IMPROVING GRADE 6 NUMERACY SKILLS IN ADDITION AND SUBTRACTION OF FRACTIONS THROUGH DIGITIZED SELF-LEARNING KIT

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ABSTRACT

Nowadays, we are all staying in our homes due to the lockdown and community quarantine policy implemented by the Government. However, learning should not halt. To address quarantine issues, the Division of Ilocos Sur had an orientation on the preparation of learners' self-learning kits (SLKs) based on the K to 12 most essential learning competencies (MELC). Learning fractions is one of the mathematics fundamentals that students must possess; however, the competencies in addition and subtraction of fractions were the least mastered as perceived in the Test Item Analysis of Pias ES during the 1st Periodic Examination for Grade 6 pupils for the SY 2021-2022. This study aimed to determine the effectiveness of Digitized SLK in improving the numeracy skills of Grade 6 pupils of Pias ES. It sought to determine the level of the numeracy skills of Grade 6 pupils in Math before the implementation of Digitized SLK; the level of numeracy skills of the Grade 6 pupils in Math after the implementation of Digitized SLK; the rate of pupils with improved performance; and the significant difference between the level of performance of the pupils' respondents before and after the implementation of the Digitized SLK. A teacher-made test was used in gathering data aligned to the leat mastered competency in mathematics and made use of one-group pre-test-posttest design and the data were analyzed using mean t-test and gain percentage. The results found out that there is a significant increase from needs improvement to very satisfactory level of performance. This implies that teaching Mathematics with Digitized SLK is effective and could enhance the mathematical performance of Grade 6 learners. It is therefore recommended that Grade 6 Math teachers should use the Digitized SLK in distance learning during the new normal of education.

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CONTEXT AND RATIONALE

Education is the key for generations of Filipinos to become full-pledged, productive members of society. Therefore we should be looking at how the nation will go back to school this coming August (S. Angara, 2020).

Nowadays, we are all staying in our homes due to the lockdown and community quarantine policy implemented by the Government. However, learning should not halt. Different countries worldwide have introduced various answers during the pandemic to continue the education process – the introduction of distance learning. These are online learning platforms such as google, TV broadcasts, guidelines, resources, video lectures and online channels were introduced (UNESCO, 2020). Thus, the Department of Education adopt numerous learning delivery options such as but not limited to face-to-face, blended learnings, distance learnings, and home-schooling and other modes of delivery (DepEd, 2020).

Manila Times' 2020 on "New Normal" featured that the Department of Education (DepEd) announced that classes for the next school year would begin on August 24, 2020. Classes may start earlier, but there will be no physical return to school. DepEd is offering schools a menu of alternative learning methods that incudes online learning and offline methods, such as take-home readings and activities.

To address quarantine issues, the Division of Ilocos Sur through DM. No. 103 s. 2020 on orientation on the preparation of learners' self-learning kits (SLKs) based on the K to 12 most essential learning competencies (MELC), the Curriculum Implementation Division (CID) is mandated to provide alternative delivery mode of instruction to allow home schooling activities in lieu of the days the learners are not in physical contact with teachers. One operational modality is the provision of simplified learners' self-learning kits which are enriched with interactive learning activities and assessment tools aimed to deepen understanding of concepts and mastery of the skills and competencies in all the learning areas.

Learning Kit is very important in teaching and learning process. The use of learning kits can facilitate the process of information sharing among students with respect to subjects taught more clearly (Hanif, Azman, Pratama & Ma'arof, 2016). The learning kit aims to help students understand the subject more easily and systematically (Musa & Mohamad, 2013).

A Self-Learning Kit or SLK is an innovative Learning Material originally made, produced, modified or contextualized by a teacher to meet the standards of the most essential learning competencies (MELC) in providing the teachers and learners a relevant and localized content. Moreover, Self-Learning Kit is suited for the new generation of learners who are described as self-directed learners.

However, our society often talks that their kids at school are taught using the traditional methods. It is boring for kids, and they lose interest in learning. New generation of kids are different – more provocative, intuitive, sensitive, mental, in some cases more aggressive than previous generations. That is what parents and teachers now see (Cunska & Savicka, 2012).

Digital Technology can make an important contribution to the improvement of teaching-learning process by elevating education across all areas of Curriculum for Excellence. If used effectively and appropriately, digital technology can improve learning and teaching, equip our children and young people with vital digital skills and crucially, it can lead to improved educational outcomes. Based on these technological developments, the teaching media is divided into four parts, namely: (1) Media resulting from printing technology, (2) Media resulting from audio-visual technology, (3) Media result of computer-based technology, (4) Media combined print technology and computers (Dekdouk, 2012).

Digitalization of education is a powerful trend in terms of reformation and modernization of global education environment. Digitalization means transformation of all information types into digital language (Machekhina, 2017).

Distance education, based on new digital technologies opportunities, is a separate issue in terms of education digitalization trend. One of the core benefits of integrating digital technologies in education process is that a teacher can control the practical efficiency of teaching process, the quality of educational material mastering, the time spent by a student to solve certain task, the level of new information understanding etc., whereas traditional control methods ensure “rough” performance assessment (Machekhina, 2017).

Based on a study on the impact of using multimedia interactive programs at children ability to learn basic math skill, the results showed that in such math skill at this age, using programs or multimedia enhanced methods of teaching can be effective in getting students attention especially when cartoon characters are used (Nusir, S., Alsmadi I., Alk-Kabi M., & Fatima S., 2012).

According to the study of A. Cunska and I. Savicka (2012), our pedagogical experience for 20 years in secondary school, regular observation of students in lessons and out-of-lessons activities, teaching teachers as well as continuous contact with students draw us to conclusion that student’s interest to lessons of Maths raises if the lessons are organized by using interactive methods and ICT tools. Those forms of work promote better understanding of theme because they go “through the student”, they are not pressed from outside.

In addition, teaching a lesson using ICT tools demands from a teacher skill of computer-user, skills of using multimedia technologies, much work for preparation the lesson and a lot of time. But the time used is invested in working out materials, practicums and lessons what becomes teacher’s intellectual baggage for oneself and for others. The main prize is increasing students’ interest in the subject taught, help in using ICT in order the educational process becomes more successful (A. Cunska and I. Savicka, 2012).

Moreover, the study conducted by M.L. Mascia, et.al. (2018) revealed that effects of a digital experience are particularly evident in some specific numerical areas, such

as accuracy, speed, semantic and syntactic numerical knowledge. Also, participants with greater experience of digital trainings score higher on spatial orientation.

Furthermore, Adaptive instruction can provide teachers with supports to attend to individual students' needs in ways that would be more difficult without technology. Using technology can help keep students "on task" doing mathematics with support and feedback from a computer while a teacher directs attention to individual students. This can be enabled teachers to focus their limited instructional time to differentiate their instruction to the needs of individual students. In blended learning theory technology can thus both free teachers from the need to orchestrate the large group's minute-to-minute activity and provide teachers with student performance data to guide individualized instructional decision making (Shechtman, N., Roschelle, J., Feng, M., & Singleton, C., 2019).

Since digital learning is far more interactive and remarkable than the texts written on a paper, they offer better context and more engaging activities than traditional education methods. This allows students to better connect with the learning material.

In the digital age, this study touches upon the ways to improve the numeracy skills of Grade 6 pupils in addition and subtraction of fractions.

Moreover, learning fractions is one of the mathematics fundamentals that students must possess; however, children encounter fractions as the most complicated mathematical concepts in primary and even in their middle years in school (Gagani & Diano, 2019).

The above situation was also true in Pias Elementary School. Based on the result of 1st Periodical Examination of Grade 6 Math for the school year 2021-2022, the competencies in addition and subtraction of fractions were the least mastered as perceived in the Test Item Analysis.

Therefore, teacher competencies in both pedagogy and technology should be reinforced (Basilia & Kvavadze, 2020).

The aforementioned needs and facts contributed to the desire of the researcher to look into the pupils' related factors which may affect the pupils' level of numeracy skills.

Since the goal of educators and instructional designers is to maximize the process of learning, consideration for students' perceptions and ultimate attention to presented material is relevant (Miner S. & Stefaniak J., 2018). This study aimed to determine the effectiveness of digitized self-learning kit in improving the numeracy skills of Grade 6 pupils of Pias Elementary School. Lastly, this study sought to find out if there is a significant difference between the level of performance of the pupils' respondents before and after the implementation of the Digitized Self-Learning Kit.

Interpreting the results of this study will guide the school administrators and Math teachers at Pias Elementary School in providing appropriate intervention for the pupils.

INNOVATION, INTERVENTION, AND STRATEGY

This study was confined in determining the effectiveness of digitized self-learning kit as a tool in teaching addition and subtraction of fractions. Also, it assessed the numeracy skills in addition and subtraction of fractions among the Grade 6 pupils of Pias Elementary School, Salcedo, Ilocos Sur. This study involved 17 Grade 6 pupils composed of (7) seven boys and (10) ten girls.

The data gathered in this study were limited to what was measured by the instrument made by the teacher-researcher.

The researcher designed and developed digitized self-learning kit based on the approved self-learning kit of the Schools Division of Ilocos Sur.

In addition, the pupils used their smartphones for the implementation of digitized self-learning kit. 100% of the enrollees in Grade 6 have their own smartphones at home based on their Learner Enrollment Survey Form.

In designing the tool used in the research; the following procedures were utilized for the experimental group:

1. A digitized self-learning kit was developed to cover two from most essential learning competencies (1. adds and subtracts fractions with and without regrouping and 2. solves routine and non-routine problems involving addition and/or subtraction of fractions using appropriate problem-solving strategies and tools) in Math 6.
2. The self-learning kit approved by the Schools Division of Ilocos Sur was digitized with the used of Microsoft Office 365 and Filmora App and was used for learning addition and subtraction of fractions.
3. The pupils interacted with the digitized self-learning kit. A pre-test was given before using the digitized self-learning kit and a post-test was administered after accomplishing the digitized self-learning kit.

ACTION RESEARCH QUESTIONS

The main objective of this study was to determine the effectiveness of Digitized Self-Learning Kit in improving the numeracy skills in addition and subtraction of fractions of Grade 6 pupils of Pias Elementary School, Pias, Salcedo, Ilocos Sur during the school year 2021-2022.

Specifically, it sought answers to the following questions:

1. What is the level of the numeracy skills of Grade 6 learners in Math before and after the implementation of Flipped Learning?
2. Is there a significant difference between the mathematical skills of the respondents before and after the implementation of the Flipped Learning?

ACTION RESEARCH METHODS

This chapter presents a discussion of the population, research design, sources of data, research instrument, data gathering procedure and statistical treatment of data used in the study.

a. Participants and/or other Sources of Data and Information

The study used one group pretest-posttest design of research to determine the effectiveness of the Digitized SLK as a method in improving the mathematical skills of the Grade 6 learners of Pias Elementary School. This design was appropriate since the study aimed to enhance the numerical skills in solving addition and subtraction of simple fractions and mixed numbers without or with regrouping through Digitized SLK.

The respondents of the study were 17 Grade 6 learners composed of seven (7) boys and ten (10) girls. They were presently enrolled learners of Pias Elementary School for school year 2021-2022. Total enumeration of Grade 6 learners was considered as respondents of the study because based on the result of the evaluation given after the lesson on solving addition and subtraction of simple fractions and mixed

numbers without or with regrouping, all learners have difficulties in understanding the lesson due to very low-test results.

b. Data Gathering Methods

The data was taken from the results of the pretest and post-test administered to the 17 Grade 6 learners of Pias Elementary School, Pias, Salcedo, Ilocos Sur enrolled for school year 2021-2022.

In the conduct of the study, the researcher made use of a teacher-made test which is based on the Grade 6 Mathematic competencies on solving addition and subtraction of simple fractions and mixed numbers without or with regrouping. The test was composed of 30 items.

The Flipped Learning is a method, and a type of blended learning wherein teacher-made video lessons were used for the discussion outside the classroom and interactive learning activities were implemented inside the classroom.

The teacher-made test was reviewed and validated by three (3) Mathematics teachers of Salcedo District and Mr. Nestor G. Villaflor, EPS-Math, to determine the extent to which the items of the test are representative of the entire domain the test seeks to measure. They used Content Validity form to rate the test items. The researcher personally conducted the study in their school.

Likewise, the level of performance of the learners during the pretest and posttest.

c. Data Analysis Plan

The data was statistically analyzed to come up with reliable results. The following tools were used in the treatment data.

1. Mean ($\bar{x}$) was used to determine the level of numerical skills of the learners during the pretest and posttest.

2. Standard deviation (sd) was used to determine the variability of the scores.

3. One sample t-test (t) / paired was used to determine if there is a significant difference between the pretest and posttest scores of the respondents.

DISCUSSION OF RESULTS AND REFLECTION

PROBLEM 1. What is the level of the numeracy skills of Grade 6 learners in Math before and after the implementation of Digitized SLK?

TABLE 1. Pretest and Posttest Results of the Grade 6 Pupils

Items	Pre-test	Posttest
Number of Respondents	17	17
Number of Points	30	30
Lowest Score	5	16
Highest Score	18	30
Mean	11.18	24.06
Descriptive Level	Needs Improvement	Very Satisfactory
Standard Deviation	4.14	3.68
Coefficient of Variation	35.95	14.85

The presentation and evaluation of treated data were divided according to the problems presented. The following tables showed the data for all the interpretations in the discussions. Table 1 presented the level of numerical skills of the Grade 6 pupils of Pias Elementary School and showed that there were 17 pupils who took 30-item test. The lowest score obtained during the pretest is 5 and 16 in the posttest. The highest score obtained during pre-test was 18 and 30 in the posttest. It is reflected that the mean in the pretest was 11.18 described as Needs Improvement (NI), while in the posttest was 24.06 described as Very Satisfactory (VS). The standard deviation in the pre-test was 4.16 which was slightly higher than 3.68 in the posttest. The coefficient of variation in the pre-test was 35.95 which was higher than 14.85 in the posttest.

PROBLEM 2. Is there a significant difference between the mathematical skills of the respondents before and after the implementation of the Flipped Learning?

TABLE 2. Comparison of the Pre-test and Posttest Performance of the Grade 6 Pupils

Mean	Mean Difference	Computed t-test	Tabular Value	Decision
Pre-test 11.18 Posttest 24.06	12.88	22.18	2.12	Reject Ho

Level of significance- 0.05
Degrees of freedom (n-1)- 16

Table 2 showed the significant difference in the levels of mathematical performance of Grade 6 pupils between the pre-test and posttest. It further revealed that the mean in the pretest was 11.18 while 24.06 in the posttest. The mean difference was 12.88. The computed t-test was 22.18, which was greater than the tabular value of 2.12 at 0.05 level of significance with 16 degrees of freedom. Hence, the null hypothesis was rejected. This implies that the Digitized SLK is effective in improving the numeracal skills of Grade 6 pupils.

Based on the findings, the following were reflected:

1. The level of the numeracy skills of the pupils improved from “Needs Improvement” in the pre-test to “Very Satisfactory” in the post test.

2. The Percentage of pupils with improved performance is high.

3. The use of Digitized SLK is an effective strategy in improving the level of numerical skills of the pupils.

ACTION PLAN

ACTION RESEARCH WORK PLAN AND TIMELINES

ACTIVITIES	Feb. 2022	March 2022	April 2022	May 2022	June 2022	July 2022
Submits proposal to the Regional Research Committee.	■					
Presents study during the proposal.		■				
Coordinates with the target/respondents/discusses the consent form.			■			
Prepares the tools for the intervention of the study.			■			
Conducts research and implement the intervention for the study incorporating suggestions of the RRC.				■		
Analyzes and interprets the results of the data gathered.				■		
Writes the initial draft of the study.					■	
Consults validators of the result study.					■	
Checks, edits, and incorporates suggestions from the validators.					■	■
Submits the full-blown research at PPRD-RO1.						■

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