistically significant differences in the content area of math. Childers (2018) promotes positive social change by adding to the understanding of the effectiveness of different schedules on student academic achievement. Since the time allotted in every subject in class can also be adjusted, the researcher wish to make an adjustment regarding the time allotted in a day intended in teaching math so that the teachers and learners can enjoy using different interventions without worrying about the time they spent in their math class.

Theoretical Framework

Instructional theories provide principle to guide design within one or more of these layers, but no theory provides guidelines for all them, suggesting to designers the wisdom of subscribing to multiple local theories of design rather than a single monolithic theory.

Classroom program is one of the major elements of classroom management. It is very important to be clearly instructional, adaptable and approachable. Helping students understand routines and classroom program are very important as it helps the learner feels comfortable and secure because they know what will happen next in both a routine and with a classroom program. It also helps the teacher build a good and friendly relationship with the student, helps them when planning and also helps with child guidance. Research indicates that the structure of the classroom program, environment, paired with planned instruction, supports the development of social emotional skills as well as prevents behavioral issues.

According to Lyons, Ford and Arthur-Kelly (2015) in their theory known as, "The Lyford Model", the Lyford Model is a flexible framework that pre-service and early career teachers can use to scaffold their own classroom management plans and programs, which takes account of school wide practices, their own classroom management approach and the needs of individual students. Furthermore, the model allows educational practitioners to take account of the socio-cultural context in which students operate as an important element within the broader context of classrooms and schools. The Lyford model is designed to create a classroom management plan that has internal integrity between teaching philosophy, theoretical approaches to classroom management and practice (Manning & Butcher, 2013).

From this point, we can see that the features and quality of a classroom program really affects not only the behavior of the learners but also their performance in studying. Not only that, it also has a great impact in the classroom management of the teacher in the sense that he/she may able to build a good relationship with their students by having a quality and approachable classroom program.

According to the theory of Model Centered Instruction and Design Layering (MCI) by Gibson as cited by Culatta (2022), it is a set of principles to guide instructional designers in selecting and arranging design constructs, so it is appropriately called a design theory. It favors design that originates with and maintains the priority of models as the central design structure. Technology is an agent of change, and major technological innovations can result in entire paradigm shifts. The computer network known as the Internet is one such innovation. After effecting sweeping changes in the way people communicate and do business, the Internet is poised to bring about a paradigm shift in the way people learn. Consequently, a major change may also be coming in the way educational materials are designed, developed, and delivered to those who wish to learn. The instructional technology called “learning objects”. Currently leads other candidates as the technology of choice for the next generation of instructional design, development, and delivery This is because of its potential for reusability, generatively, adaptability, and scalability.

Based on the above theories, instructional technology including digital games and audio-visual materials is a great learning tool in education. It may be part of a quality and approachable classroom program. In connection with the present study the theories above may serve as foundation in finding the significance of Half-day instruction program in the learner’s performance in Mathematics to improve the mathematics performance of grade six (6) learners of Balanac Elementary School in Magdalena, Laguna S.Y. 2021 - 2022.

Statement of the Problem

The purpose of the study is to determine the impact of collaboration of instructional digital games and audio-visual materials in “Half-day” Instruction Program to the performance of grade six students in Mathematics at Balanac Elementary School, Magdalena Laguna.

Specifically, it seeks to answer the following questions:

1. What is the level of the half-day instruction program in mathematics in terms of;
 - 1.1 instructional digital games, and
 - 1.2 audio-visual materials?
2. What is the learners performance in mathematics in terms of
 - 2.1 pretest and
 - 2.2 posttest?
3. What is the significance difference on learners’ performance in terms of pretest and posttest?
4. Is there a significant effect of the Half-day instruction program in Mathematics on the Learners Mathematical Performance?

2. Research Methodology

This chapter presents the details of the investigation as basis for the researcher to carry out her investigative efforts in applying the appropriate research design, population and sampling technique, research instrument, and data gathering procedure envisioned to acquire the needed data and their subsequent statistical treatment and interpretation.

Research Design

The experimental method of research was used in this study to determine the impact of collaboration of instructional digital games and audio-visual materials in “Half-day” Instruction Program to the mathematics performance of grade six students at Balanac Elementary School, Magdalena Laguna.

According to Cristobal (2017) Experimental research is concerned primarily with cause-and-effect relationships in studies that involve manipulation or control of the independent variables and measurement of the dependent variables. This design utilizes the principle of research known as the method of difference. This means that the effect of a single variable applied to the situation can be assessed and the difference can be determined.

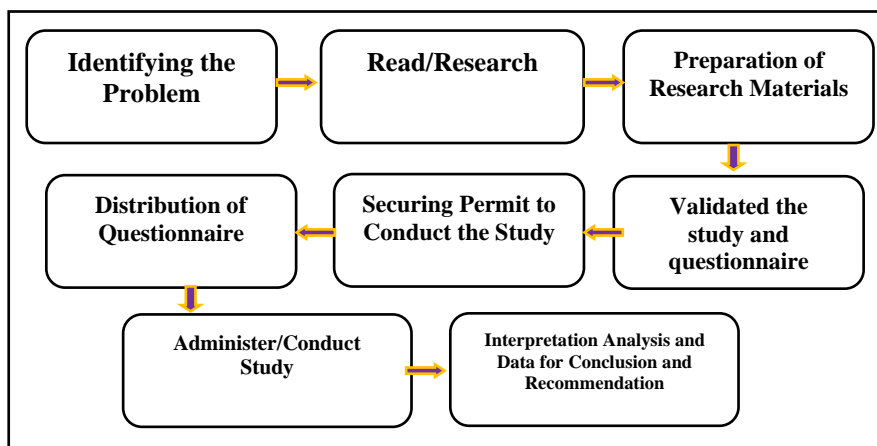
Based on the procedure recapitulated above, the researcher was fully convinced that descriptive and experimental designed were essential to the kind of investigation she ventured to undertake. The researcher used pretest to find out the performance of the students without the use of computer-based instruction, secondly the researcher discussed the series of lessons using computer-based instruction and the respondents answered the posttest after the series of lesson with scrutiny the population of her research parameter, third, she made a careful record of what she observed, and the outcome.

Respondents of the Study

This research is focuses on the sixth grader of Balanac Elementary School S.Y. 2021 – 2022 in Magdalena, Laguna so that the researcher decided to use all of the eighteen (18) grade six students of Balanac Elementary School in Magdalena, Laguna S.Y. 2021 – 2022. It was purposely taken as a sample in this study since the researcher is the mathematics teacher of the respondents. The respondents were also divided into two groups namely, experimental, and controlled group. Purposive sampling was employed in this study among eighteen (18) grade six students of Balanac Elementary School s.y. 2021- 2022 hence, all of the eighteen (18) grade six students of Balanac Elementary School were purposely selected as the actual respondents during the day set for the gathering and retrieving of data from them.

As claimed by Saunders et. al. (2012), Purposive sampling (also known as judgment, selective or subjective sampling) is a sampling technique in which researcher relies on his or her own judgment when choosing members of population to participate in the study. Purposive sampling, is a non-probability technique and also known as judgmental, selective, or subjective sampling, is a form of non-probability sampling in which researchers rely on their own judgment when choosing members of the population to participate in their surveys.

Research Procedure



The research study started by the presentation of the problem and defending the research title and after the approval, the researcher prepares all the necessary materials that will be used to the attain the objectives of the study. The questionnaire checklist and pretest/posttest were validated by the panel members. The researcher also asked the school head of Balanac Elementary School to validate the self-made questionnaire. As there was assurance for validity and reliability of the major instrument coupled with the approval by the thesis adviser to conduct an actual study, letters addressed to the Schools Division Superintendent of Division of Laguna, District Supervisor of Magdalena District and School Head of Balanac Elementary School in Brgy. Balanac Lumban, Laguna was prepared, requesting permission to distribute the one set of questionnaire to the third graders as actual respondents of this study.

The researcher gave the pretest to the controlled and experimental group. Then for the experimental group, the researcher use the collaboration of audio-visual materials and digital instructional games in half-day instruction in mathematics for the experimental group, Then the researcher were administered the posttest to the experimental group. The perception of the experimental group based on the materials was also gathered by the used of questionnaire checklist.

As approval was granted by the said school authorities, the distribution and retrieval of the one set of major instruments were done personally by the researcher in order to clarify questions which are find highly technical in nature by the actual respondents. The data were tallied and computed Mean, standard deviation, t-test and regression. The data were presented in tables/ graphs, analyzed and interpreted.

Research Instruments

The researcher made two sets of 10 - item test covering the topics of LCM and GCM which were parallel with each other. The constructed test served as the pre-test and post-test of the study. The test was validated by a school head from Magdalena Elementary School and was checked by the Research Adviser. The test was also administered to a different set of students to test the reliability of the self-made test and the result was statistically analyzed using Cronbach Alpha.

The researcher made a questionnaire survey with five (10) statements for each indicator, that was checked and validated by the research adviser, subject expert, and technical editor. The questionnaire was used to know the perception of the students on the collaboration of audio-visual materials and digital instructional games in half-day instruction in mathematics. The Likert Scale is used for the interpretation of the corresponding values of data gathered from the survey checklist.

Rating	Scale	Perception of the Attributes of the game-based Applications	Adjectival Rating	Scale	Performance Remarks
5	4.20-5.00	Strongly Agree	Very Beneficial	21-25	Very Good
4	3.40-4.19	Agree	Beneficial	16-20	Good
3	2.60-3.39	Neutral	Moderately Beneficial	11-15	Average
2	1.80-2.59	Disagree	Moderately Not Beneficial	6-10	Below Average
1	1.00-1.79	Strongly Disagree	Not Beneficial	0-5	Poor

Statistical Treatment of Data

The data obtained was statistically treated with the use of Mean, standard deviation, pearson-r correlation and t-test to determine the impact collaboration of instructional digital games and audio-visual materials in “Half-day” Instruction Program.

The mean was calculated in order to verify the pre-test and post-test mean score in Mathematics. The standard deviation was also used to describe and present the data in determining the degree of dispersion and estimate the variability in total population.

The pearson-r correlation was used to determine if the significant relationship between the performance of the control and experimental group in pre-test and post-test.

The t-test was used to determine the significant impact of collaboration of instructional digital games and audio-visual materials in “Half-day” Instruction Program to the performance of grade six students in Mathematics at Balanac Elementary School, Magdalena Laguna.

3. Result and Discussion

This chapter deals with the presentation, analysis and interpretation of data gathered the sub problem relative to the main problem of this study. This part discusses the findings of the study based on the research questions. In this study, the collaboration of instructional software games and audio-visual materials were used to determine the impact on the performance of the Grade Six (6) students of Balanac Elementary School S.Y. 2021 - 2022.

Level of Perception on the Half-day Instruction Program in Mathematics

In this study, the Half-day Instruction Program in Mathematics refers to the use of Instructional Software Games and Audio-visual Materials in teaching for half a day. The respondents assessed the perception of the learners on the Half - day instruction program in terms of Instructional Software Games and Audio-Visual Materials

Table 1 presents the perception of the learners on the half -day instruction program particularly the instructional digital games used by the teachers. The learners *Strongly Agree* that the use of instructional digital games was found interactive, suitable to learners age (M= 4.78, Sd= 0.44). The instructional digital games contain graphics that are clear and interactive (M= 4.56, Sd= 0.53). The learner enjoys using the instructional digital games (M= 4.78, Sd= 0.44).

The overall mean and standard deviation (OM=4.64, Sd= 0.57) indicates that the level of perception of the learners on the use of instructional games was *Very Beneficial*. This indicates further the usefulness of the Half-day Instruction Program in Terms of Instructional Digital Games help the learners to continue the education and motivates to attain the desired competencies for a specific learning area.

Table 1. Level of Perception on the Half-day Instruction Program in Terms of Instructional Digital Games

Instructional Digital Games	Mean	SD	Adjectival Rating
1. It is suitable on my age.	4.78	0.44	Very Beneficial
2. It provides specific instruction before it start.	4.78	0.44	Very Beneficial
3. It is easy to follow and to play.	4.11	0.78	Beneficial
4. The graphics are clear and attractive.	4.56	0.53	Very Beneficial
5. I find it beneficial to me in the short time playing it.	4.78	0.44	Very Beneficial
6. The game motivates me to learn.	4.78	0.67	Very Beneficial
7. It enhances my academic performance.	4.67	0.50	Very Beneficial
8. The level of difficulty of the game is increasing as time passes.	4.56	0.73	Very Beneficial
9. I enjoy playing the instructional digital games.	4.78	0.44	Very Beneficial
10. The game is suitable in our topic for the day.	4.67	0.50	Very Beneficial
Overall Mean = 4.64	Rating	Scale	Remarks
Standard Deviation = 0.57	5	4.21-5.00	Strongly Agree
Verbal Interpretation = VB	4	3.41-4.20	Agree
	3	2.61-3.40	Moderately Agree
	2	1.81-2.60	Disagree
	1	1.00-1.80	Strongly Disagree
			Adjectival Rating
			Very Beneficial (VB)
			Beneficial (B)
			Moderate Beneficial (MB)
			Moderately Not Beneficial (MNB)
			Not Beneficial (NB)

It was evident that the learners are interested to learn with the use of instructional software games and it is supported by the works of Connolly et al; Young et al., (2012) Educational video gaming is a developing field that constantly produces new empirical findings and their applications vary across various content areas, we have conducted an extensive search of published and unpublished academic work on video gaming focusing on mathematics content area exclusively two years after the publication of the most recent eta-analytical attempts on instructional gaming. And it was found helpful into the new generation of learners.

Table 2. Level of Perception on the Half-day Instruction Program in Terms of Audio-Visual Material

Audio-Visual Materials	Mean	SD	Adjectival Rating
1. I understand the teacher when he shows images or videos.	4.11	0.93	Beneficial
2. It is easy to follow instructions when the teacher shows images or videos.	4.11	0.78	Beneficial
3. It helps me to understand the topic that my teacher is discussing.	3.89	0.93	Beneficial
4. It helps me to visualize the given word problems.	4.22	0.83	Very Beneficial
5. It motivates me to listen and to learn.	3.89	0.93	Beneficial
6. I enjoy studying because of the audio-visual materials that my teacher uses.	4.00	0.87	Beneficial
7. It can divert our boring mathematics classes before.	4.11	0.93	Beneficial
8. It catches my attention before my teacher started his discussion.	4.44	0.88	Very Beneficial
9. The animations, pictures, videos are attractive and sounds wonderful.	4.33	1.00	Very Beneficial
10. I want every discussion to have an audio-visual material.	3.78	0.83	Beneficial

	Rating	Scale	Remarks	Adjectival Rating
Overall Mean = 4.09	5	4.21-5.00	Strongly Agree	Very Beneficial (VB)
Standard Deviation = 0.87	4	3.41-4.20	Agree	Beneficial (B)
Verbal Interpretation = VB	3	2.61-3.40	Moderately Agree	Moderate Beneficial (MB)
	2	1.81-2.60	Disagree	Moderately Not Beneficial (MNB)
	1	1.00-1.80	Strongly Disagree	Not Beneficial (NB)

Table 2 presents the perception of the learners on the half -day instruction program particularly the audio-visual materials used by the teachers. The learners *Strongly Agree* that the use of instructional digital games was found Helps to visualize the given word problems (M= 4.22, Sd=0.83), catches the student's attention (M= 4.44, Sd= 0.88), and the animations, pictures, videos are attractive and sounds wonderful (M= 4.33, Sd= 1.00). On the other hand, The learners *Agree* that the use of instructional digital games was found uses images or videos (M= 4.11, Sd= 0.93), easy to follow (M= 4.11, Sd= 0.78), helps in understanding (M= 3.89, Sd= 0.93), motivates the learners (M= 3.89, Sd= 0.93), enjoyable to use (M= 4.00, Sd= 0.87), divert boring mathematics classes (M= 4.11, Sd= 0.93), and the learners want it (M= 3.78, Sd= 0.83).

The overall mean and standard deviation (OM=4.09, Sd= 0.87) indicates that the level of perception of the learners on the use of audio-visual materials was *Beneficial*. This indicates further the usefulness of the Half-day Instruction Program in Terms of audio-visual materials help the learners to continue the education and motivates to attain the desired competencies for a specific learning area.

Audio-visual is another effective way to teach children because it can easily to catch their attention with the use of it. Children can play videos, DVDs, games and learn computer, typing functions. Children can learn at an early age, faster than later period of their life. Dauda, (2015) stated that Children find computers as toys and like to play with them. The use of an electronic device can make learning fun and easy for children in 6-14 old age. Also, as claimed by Natoli (2016) The use of audio-visual materials in teaching and learning made teaching interesting to students and their teachers as well as creating better relationship in the classroom and promoting effective communication between the students and their teachers. Teaching aids have help students to retain knowledge better thereby making learning to be permanent; it enables students to retain and recall what they have learnt. This is made possible because they were able to visualize what was been taught in the classroom.

Learners' Performance in Mathematics in terms of Pretest and Posttest

The mathematics performance of the controlled and experimental group was measured based on Pre-test and Post-test that been administered. To measure the performance of the study before and after the discussion of the lesson with the use of audio-visual materials and instructional software games in a Half-day scheduled.

Table 3. Learners' Performance in Mathematics in terms of Pretest and Posttest

	Controlled Group			Experimental Group		
	Mean	SD	Verbal Interpretation	Mean	SD	Verbal Interpretation
Pre-test	9.33	2.55	Below Average	8.56	3.13	Below Average
Post-test	16.00	2.00	Good	21.78	2.68	Very Good

Table 3 revealed the student's performance in terms of pre-test and post-test. It can be seen that the two group of learners attain a *Below Average* performance with the (M= 9.33, Sd=2.55) for controlled group (M= 8.56, Sd=3.13) experimental group. This means that most of the students have no pre-existing knowledge about the content of the topic. On the other hand, the post test result revealed a *good* performance of the students. The (M= 16.00, Sd= 2.00) for the controlled group, (M= 21.78, Sd=2.68) for experimental group. Among the two group of learners experimental group attain *Very Good* performance as indicated in the table above. This imply that half- day instruction program helps the students to improve their performance in mathematics I terms of post test.

According to Rico, as cited by Millena (2015), stated that pre-test is a way which shows the preparedness or unpreparedness of the students in the examinations that they undertake within a certain course. Post test as defined by Merriam (2010) is a test given to the students after completion of an instructional program or segment often used in preposition with a pre-test to measure their achievement and effectiveness in a program.

Significant Difference in the Learners Mathematics Performance

The table shows the significant difference in the controlled and experimental groups mathematics performance based on their pre-test and post-test.

Table 4. Significant Differences in the Learners' Mathematics Performance in terms of Pretest and Posttest

	<u>Controlled Group</u>	<u>Experimental Group</u>	<i>Mean Difference</i>	<i>t</i>	<i>p-value</i>	<i>Analysis</i>
<i>Pre-test</i>	9.33	8.56	0.37	0.498	0.632	Not Significant
<i>Post-test</i>	16.00	21.78	5.78	-4.411	0.002	Significant

Table 4 revealed the significance difference in the learners mathematics performance of the controlled and experimental group in terms of pre-test and post-test. The pre-test result of the two group of learners has no significant difference as indicated in the ($p= 0.632$). The p value is higher than (0.05) level of significance which supported the result of the analysis. This means that majority of the learners has the same level of pre- existing knowledge about the content of the topic. On the other hand, the result of the post test of the two group of learners has significant difference. The controlled group attain the *Average* performance while the Experimental group attain the *Very Good* performance. The ($p= 0.002$) is lower than the (0.05) level of significance. This means that the collaboration of the instructional software games in the half day instruction can help the students to improve their mathematics performance.

A collateral disclosure has been advocated by Koney (2013) that post test is an assessment test given to group of examinees in order to evaluate what they have learned from lectures given on their behalf. Kelly (2017) contented that the teachers need to know the students' knowledge before the lesson begins. Pre-test is one way to make this determination to assess the students' proficiency that will be taught in the lesson. Therefore, before teaching, teachers should carefully review the results, the data from the pre-test. Pre-test helps measure students learning over a period of time and marks the level of understanding before the instruction. Meanwhile, posttest measures student learning. The comparison of these two tests can provide the teacher an opportunity to track the students' development.

Significant Effect of the Half-Day Instruction Program in Mathematics on the Learners Mathematical Performance

The table presented the impact on the use of computer-based instruction in terms of teachers' prerecorded video lesson, online tutorials video, and power point presentation on the learners' performance in the posttest.

Table 5. Significant Effect of the Half-day Instruction Program in Mathematics to the Learners' Performance in Mathematics in terms of Posttest

<u>"Half day" Instruction Program</u>		<i>t</i>	<i>p-value</i>	<i>Analysis</i>
Instructional Digital Games	Performance In Post Test	-.590	.048	Significant
Audio-Visual Materials		.056	.010	Significant

Table 5 present the significant effect on the learner's perception on half- day instruction program in the learner's performance in the post-test. The instructional games and audio- visual materials has significant effect on the learner's performance as indicate in ($p= .048, .010$) which was lower than the (0.05) level of significance. This implies that the Use

of collaboration of the instructional software games in the half day instruction can help the students to improve their performance.

This was supported by Chang, et al. (2012) that Game-based learning can provide an effective way to offer engaging and motivating learning experiences that would increase student interest in STEM content areas and improve student academic performance. Research in this review will show this instructional method may provide an avenue for educators to create learning experiences that challenge and engage students. Also, according to Natoli, (2011) the use of audio-visual materials in teaching and learning made teaching interesting to students and their teachers as well as creating better relationship in the classroom and promoting effective communication between the students and their teachers. Teaching aids have help students to retain knowledge better thereby making learning to be permanent; it enables students to retain and recall what they have learnt. This is made possible because they were able to visualize what was been taught in the classroom.

4. Summary of Findings

This chapter presents the summary, findings of the study, the corresponding conclusion and the subsequent recommendations in the light of the problem set in the study.

Summary of Findings

The purpose of the study is to determine the impact of collaboration of instructional digital games and audio-visual materials in “Half-day” Instruction Program to the performance of grade six students in Mathematics at Balanac Elementary School, Magdalena Laguna. It utilized eighteen (18) grade six students of Balanac Elementary School in Magdalena, Laguna S.Y. 2021 – 2022. The respondents will be divided into two groups alphabetically and classify as the controlled and experimental group of the study. It was purposely taken as a sample in this study since the researcher is the mathematics teacher of the respondents.

The main instrument used in this research study was a pre-test/post test prepared and modified by the researcher. A researcher-made questionnaire in the form of checklist was also prepared by the researcher to collect the needed data for the students. The pretest/post test and questionnaire were modified and validated for suggestions and enhancements before it was distributed to the respondents. The responses from the respondents were recorded, tallied, computed, and analyzed. The statistical treatments used in computing the data were mean, standard deviation, and t-test.

From the instruments that yielded the data gathered by the researcher summarized the following findings.

The mean of 4.64 indicates that the level of perception of the learners on the use of instructional games was Very High. And the mean of 4.09, indicates that the level of perception of the learners on the use of audio-visual materials was High. This indicates further the usefulness of the Half-day Instruction Program in Terms of instructional digital games and audio-visual materials help the learners to continue the education and motivates to attain the desired competencies for a specific learning area.

The pre-test exposes that the level of mathematics performance of the controlled group’s is described as Below Average ($M = 9.33$ $SD = 2.55$). The posttest indicates that the level of mathematics performance of the controlled group’s as Average ($M = 16.00$ $SD = 2.00$).

The pre-test exposes that the level of mathematics performance of the experimental group’s is described as Below Average ($M = 8.56$ $SD = 3.13$). The posttest indicates that the mean percentage score of the controlled group’s mathematics performance of the experimental is described as Average ($M = 21.78$ $SD = 2.68$).

The significance difference in the learner’s mathematics performance of the controlled and experimental group in terms of pre-test and post-test. The pre-test result of the two group of learners has no significant difference as indicated in the ($p = 0.632$). The p value is higher than (0.05) level of significance which supported the result of the analysis. This means that majority of the learners has the same level of pre-existing knowledge about the content of the topic. On the other hand, the result of the post test of the two group of learners has significant difference. The controlled group attain the Average performance while the Experimental group attain the Very Good performance. The ($p = 0.00$) is lower than the (0.05) level of significance. This means that the collaboration of the instructional software games in the half day instruction can help the students to improve their mathematics performance.

The significant effect on the learner’s perception on half-day instruction program in the learner’s performance in the post-test. The instructional digital games and audio-visual materials has significant effect on the learner’s performance as indicate in ($p = .048, .010$) which was lower than the (0.05) level of significance. This implies that the Use of collaboration of the instructional software games in the half day instruction can help the students to improve their performance.

Conclusions

In the light of the summary of findings of this study, the following conclusions were drawn.

The level of perception of the learners on the use of instructional digital games was Very High. And the level of perception of the learners on the use of audio-visual materials was High. This indicates further the usefulness of the Half-

day Instruction Program in Terms of instructional digital games and audio-visual materials help the learners to continue the education and motivates to attain the desired competencies for a specific learning area. The instructional digital games and audio-visual materials has significant effect on the learner's mathematics performance. Therefore, the null hypothesis of the study is hereby rejected. This also implies that the Use of collaboration of the instructional software games in the half day instruction can help the students to improve their performance.

Recommendations

In light of conclusions drawn from the findings, the recommendations of the study were as follows:

1. To School Administration

They may plan a classroom program that gives more time to explicit all the most essential learning competencies per learning area. Also divides class hours per week based on the weight of the learning area. Include on the school lac sessions or in the INSET of the teachers the correct planning and making the class program. They must Provide different trainings that will enhance the teacher's ability in utilizing the use of audio-visual materials and digital instructional software games. And include the procurement of materials that supports the audio-visual materials and instructional software game that may use in teaching and learning process.

2. To Classroom Teachers

They may explore and study more concerning in making a good quality classroom program for students. Make it more accessible, approachable, and adjustable for every learner. Attend different training and workshops that will enhance their ability in utilizing the use of ICT in their teaching strategies for more efficient teaching and learning process. Furthermore, Its still for their own professional development.

3. To Future Researchers

To ensure better academic performance, other researchers should be encouraged to conduct parallel studies regarding this study since the researcher have no choice but to used only eighteen (18) respondents due to pandemic and to find out the other materials and interventions that may helps in designing the classroom program. This research study will serve as a reference for future researchers who will conduct related study. They may develop their research in broader spectrum for further evaluation of results.

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