



Utilization of Concrete-Pictograph-Abstract Approach on the Performance of Learners in Mathematics 2

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ABSTRACT

This action research utilized to improve the mathematics performance of grade 2 pupils in San Vicente Elementary School using Concrete-Pictograph- Abstract approach as learning intervention tool in the learning process. This study aims to 1) improved the level of mathematics performance of the learners who are subjected to the CPA approach, 2) find out the learning motivation and level of participation of grade 2 pupils. This study is pre- experimental study involving 24 pupils with one group pretest and a posttest. The intervention was employed during their 3rd quarter period school year 2022-2023 and was used for four weeks. The researchers-made instrument used was validated by the advising teacher, mathematics teacher and the school principal consisting of 30 test items. The data analysis technique used paired sample T-test to see the improvement of mathematics performance and descriptive analysis to explain the data collected from the study. It was revealed in the pre and post-tests that the average scores of the participants exhibited a significant difference. The mean score in pretest ($M=6.38$) while in post-test is higher ($M=28.17$). The results showed that CPA approach has a significant difference in the mathematics performance of grade 2 pupils thus; learning using the CPA approach increased the motivation and participation of the pupils.

Keywords: Abstract Approach, Concrete, Mathematics Performance, Motivation, Pictograph.

INTRODUCTION

CONTENT AND RATIONALE

Mathematics plays an important role in accelerating a nation's social, economic, and technological growth. To develop global competence, students need to have a solid foundation in mathematics, the young learners can put these talents into practice, the more probable it is that our society and economy will continue to be innovative. Several concerns are traveling to many elementary mathematics teachers today. They are undergoing role changes for various reasons and this changes in expectations of what mathematics teachers should be able to accomplish are related to a variety of issues such as the push for higher achievement in mathematics back to basics pressures state and federal legislation concerning education and the increasing pressure on students and teachers (Reisman, 2001).

Studies have shown that many people's images of mathematics are negatively and is perceived as difficult in many cultures and largely masculine. Some societal views about Mathematics such as mathematical problems have one answer and can be solved in a particular way and its solitary activity done by individuals in isolation requires good memory and is for clever ones. People view it as a difficult subject and as such their performance is affected. Pupils seem not to have encouragement from people outside the school system. Teaching experience contribute to poor academic performance in Mathematics at Ordinary Level (Makondo, 2020).

According to Putri (2020), one of the main issues discussed in the field of mathematics education is how students can possess mathematical abilities at every level of education. The ability to think mathematically becomes guidance for all learners to solve life problems. There are many kinds of mathematics abilities needed to be developed to improve the quality of learning achievement, and foster students' mindset to face the challenges of the times. Bernard and Senjayawati (2019) said that a human being can develop logical, analytical, systematic, critical, and creative thinking skills, and cooperative abilities applied in daily inhalation through mathematics.

In an international assessment for mathematics and science for Grade 4 students, Filipino students came in last out of 58 countries, it is stated by the Trends in International Mathematics and Science Study 2019 (TIMSS).

As the world continuously facing a COVID-19 pandemic, it affected a lot of people in every country, mostly in the community, the industry, the businesses of the people, their income, their lifestyle, and even education. The COVID-19 pandemic has a severe impact on education as they declare a lockdown as a response to the situation. COVID-19 has disrupted traditional schooling across the country by promoting distance learning, such as Modular, Online,

and Hybrid as a mode of teaching in which students can learn even when they are at home by relying more on their own resources such as the Internet, data, laptops, cellphones, and other materials or platforms that they can use.

Since the school promotes distance learning as the mode of their teaching. It seems that the interaction and various skill development opportunities that Face-to-Face interaction provides has been disrupted. As a result, it affects the performance of the students. The re-opening of face-to-face class seemed challenging to both teachers and pupils. According to the principal of the San Vicente Elementary School, it does not guarantee the successful learning of the students, especially the grade 2 pupils who did not experience face-to-face class instruction. It was proven that their performance on the mathematics was very poor when they took the Regional Diagnostic Test. 7% out of the 26 pupils passed the minimum proficiency level (MPL). The result did not meet the proficiency level based on the interpretation of result made by the teachers. The students were having difficulty grasping basic mathematical concepts, they received low scores on summative exams and quizzes. As a result, the students' low level of performance in mathematics was identified as one of the school's main problem.

The researchers observed the pupils from the grade 2- Lotus in San Vicente Elementary School have difficulty in learning the subject mathematics because of the following reasons; (a) is the lack of instructional resources that the teacher used in teaching mathematics. It was admitted by the teachers of the school that due to loads of paper works, they had no time to prepare the materials. They only used chalk and board in teaching the lessons in mathematics which cannot guarantee the successful learning of the pupils; and (b) Second reason is lack of understanding on the basic concepts and number sense of the pupils that result to low level of academic performance. Since, they did not experience the face-to-face instruction on previous years, teachers are having a problem on how to teach the basic concepts to their students to understand more difficult concepts in mathematics.

The fact that the diagnostic test results showed that students' academic performance in mathematics is low. These will become a problem for teachers and students in the learning process. This is supported by the research results of Sulistiawati (2014), which revealed that the low ability of students' mathematical reasoning was due to a lack of active students involved in learning mathematics. Additionally, according to Nasution (Fuad et al., 2016), the low ability of students' mathematical reasoning was affected by the provision of instructional material by teachers, which is only equipped with examples and practices.

The Concrete Pictograph Abstract (CPA) approach is a learning system that uses physical and visual aids to help children understand abstract concepts. Using concrete resources, students are introduced to a new mathematical concept (e.g. fruit, Dienes blocks etc). They are given problems with pictures when they are comfortable solving problems with physical aids. These problems are usually pictograph representations of the concrete objects they were using. Then they are asked to solve problems where they only have the abstract i.e. numbers or other symbols. Building these steps across a lesson can help pupils better understand the relationship between numbers and the real world, and therefore helps secure their understanding of the mathematical concept they are learning (Johnson, 2022).

The researchers will implement the CPA approach throughout the discussion, as the Concrete known as "doing" the practice teacher will use concrete or real objects to model the problem and will be used in the motivation part of the lesson. Then they will use Pictograph to introduce the topic using technology to help the pupils visualize the topic, as it was known for "seeing stage" and for the Abstract that also known for "symbolic stage" they will use this approach to introduced the concept at a symbolic level in number form and will use on the application of knowledge or in the form of assessment.

The overall goal of this study is to improve the performance of Grade 2 Pupils on Basic Mathematical concepts using CPA approach as an intervention.

Review of Related Literature

The Concrete, Pictorial, Abstract approach (CPA) is a highly effective approach to teaching that develops a deep and sustainable understanding of math in pupils. The teaching approach was similar and was based on Jerome Bruner's idea from 1960. CPA approach consists of three stages where students learn through physical manipulation of concrete objects, followed by learning through a pictorial representation of a concrete manipulation, and ends with solving problems using abstract notation (Witzell, 2005).

Ban Har (2013) explains the principles of the Concrete, Pictorial, Abstract framework. The "doing" stage is concrete. Students will use concrete or tangible objects to model problems at this stage. Unlike traditional math teaching methods, in which teachers demonstrate how to solve a problem, the CPA approach will bring concepts to life by allowing children to interact with and experience real (concrete) objects. The "seeing" stage is pictorial. To model problems, visual representations of concrete objects are used. This stage encourages children to form a mental link between the physical object and the pictorial object so that they can handle the abstract pictures, diagrams, or models that they build or draw. This helps children understand difficult abstract concepts and models that represent the objects in the problem. The "symbolic" stage is abstract, where children use abstract symbols to model problems. The abstract stage involves the teacher introducing abstract concepts. Children are introduced to the concept at a symbolic level, using only numbers, notation, and mathematical symbols such as the four operations: addition, subtraction, multiplication, and division. With the CPA Approach, every abstract concept is first introduced using physical, interactive concrete materials. Students will not progress to this stage until they have demonstrated that they have a solid understanding of the concrete and pictorial stages of the problem.

Learning with CPA approach provides a conceptual framework to create a meaningful relationship between the stages of concrete, pictorial, and abstract understanding. The learning stages within CPA approach according to Flores (2010) are as follows: (1) Choose concrete materials (manipulative) which will be used to introduce conceptual understanding of a lesson that will be learned by the students;(2) Guide the students to independently participate in using the concrete materials (manipulative) by giving them direction and sign; (3) Change the use of the manipulative materials with pictures or paintings; (4) Use strategy that could help the students memorize learning previously conducted. It functions as a transition process from the use of pictures or

paintings to the use of numbers or symbols; and (5) Encourage the students to only use numbers or symbols in completing mathematics exercises given, and this activity is focused on mastery.

In the learning process with CPA approach, there is a manipulative aspect which is called to contain advantage and trick at the same time. As a fun factor, learning by using manipulative materials can enhance students' disposition and attitude in class (Cooper, 2012).

However, the use of manipulative materials has a tricky potential when the students consider the learning as a playing activity rather than as an opportunity to enhance their understanding of mathematics (Cooper, 2012).

The enhancement of elementary school students' mathematical connection ability can be done through appropriate learning approaches. Elementary school students who are, in average, between 7-12 years old are still in the concrete operational stage as stated by Piaget (Desmita, 2008) that, in this day and age, students should think logically about concrete events and classify materials into various shapes but based on the diagnostic results students did not attain the intended learning outcomes.

Mathematics learning in elementary school must use something real and concrete so that students can be expected to understand the learning better, especially the connection in daily use. To achieve the greatest possible improvement in student academic performance when learning with the CPA approach, it is necessary to devote a large amount of time to discussing and preparing the subject matter provided at each stage of learning with the CPA approach. As a result, students can learn the material thoroughly at each stage (concrete, pictorial, abstract).

This is in accordance with the opinion of Jordan, et al. (2007) which stated that the CPA approach benefits the majority of students and has proven to be very effective in helping students who have difficulties in learning mathematics, because the CPA approach progresses gradually from actual objects to images and then symbols as a result, it is clear that the three stages of CPA learning provide opportunities for students with low ability to improve their academic performance.

Additionally, Hoong, et al. (2015) also expressed that the CPA approach is used to help students who have difficulties in learning, Mathematics and CPA approaches have also been reported to be effective in recovering deficits in basic Mathematics calculations.

CPA has its own characteristics and strengths. Colham Manor Primary School & Children's Center (2016) recognized that the CPA approach is a mainstay of Mathematics learning in Singapore.

The importance of the use of manipulative materials is also stated by Skemp (Turmudi, 2012) that manipulative materials in mathematics learning can be used as a foundation to learn more abstract lessons. It is in line with Bruner (Suwangsih, 2012) who states that interaction with manipulated concrete materials can help students memorize and implement mathematics ideas learned in solving the issue in the real world correctly.

Similarly, Brownell (2012) states that the use of concrete materials to be manipulated can help students to understand the meaning of concepts and skills learned. Therefore, according to the aforementioned studies, the use of concrete materials to be manipulated can be very meaningful in the effort to develop and enhance students' mathematical ability

Learning with CPA approach is advantageous for most students and has been proven effective to help students who have difficulty in learning mathematics because this CPA approach is gradual from learning through real materials to through pictures then through symbols (Jordan, et al. 2007). Students often feel frustrated when teacher gives a mathematical issue only in abstract form. Teachers need to develop concepts to control mathematical content and to provide teaching which allow students to process new learning more meaningfully and effectively.

According to Cooper (2012) in teaching and learning with CPA approach there are manipulative aspects which are said to be a source of benefits and pitfalls at the same time, the benefits of learning with the use of manipulative objects will enhance the students' dispositions and attitudes towards learning in the classroom. The trap when students prefer to regard the use of manipulative objects as play events to fill the spare time rather than to provide an opportunity to improve their understanding of mathematics.

Therefore, it can be concluded that learning with CPA approach is a learning approach which pays attention to the order of the three learning stages, starting from the use of concrete materials, then students are given opportunity to create pictorial representation from the concrete materials, and finally students work in abstract notation. It is expected that by doing the three learning stages, students will understand the mathematical concepts clearly and correctly and feel a direct advantage when learning mathematics.

It is important to recognize that the CPA model is a progression. By the end of the third quarter, children need to be able to go beyond the use of concrete equipment to access learning using either pictorial representations or abstract understanding.

Conceptual Framework

Jerome Bruner developed the CPA Approach, which stands for concrete, pictorial, and abstract as a way to scaffold learning. The CPA approach extends a child's prior knowledge by presenting abstract concepts in a concrete and tangible manner. It is the progression of learning from concrete materials to pictorial representations to abstract symbols and problems (Courtney, 2021)

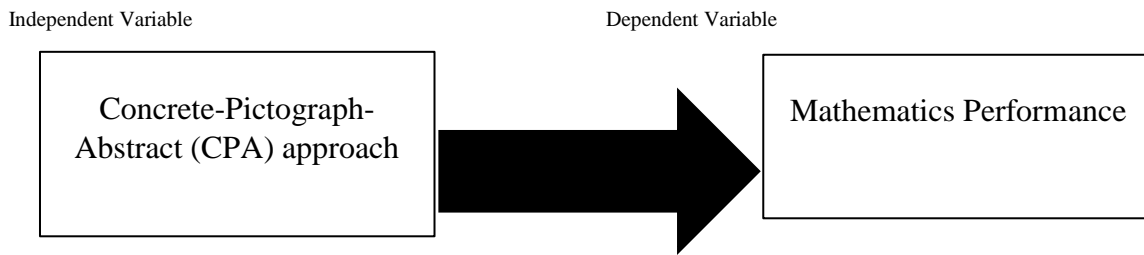


Figure 1. Paradigm of the Study

In figure 1, CPA approach as an independent variable pertains to an instructional method that the researchers will use in teaching mathematics to grade 2 pupils to improve their mathematics performance. As cited in the study of McLeod, S. A., (2019) that learning occurs through enactive means (doing, which is action based), iconic means (seeing, which is visual) and symbolic means (abstract, which is in the form of 'codes or symbols. CPA approach aims to develop a strong Mathematical foundation in young learners and continue

to use this approach to translate complicated Mathematical word problems into visual models at higher Mathematics.

Furthermore, mathematics performance refers to the measurement of students' progress on basic mathematical concepts after utilizing CPA approach.

Research Questions

The study aimed to enhance the Mathematics Performance of Grade 2 Pupils in San Vicente Elementary School using CPA approach as an intervention tool.

It specifically sought to answer the following questions:

1. How may the level of performance of the pupils be describe in terms of pretest and posttest;
2. How may the assessment of grade 2 pupils with regards to CPA intervention be evaluated; and
3. Is there a significant difference between in the pretest and post test scores of the pupils after utilizing the CPA approach?

Hypothesis of the Study

There is no significant difference in the mathematics performance of the grade 2 pupils in their pre-test and post-test after utilizing the CPA approach.

Significance of the Study

This study entitled "Utilization of Concrete-Pictograph-Abstract approach on the Mathematics Performance of Grade 2 Pupils " aims to determine the effectiveness of CPA approach in improving the performance of Grade 2 pupils in mathematics.

Student. The intervention that used in the study have a great benefit for the pupils it helps them to equip with the knowledge regarding on solving problems with their low level of performance in basic mathematical concepts.

Teachers. The result of the study helps the teachers to equip with the productive scheme on how to effectively help the students to improve their mathematical performance.

School Administration. This study can help the school's administration initiating and utilizing of CPA Approach in Teaching Mathematics to Enhance the Mathematics Performance of the pupils.

Future Researcher. This research will serve as a reference for the further research that will be conducted about a scheme and a process that will help students to improve their knowledge and skills.

Scope and Limitation

This study aims to determine the effectiveness of the CPA approach in enhancing mathematics performance. Moreover, the respondents of this study are grade 2 pupils in San Vicente Elementary School, San Vicente San Miguel Bulacan. The included lessons are from the third quarter of the Most Essential Learning Competencies (MELCS) Math 2. Furthermore, the topics are limited to the following: visualizes division, solves routine and non-routine problems involving division and visualizes, represents, and identifies unit fractions.

METHODOLOGY

Type of Research

The study is classroom based-action research. It is a method of finding out what works best in an own classroom so that teacher can improve student learning (Khasinah, 2013).

Moreover, pre-experimental research design was utilized with one-group using pretest and posttest. Cece, A. I., (2017) states that this type of research enables to investigate the way how students' mathematics performance improves after utilizing CPA approach as an intervention scheme that was applied for a given duration of time.

Respondents

The respondents of the study were the Grade 2 – Lotus, pupils from San Vicente Elementary School. The results show that the grade 2 - Lotus had the lowest percentage of learners that did not passed the Minimum Proficiency Level (MPL). They experienced the modality approach for 2 years and did not experience the face-to-face learning approach.

Table 1. Respondents of the study

Grade 2 - Lotus	n	%
Female	12	50
Male	12	50
TOTAL	24	100

Table 1 displays the frequency of the respondents of the study. It was composed of 12 girls and 12 boys. students A total of 24 pupils undergo the CPA approach in the learning process.

Sampling Method

Purposive sampling was used in the study. The purposive sampling technique, also called judgment sampling, is the deliberate choice of a participant due to the qualities the participant possesses. This type of sampling method is a non-probability sampling to select pupils' participants in this action research. It is a nonrandom technique that does not need underlying theories or a set number of participants (Etikan, et al. 2015).

Proposed Intervention

For the duration of the implementation of the intervention, the grade 2- Lotus pupils get a certain type of intervention as proposed by the researchers. The table shows the flow on how the proposed intervention which is the CPA approach will conduct during the implementation. The first column contains the weeks that the researchers need to conduct the study. Second column are the topics from 3rd quarter period lifted from MELCS (Most Essential Learning Competencies) of the Grade 2 respondents with the permission of cooperating teacher. Third column contains the instructional materials that the researchers utilized in teaching the lesson in mathematics.

Table 2: Intervention Plan

Weeks	Topics	Materials
Week 1	<ul style="list-style-type: none"> Pre-Test 	
Week 2	<ul style="list-style-type: none"> Visualizes division of numbers up to 100 by 2,3,4,5, and 10 (multiplication table of 2, 3, 4, 5 and 10). 	Pencil, Plastic cups, Apple toy, balls, leafs, and sets of pictures
Week 3	<ul style="list-style-type: none"> Solves routine and non-routine problems involving division of numbers by 2,3,4,5 and 10 and with any of the other operations of whole numbers including money using appropriate problem solving strategies and tools. 	Win cards, popsicle sticks, balls, pencil, fruits, coins, play money and set of pictures
Week 4	<ul style="list-style-type: none"> Visualizes, represents and identifies unit fractions with denominators of 10 and below. Reads and writes unit fractions. Compares using relation symbol and arranges in increasing or decreasing order the unit fractions. 	Balls, pencil, candies, popsicle sticks, and set of pictures.
Week 5	<ul style="list-style-type: none"> Identifies other fractions less than one with denominators 10 and below. Visualizes (using group of objects and number line), reads and writes similar fractions 	Cards, paper, fruits, box, pizza and set of pictures.
Week 6	<ul style="list-style-type: none"> Post-test 	

Instrument

The study used the following instruments; Pretest and Posttest is a 30-item objective test created by researchers. The researchers-made instrument used were validated by Grade 2 Advisers, math teacher and school principal consisting of 17 multiple choice test items, 5 matching test type items, 3 completion

test items and 5 problem solving test items with a total of 30 test items (*see in appendix A*). Covering the objectives and topics of the third quarter based on Most Essential Learning Competencies (MELCs) such as visualizes division of numbers up to 100 by 2,3,4,5, and 10 (multiplication table of 2, 3, 4, 5 and 10), illustrates that multiplication and division are inverse operations, solves routine and non-routine problems involving division of numbers by 2,3,4,5 and 10 and with any of the other operations of whole numbers including money using appropriate problem solving strategies and tools, visualizes, represents and identifies unit fractions with denominators of 10 and below, reads and writes unit fractions, compares using relation symbols and arranges in increasing or decreasing order the unit fractions, identifies other fractions less than one with denominators 10 and below, and visualizes (using group of objects and number line), reads and writes similar fractions. The items in the pretest and posttest are the same but the items in Posttest were shuffled.

Data Collection

A letter seeking permission to conduct the study was submitted to the school principal and advising, teacher upon approval. The study was conducted by the researchers once the letter was approved.

The researchers administer the pretest on the 3rd week of February before the implementation of the intervention.

Furthermore, the researcher used the intervention to teach mathematics in Grade 2-Lotus during the course of the intervention, which was administered for four weeks from February 2023 to April 2023.

The tools used in the intervention are composed of real objects, pictures, visual aids, and abstract problems that are made by the researchers.

After the intervention, the posttest was administered by the researchers on the second week of April, and a follow up survey questionnaire was also given to the participants. To interpret the data, all data was encoded in Microsoft Excel.

Ethical Consideration

This research proposal comprises reference materials such as study instruments, a work plan, a letter of request, a consent letter, and an approval letter. The researchers create a schedule for the pre and posttests after receiving clearance. The researchers guarantee the participants that proper research protocols and research ethics were followed in this study. Participants' information was kept confidential to protect the privacy of their data. In compliance with Republic Act 10173, also known as the Data Privacy Act of 2012, the identity of the school where the study would be performed was not released, and the participants' identities were categorized to protect their anonymity. Moreover, the researchers ensure that the ethical components of this research are properly followed during the study.

Data Analysis

The data analysis techniques used in this research are descriptive analysis and inferential statistics. Sugiyono (2012) explained that descriptive analysis serves to explain or provide a description of the subject under investigation based on the data collected from samples or population. Inferential statistics of the data in this research were carried out through statistical tests. The researchers tested the given data if it is normally distributed and homogeneous. Paired T-Test was used to assess the significance between the pre-test and post-test scores. All data was presented in means \pm standard deviation. Microsoft Excel was used as the statistical software for the computation of action research data.

To verbally interpret the result of the data, the table below was used:

Score Interval	Verbal Description
26-30	Outstanding
21-25	Excellent
16-20	Very Good
11-15	Good
6-10	Poor
0-5	Very Poor

Gantt Chart



RESULTS AND DISCUSSION

Results

Pupils' mathematics performance improvement was measured using descriptive and inferential analysis. The following are the results of the descriptive and inferential analysis:

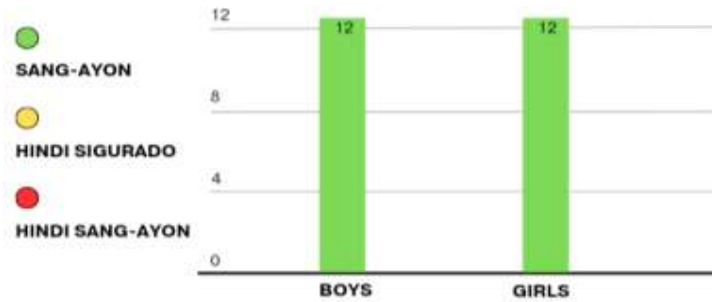
Scores	Pretest		Posttest	
	n	%	n	%
26-30	0	0	24	100
21-25	0	0	0	0
16-20	0	0	0	0
11-15	0	0	0	0
6-10	15	63	0	0
0-5	9	37	0	0
Total	24	100	24	100
Standard Deviation	1.88		1.31	
Mean	6.38		28.17	
Verbal Description	Poor		Outstanding	

Table 3. Level of performance of the pupils can be described in terms of pretest and posttest.

Table 3 illustrates the level of performance of the learners in their pretest scores and posttest scores. The mean of the pretest scores was 6.38 with a verbal description of poor. While the posttest obtained a mean score of 28.17 with a verbal description of outstanding. Moreover, 15 pupils or 63% got a score between 6-10 and only 9 pupils or 37% got the score 0-5. Furthermore, 24 pupils got a score between 26-30 in the posttest. Additionally, the highest score for the pretest is 10 and the lowest is 3 while in posttest scores is 30 and the lowest is 26.

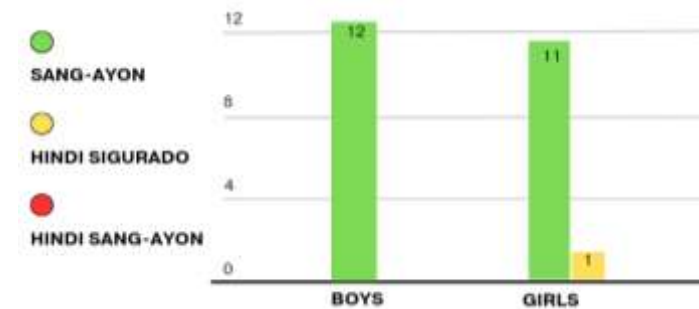
This implies that after utilizing the CPA approach the level of performance of the learners is three steps higher from poor to outstanding.

Response of the learners in perception in terms of *naging masaya ako sa aralin*



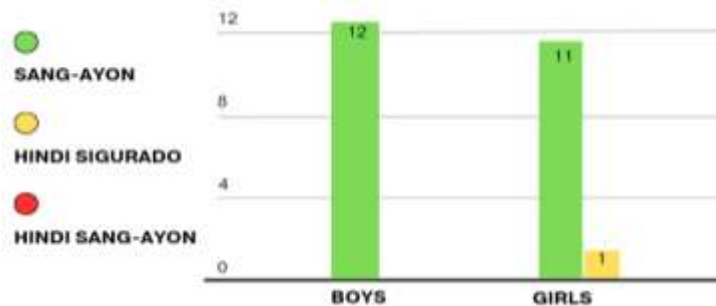
This figure illustrates that 100% from boys and girls answered sang-ayon in terms of naging masaya ako sa aralin.

Response of the learners in perception in terms of ang mga materyales na ginamit ay nakaka enganyo.



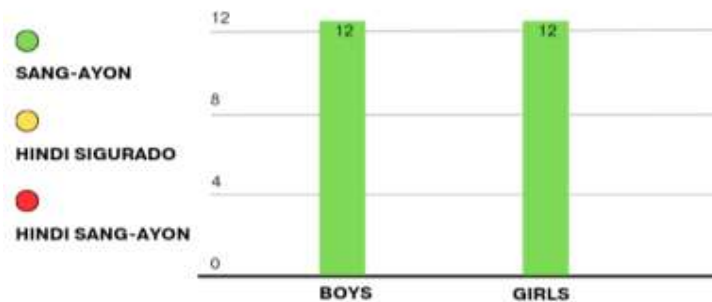
This figure illustrates that 100% from boys answered sang-ayon and 92% from girls answered sang-ayon 8% answered hindi sigurado in terms of ang mga materyales na ginamit ay nakaka enganyo.

Response of the learners in perception in terms of natutunan ko ang mga aralin gamit ang CPA.



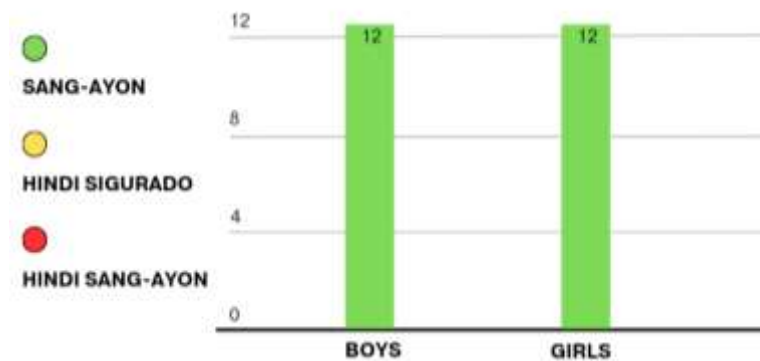
This figure illustrates that 100% from boys answered sang-ayon and 92% from girls answered sang-ayon 8% answered hindi sigurado in terms of natutunan ko ang mga aralin gamit ang CPA.

Response of the learners in perception in terms of gusto ko ang mga gawain namin sa oras ng matematika.



This figure illustrates that 100% from boys and girls answered sang-ayon in terms of gusto ko ang mga gawain namin sa oras ng matematika.

Response of the learners in perception in terms of *marami akong natutunan sa klase*.



This figure illustrates that 100% from boys and girls answered sang-ayon in terms of *marami akong natutunan sa klase*.

Table 4. Test of significant difference on pretest and posttest scores after utilizing the CPA Approach

	t-value	p-value	Decision	Verbal description
Pretest	0.000	0.05	Reject H_0	sig
Posttest				

Legend: < 0.05 = significant

As illustrated in table 4, the computed t-value was 0.000 which is less than the p-value at 0.05 level of significance, it indicates that there is a significant difference on the pretest and posttest scores after utilizing the CPA Approach. Therefore, the null hypothesis is rejected.

The result implies that after exposing pupils to CPA Approach were yield a higher mean for posttest scores of the learners.

This supports the finding of (Putri,2015) states that the achievement of students' mathematical representation ability who got CPA teaching and learning approach is significantly better than students who got conventional teaching and learning approach. These results are also in line with the results of Agrawal and Morin's research (2016), which show that CPA is very effective in improving the mathematical abilities of students who have less mathematical abilities and learning difficulties.

CONCLUSIONS AND RECOMMENDATIONS

Summary

The primary objective of this research is to enhance the mathematics performance of Grade-2 Lotus in San Vicente Elementary School, San Vicente San Miguel, Bulacan. The researchers implemented the CPA approach throughout the discussion, as the Concrete known as "doing" the practice teacher used concrete or real objects to model the problem. Then, Pictograph was used introduce the topic that help pupils to visualize the problem, as it was known for "seeing stage" and for the Abstract that also known for "symbolic stage" it was used to introduce the concept at a symbolic level in number form and used on the application of knowledge or in the form of assessment.

We implement the CPA approach with 24 pupils' participants. A pre-test was given before the start of the third quarter period, and a post-test was given after 4 weeks of utilizing CPA. Both the pre-test and the post-test contain 30 item test questions. On average there is an improvement of 73% in the post-test score compared to the pre-test. The mean score in the pretest is 21% and in the post-test is 94%. The results are encouraging. There is a significant learning gain of 1.31 SD when pupils learn the topic using this approach. The CPA approach can bridge the gap between conceptual understanding and arithmetic. Teachers and educators should consider using more such strategies in their teaching and make students learn Math with understanding.

The results showed the improvement of mathematics performance of pupils' who received learning with the CPA approach. The average percentage of achievement assessment of participants subjected to the CPA approach was 100% when compared to pretest scores. This is evident from pupils' enthusiasm during the CPA learning process. The pupils feel challenged and have a good understanding of the lesson when using the CPA approach.

Conclusion

Based on the study findings, 1) pupils' level of performance in mathematics enhanced after being subjected to learning with the CPA approach. The pupils were able to quickly exhaust all the important options in each situation using real-world examples and illustrations that were tailored to their daily lives. The students were persistent in trying to solve the problem on their own after being introduced to the abstract method, which allowed them to link the reasons why they did such tedious processes so that they could perceive all these options more simply 2) pupils' motivation increased while learning with the CPA approach. The level of participation of the pupils was very evident as is shown in the discussion results above. They are actively participating

because they are given a chance to manipulate the intervention materials and learn while having fun. 3) There is a significant learning gain after utilizing the CPA approach in basic mathematical concepts. The results of the analysis of pupils' work on the description test show that pupils can solve problems using non-standard problem-solving procedures.

This illustrates that the CPA approach's learning process has a high motivational impact, which increases students' desire and tenacity to try a variety of potential solutions to the problem until the right solution is found. Based on this, the CPA approach is very appropriate to be applied in arithmetic learning. The CPA approach can help students gain a correct understanding of mathematical concepts, enabling them to solve a variety of problems presented in various formats.

Recommendation

Based on the findings, mathematics teachers may implement the CPA strategy as teaching approaches for young learners in both elementary and middle schools to give pupils' more opportunities to explore and experience the mathematical concept. However, it is recommended to use larger samples and may ask from the higher institution to provide learning resources that can be utilized in a concrete approach. In addition, it is interesting to study further about the effectiveness of the CPA approach in other topics.

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