Effectiveness of Digital Simplified Activities in Improving the Performance of Grade 4 Pupils in Math

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Abstract —The availability of a wide range of technological resources could result positive effects in the classroom. In this digital era, technological resources are becoming increasingly available to support metamathematics education. To address the learning loss of the Grade 4 pupils in Math, this research was crafted which aimed to evaluate the effectiveness of digital simplified activities in improving the performance of Grade 4 pupils in Math. Utilizing the quasi-experimental research design employing the pre-test and post-test in Math for an in-depth analysis of the study, the researcher used the researcher-made test which covers the 1st quarter Most Essential Learning Competencies (MELCs) in Math. Simple Percentage, Weighted Mean and t-Test of Mean Difference were the statistical tools used. It was revealed on the study that there is a significant difference in the pre-test and post-test performances of the Grade 4 pupils in Math before and after the utilization of digital simplified activities in the lessons. The utilization of the intervention is effective due to the fact that it boosts the interest of the pupils and motivates them to be attentive in the discussion of the lesson which enable them to achieve the mastery of the skills and bale to improve their performance to the subject. Thus, digital simplified activities if utilize is effective in improving the performance of the pupils in Math.

Keywords — Effectiveness, Digital Simplified Activities, Performance, Grade 4 Pupils, Math

I. Introduction

Mathematics is a backbone of many disciplines such as engineering, science, business and computer science. Success in mathematics is not only required a development of cognitive and metacognitive skills, but also depends on the affective domain (Ke, 2008 & Su Ting Yong, et al., 2017), which is conceptualized by belief, attitude, and emotion (Su Ting Yong, et al., 2017). Other similar terms - “motivation”, “disposition” and “will” - have been interchangeably used in some literature (Chamberlin, 2010), but the focus of this study was to investigate the affective domain.

The Research has shown that students' attitude towards mathematics learning with technology is greatly influenced by their attitude about the subject itself and technology in general. For instance, students are more likely to have a positive attitude towards the use of computers in learning mathematics if they rated themselves highly in computer proficiency (Valle, 2008) and achieved good performance in mathematics (Barkatsas, et al., 2009). Thus, the study of belief, attitude, and emotion about mathematics learning with digital games should also include the investigation on mathematics and technological use.

Teaching in 2020 looks unique than any other year of education. Teachers are reevaluating what teaching looks like and how to best serve their students in unconventional setting. Whether a teacher teaching virtually or in the classroom following extreme safety measures to reconsider every teaching strategy chosen.

One of the positives of COVID-19 is the expansion of digital instructional activities. Most of the teachers engaged in digital activities for its competence and what this means for the world of education. There are four reasons why digital activities are perfect for any classroom setting and will remain important after pandemic life is over. First, are auto-grading features. Auto-grading using google sheets or google forms. This is created for you to automatically record the work of the pupils. It uses the digital math quick checks to review all the math standards for grades 3-5 and grades everything for all outputs. Second, digital activities are highly engaging for students. One of the concerns for teaching math in 2020 onwards was the potential of abandoning the hands-on component of math lessons, but with digital math activities there is space for virtual manipulatives. Another it saves a lot of trees for it will no longer be needing papers for the activities. Getting through every day of teaching needs loads of paper, particularly if you're implementing science centers. Digital math activities require no paper and often this means low preparation for teachers. Lastly, is you can instantly hear feedback for students. Students need as much support as possible without too much hand holding. The digital math pixel arts provide immediate students feedback in an engaging presentation.

Digital activities are similar to the traditional paper-and-pencil tasks teachers used for years except students complete them on a computer or handled device. Not only does this mean student can access their assignments from anywhere in the world, but it also means you can save a ton of money on copies. Digital activities have been gaining reputation over the past few years, but the events of 2020 have helped them increase rapidly to become a go-to resource for many teachers due to increased safety protocols and limited prospects for material-sharing.

Many types of digital activities developed over the past year, including interactive digital slides, Boom Cards, digital escape rooms, digital task cards and other paperless activities.

In the digital era, technological resources are becoming accessible to support mathematics education. Interactive software, open learning resources, applets, hypertexts, Internet portals, blogs, podcasts, videos, games, simulations, virtual learning environments, virtual reality,

augmented reality, and other resources that enable action, reflection, and interaction are available and at the range of teachers, parents, and students.

Digital activities have been achieving popularity for years and now. Besides the fact that they are fun, engaging, and easy-to-use, students love them and they help make learning accessible to all students from anywhere in the world. There are five digital math activities which creates engaging learning experiences for the students in a pandemic-proof classroom. Among these are interactive digital slides, boom cards, digital task cards, digital escape room, and digital worksheets.

One of the fastest things that emerged were interactive digital slides. This fun and appealing digital activities are simple and easy-to-make. The best part is you can use print resources to make these in a few quick steps. Once the activities get enclosed into the background of the slide, elements students can use to respond to the activity can be added on the upper layer, such as text boxes, drawing tools or matching objects, and even digital manipulatives. Other ideas, such as images with the solutions to the activity, can be added so students can place the images to the correct position on the slide.

Boom Cards are self-grading activities, like task cards, constructed to be interactive and "gamified" for students to provide an appealing learning experience. They are easy to use and provide instant feedback and performance data for teachers. Boom Cards can be utilized on android phones, tablets, Chromebooks, desktop computers, laptops, and interactive whiteboards. Boom Cards are also compatible with Google Classroom and can be sent via the Google Classroom platform.

During lockdowns, most of the children had engaged in using gadgets. It was observed that they are no longer interested in accomplishing their modules because they are busy with their games on cellphones and with this, parents find difficulty in encouraging them to do their task. As an intermediate Math teacher, the researcher thinks of some innovative project which will help address the problems faced by most parents with regards to the usage of cellphones. Thus, the researcher created some educational activities to be used in the classroom or even the pupils are learning at home. He created digital simplified activities to help the pupils learn mathematics while engaging themselves in digital games. And this is the reason why the researcher had conducted this research in order for him to evaluate the effectiveness of digital simplified activities in improving the performance of the grade 4 pupils in math. This is his way of helping the low performing pupils in Math which was assessed during the last quarter of the last school year. Anticipating that the intervention he is working will help achieve his goal of making all his pupils numerates and will learn mathematics while playing digital games. A proposed improvement plan was formulated based on the result of the study.

It is in the rationale that the researcher who is currently a Grade 4 teacher in L. Cabahug Elementary School, would like to delve worthy research undertaking that will benefit the school she is currently teaching and that of her Graduate Program she is enrolled at.

This study evaluates the effectiveness of digital simplified activities in improving the performance of Grade 4 pupils in Math in L. Cabahug Elementary School, Ormoc VII District, Ormoc City Division for School Year 2022-2023. The findings of the study were bases for the proposed improvement plan.

Specifically, this study sought to answer the following questions:

1. What is the pre-test performance of the Grade 4 pupils in Math before the utilization of digital simplified activities?
2. What is the post-test performance of Grade 4 pupils in Math after the utilization of digital simplified activities?
3. Is there a significant difference in the pre-test and post-test performances of the Grade 4 pupils in Math before and after the utilization of digital simplified activities?
4. What improvement plan can be proposed based on the findings of this study?

II. Methodology

Design. This study employed the quasi-experimental research design utilizing the pre-test and post-test to evaluate the effectiveness of digital simplified activities in improving the performance of Grade 4 pupils in Math for School Year 2022-2023. L. Cabahug Elementary School, Ormoc VII District, Ormoc City Division is the main locale of the study. The 34 Grade 4 pupils enrolled in the said locale for School Year 2022-2023 are the main respondents of the study and a researcher-made test which covers the 1st quarter Most Essential Learning Competencies (MELCs) in Math was used. Moreover, a digital simplified activities in Math was crafted as instructional materials in teaching Math. The researcher developed lesson plans of which digital simplified activities were integrated in the lesson. This research is focused in evaluating the pre-test and post-test in Math before and after the utilization of digital simplified activities and its significant difference. The Proposed Improvement Plan based on the findings of the study is the output.

Sampling. There are 34 Grade 4 pupils involved in this study. The tests were conducted personally by the researcher with consent from the Local IATF and strictly following the prescribed Health Protocol.

Research Procedure. The researcher prepared the research design and tools to be utilized in the study. Approval and recommendation from the Panel of Examiner of the Graduate Studies was sought. A letter request to conduct this study was forwarded to the Office of the Schools Division Superintendent. Upon approval, permission from the District Supervisor and School Head was secured before the actual gathering of data. Orientation of the participants and

administration of the pre-test was done through face-to-face after the approval of the permit from the parents of the respondents. After accomplishing the pre-test, intervention was given within four weeks. The utilization of digital simplified activities was emphasized in the development of the lesson. A matrix of activities was formulated to keep track of the activities during the data gathering process. After the four-week of intervention, post-test was administered. Results of the tests were collected. Data results were tallied and submitted for statistical treatment. Analysis and Interpretation of Data. Making of Proposed Improvement Plan followed.

Ethical Issues. The right to conduct the study was strictly adhered through the approval of the Schools Division Superintendent of the Division, District Supervisor, and School Head. Orientation of the respondents were conducted using face to face modality. In the orientation, issues and concerns were addressed and consent to be included in the study were signed.

Treatment of Data. The Simple Percentage and Weighted Mean were employed to evaluate the pre-test and post-test performances of the Grade 4 pupils in Math. **t-Test of Mean Difference** was used to determine the significant difference in the pre-test and post-test performances of the Grade 4 pupils in Math.

III. Results and Discussion

Table 1
Pre-Test Performance of Grade 4 Pupils in Math

Score Range	Description	PRETEST	
		Frequency	%
25-30	Excellent	1	2
19-24	Very Good	7	21
13-18	Good	22	65
7-12	Fair	4	12
1-6	Poor	0	0
Total		34	100
Weighted Mean		**16.35**	**Good**

Table 1 presents the pre-test performance of Grade 4 pupils in Math. It was revealed on the table that among the 34 Grade 4 pupils, 1 or 2% got a score of 25-30 which is interpreted as excellent, 7 or 21% got the score of 19-24 which is very good, 22 or 65% got the score of 13-18 which is interpreted as good and 4 or 12% got the score of 7-12 which is fair. Moreover, the pre-test performance of the Grade 4 pupils in Math has a weighted mean of 16.35 which is interpreted as good. This means that most of the Grade 4 pupils got the score of 13-18. This implies that there are some pupils who scores higher than the required passing score because

some of them have already able to master some of the skills tested. On the other hand, there are also some pupils who did not get the passing score which means that they need intervention to achieve mastery level. In two years of implementing modular learning modality, most of the pupils had resorted to gadgets in learning and in playing. Thus, it is relevant to create activities which uses gadget to make learning in Math easier and motivating. And the result of the pre-test is evident that they need intervention like the digital simplified activities to be integrate in their math lessons.

Table 2
Post-Test Performance of Grade 4 Pupils in Math

Score Range	Description	POST-TEST	
		Frequency	%
25-30	Excellent	22	65
19-24	Very Good	12	35
13-18	Good	0	0
7-12	Fair	0	0
1-6	Poor	0	0
Total		34	100
Weighted Mean		**26.09**	**Excellent**

Table 2 presents the post-test performance of Grade 4 pupils in Math. It was revealed on the table that among the 34 Grade 4 pupils tested, 22 or 65% got the score of 25-30 which is interpreted as excellent and 12 or 35% got the score of 19-24 which is interpreted as very good. Moreover, the post-test performance of the Grade 4 pupils in Math got a weighted mean of 26.09 which is excellent. This means that the intervention provided by the researcher helps improve their performance. This implies that the digital simplified activities provided by the teachers in teaching Math has motivated the pupils to learn the subject as digital activities have been popular in this digital era. Besides the fact that they are fun, engaging, and easy-to-use, students love them, and they help make learning accessible to all students from anywhere in the world. The digital activities provided by the teacher which creates engaging learning experiences for the students in a pandemic-proof classroom. Among these are interactive digital slides, boom cards, digital task cards, digital escape room, and digital worksheets. Thus, this instructional activity is effective in improving the Math performance of the Grade 4 pupils.

Table 3
Test of Difference Between the Scores in the Pre-Test and Post-Test of Grade 4 Pupils in Math

Aspects	Test Scores		Computed T	Critical T	Decision	Interpretation
Grade 4 in Math	Pre Post	16.35 26.09	1.995	0.331	Reject H_o	Significant

Table 3 presents the test of difference between the scores in the pre-test and post-test of Grade 4 pupils in Math. It was revealed on the table that the computed value of t of 1.995 is greater than the critical value of t which is 0.331, so null hypothesis is rejected. The weighted mean in the pre-test performance of 16.35 had increased to 26.09 in the post-test after the integration of intervention of digital simplified activities in Math. This means that there is a significant difference in the pre-test and post-test performances of the Grade 4 pupils in Math. This implies that the digital simplified activities provided to the learners during their math lessons helps improve their performance. Digital simplified activities are versatile and can be used in a variety of ways. In today's classroom, teachers have more tools to help pupils understand mathematical concepts and a balanced of traditional and modern methods of teaching can help pupils of all abilities. Technologies are essential in teaching and learning mathematics; they influence what is taught and enhances pupils' learning. Mathematics is not only a subject; it relates to many things in human's daily life. This study provides students with definite basic life, skills, and processes that will prepare them to be productive members of society. Proper and organized utilization of innovation impacts each aspect of mathematics education: what mathematics taught, how mathematics taught and learn, and how mathematics is evaluated. Adjustments in mathematics including the use of technology have been already practiced for several years. The teachers who utilize resources to enhance their classroom such as computers, tablets, and other technology along with concrete materials can connect materials with effective and developmentally suitable tasks in which students can engage — learning mathematics with technological advancements engage students in more active mathematical practices such as experimenting, analyzing, reasoning and problem-solving.

IV. Conclusion

Results of the study revealed a significant difference in the pre-test and post-test performances of the Grade 4 pupils in Math before and after the utilization of digital simplified activities in the lessons. The utilization of the intervention is effective due to the fact that it boosts the interest of the pupils and motivates them to be attentive in the discussion of the lesson which enable them to achieve the mastery of the skills and bale to improve their performance to the

subject. Thus, digital simplified activities if utilize is effective in improving the performance of the pupils in Math.

V. Recommendations

1. The proposed improvement plan formulated should be utilized;
2. Teachers should create digital simplified activities in Math;
3. Teachers are encouraged to submit their digital simplified activities for quality assurance;
4. Teachers should craft intervention to address the learning losses of the pupils in Math;
5. Teachers should attend in-service trainings to improve their teaching and learning strategies;
6. Teachers should ask support from the school heads for technical assistance and materials to be used in making learning resources for the pupils;
7. School Heads should craft trainings design and submit for approval and conduct training for the improvement of learning resources to be used in teaching;
8. School Heads should encourage the teachers to create innovative materials, strategies and projects for the improvement of the performance of the pupils;
9. Schools Heads should encourage the parents to support the teachers in making learning to happen among the learners;
10. School Heads should provide appropriate technical assistance to the teachers to improve their performance in teaching so as to improve the performance of the pupils; and
11. Future researchers should replicate this study to include different locale and include different variables aside from the mentioned in this study.

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AUTHOR'S PROFILE

MR. JOEY N. CODILLA

The author is Mr. Joey N. Codilla. He was born on February 04, 1996 at Kadaohan, Ormoc City, Leyte which is also where he is presently residing. He finished his primary education at Valencia Central School, Valencia, Ormoc City, Leyte in the school year 2007-2008 and continue his quest for education and able to finish his secondary education at Valencia National High School, Valencia, Ormoc City, Leyte in the year 2011-2012. After his graduation in high school, he decided to enroll his tertiary education to achieve his dream of being a teacher. He enrolled in St. Peter's College Ormoc City and in school year 2015-2016, he finished his degree, Bachelor in Elementary Education and in the same year he took the Licensure Examination for Teachers and able to pass. After graduation in college, he applied for teaching position in Sts. Peter and Paul School House Corporation. He teaches elementary pupils and at the same designated as the assistant principal. Dreaming to continue his quest for education, he enrolled his graduate program, Master of Arts in Education major in Supervision and Administration at Western Leyte College Ormoc City. At present, he is currently enrolled Thesis 2 and in God's precious gift, he will be finishing his thesis writing and soon to finish the degree.

Having served the educational institution as classroom teacher for almost 6 years where at present he is the Grade 4 teacher in L. Cabahug Elementary School, Ormoc District 7 in Ormoc City Division, he engaged himself in enhancing his capabilities in Information and Communication Technology where he is the School ICT Coordinator. With his dedication and commitment as a teacher, inspires him to continue improve, strive more, and grow professionally. Which enables him to touch the lives of his learners through teaching. He also attended series of trainings conducted in the school, district and division. His dream of becoming an illustrator, digitizer and creator of digital story books and other activities inspires him to conduct his study entitled: Effectiveness of Digital Simplified Activities in Improving the Performance of the Grade 4 Pupils in Math". Hoping that through this research study, this could be implemented not only in the school where he is currently teaching but also in the district and division where he belongs.