SJIF Impact Factor 2021: 8.013| ISI I.F.Value:1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 6 | Issue: 7 | July 2021 - Peer Reviewed Journal

UNDERSTANDING MATH STORIES: INPUTS TO STUDENTS' IMPROVED READING COMPREHENSION SKILLS AND PROBLEM-SOLVING SKILLS

[1]Aprilyn Concepcion Doria, [2]Evelyn Arriola Sunico
Laguna State Polytechnic University,Santa Cruz, Laguna

ABSTRACT

The study aimed to determine the effectiveness of using the Math Stories in improving the performance of selected Grade 6 students from two (2) classes in Yukos Elementary School. Specifically, it sought to determine the level of math stories, the level mathematical performance of the students, and the significant difference between the mathematics performance of the students after the use of math stories.

The research design used in this study was a quasi-experimental research design for determining the mathematics performance of the students using the pre-test and post-test and a descriptive research design in describing the level of Math stories using the criteria from a questionnaire. A purposive sampling technique was used to determine the respondents in the study. The statistical treatment of data was used to compute then analyze and interpret the data given by the respondents. After administering the questionnaire to the respondents, all the data were gathered, analyzed, and interpreted.

Mean, standard deviation, frequency, and percentage were used to measure the pre-test and post-test of the students and to identify the level of the performance of the students in Math. Wilcoxon W was used as a statistical treatment to determine the significant difference in the pre-test and post-test scores of the students. Findings revealed that the pupils all strongly agreed that the language used in mathematics stories is appropriate to their level of understanding, and it helped them improve their comprehension skills. The level of the math performance of the students resulted in a great improvement from Beginning into Developing to Advanced. A significant difference was found between the pre-test and post-test math performance of the students.

Based on the results and conclusion, the following recommendations were advanced: for students, apply mathematics stories when discussing and learning related topics to motivate, to improve the level of comprehension, and to facilitate understanding of complex mathematics concepts. For teachers, use mathematics stories which are relevant and fit to the level of understanding of the pupils to improve their performance in selected topics of Grade 6 mathematics. The future researcher may use this study as their reference guide.

CHAPTER 1
THE PROBLEM AND ITS BACKGROUND
INTRODUCTION

Mathematics influences children to understand the world around them. Through mathematics, they learn to find meaning and connect ideas. Children learned mathematics rules and operations in school.

Mathematics is a fundamental part of human thought and logic, and integral to attempts at understanding the world and ourselves. Mathematics provides an effective way of building mental discipline and encourages logical reasoning and mental rigor. In addition, mathematical knowledge plays a crucial role in understanding the contents of other school subjects such as science, social studies, and even music and art.

A lot of researchers found out the importance of English or language in Mathematics. It is fine to deal with difficulties if the person has the idea of how to solve problems in real life. However, it ignites a question about how to deal with the real world when he has fears in Mathematics where Math is only a subject. Thus, problem-solving has been considered as one of

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the important cognitive processes (Wismath, Orr, Mackay, 2015). Instead, student primarily learns to solve only well-structured subject matter problems (Johnson et. al., 2011). These alarming problems drove researchers to study the bigger picture behind these so-called problem-solving skills.

BACKGROUND OF THE STUDY

Word problems can play a significant role in making school mathematics meaningful and contextual for students. Along with connecting everyday reasoning with classroom context, they can also connect school mathematics with everyday situations and everyday problems, and vice versa. It is therefore very important that students are exposed not only to solving word problems but also to constructing them themselves. When working with word problems, difficulties can occur as students try to make sense of the context and come across words and expressions that are not familiar to them, or when they cannot visualize the context of the word problem.

An effective way to help students is by considering word problems as stories. Students tend to like stories and are familiar with them. Stories often catch the interest and attention of the students, who might even be well versed in creating stories themselves. They know that stories can be completely fictitious – but equally, they can take place in contexts that are familiar to the students.

CONCEPTUAL FRAMEWORK

To give a clearer perspective of this study, the problem is presented using a research paradigm, which consists of the independent variable and dependent variable together with their indicator.

In this paradigm, the arrow indicates the effect of Math Stories in the performance in Mathematics of the selected Grade 6 students as the result of the pre-test and post-test.

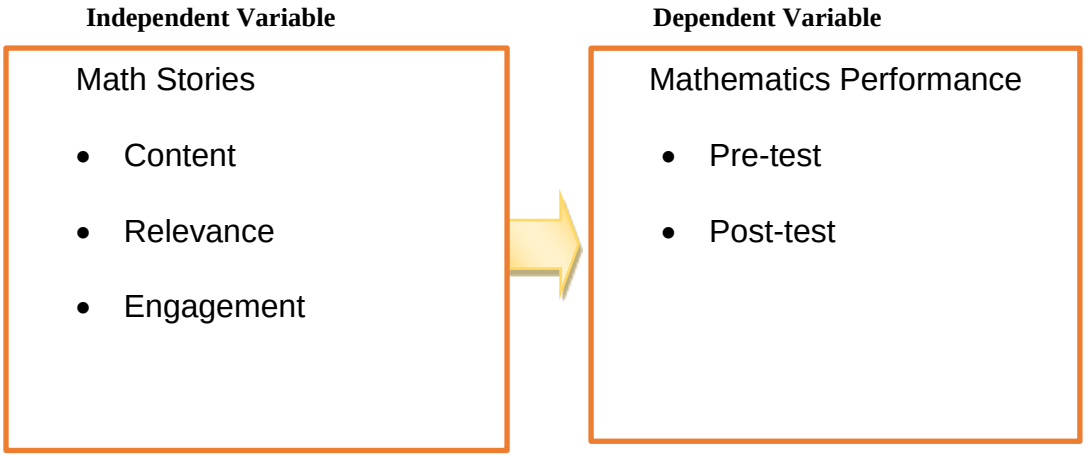

Figure 1. Research Paradigm of the Study

STATEMENT OF THE PROBLEM

The purpose of the study was to determine the effect of Math Stories on the Mathematics Performance of Grade 6-students in Yukos Elementary School, Nagcarlan Laguna, S.Y. 2020-2021.

Specifically, it sought to answer the following questions:

1. What is the level of math stories in terms of;
   1.1 content;
   1.2 relevance; and
   1.3 engagement?
2. What is the level students' mathematical performance in terms of;
   2.1 Pre-test; and
   2.2 Post-test?
3. Is there a significant difference between the students' Mathematics Performance in terms of pre-test and post-test?

RESEARCH HYPOTHESIS

There is no significant difference between the mathematical performance of grade 6 students in terms of the pre-test and post-test.

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SCOPE AND LIMITATIONS OF THE STUDY

The purpose of the study is to determine the effect of Math Stories on the Mathematical Performance of Grade 6 Students. Information from this study will help increased teacher's awareness of the idea of how they will achieve their goals in delivering effective teaching and learning process towards the Two (2) sections of selected Grade 6 students in Yukos Elementary School, Brgy. Yukos Nagcarlan, Laguna, S.Y. 2020-2021 in their Mathematics class.

Chapter 2
REVIEW OF RELATED LITERATURE AND STUDIES

Selected literature and study are reviewed hereunder as these were found to have significant relation bearing to present study. Their reading serves as a guide in formulating a conceptual frame of reference that helped the researcher to seek the answers to the problem areas investigated.

Related Literature

The performance of the students in Mathematics depends upon their accumulated to each stage of life. What a person is experiencing in this stage has a relation in the information and develops of his skills for better performance in the subject.

According to Isack (2015) Students' performance in mathematics is influenced by the teaching and learning methods and students' cultural backgrounds. Teaching methods are such as teacher centered method, students' centered method and type of homework assignments offered to students. Learning methods are such as group discussions when solving problems and individual work as provided by the teacher or as in textbooks. The relationship between teachers and students, the way students are punished and homework assignments might influence student's performance in mathematics. However, learning environment affected students' concentration in schools.

According to Airisian (1997) as cited by Estanislao (2012) pre-test is an important component that is properly given to determine how much the learner knew about the topic. The pre-test is the preliminary test administered to determine a student's baseline knowledge or preparedness for an educational experience or course of study. (http://www.thefreedictionary.com)

The above literature was related because pretest is essential to know the capability of the students about the topic before it was being discussed.

Heo (2003) states that stories allow individuals to experience the world well beyond their own lives. What's more, storytelling appeals to auditory, visual, and kinesthetic learning styles and many of the intelligence areas including spatial, linguistic, interpersonal, and intrapersonal intelligence. The wide scope of impact that story-based problem has on learning factors and needs cannot be cited for many other non-traditional or traditional teaching methods.

In brief, it appears that Math Stories as a teaching pedagogy presents a natural and highly effective approach to teaching, learning, and retaining information. Conversely, the majority of the literature and research available discusses storytelling from the teaching perspective or as applied to younger learners.

Zulueta (2006), further stated that content is a beat learned when it is interesting to the students. Some progressive educators urge that the child should be the focus of the teaching-learning process. Steve (2011) is defined content as the presentation of information for a purpose to an audience through a channel in a form. It has five components; information, purpose, audience, form, and channel. The key to successful communication is explicitly identifying and optimizing each of the individual elements.

The above literature is related to the present study in the sense that content is the knowledge of the book that should be taught by the instructor.

According to Ima and Jamil (2013) the poor reading comprehension skills of students are consistent with their performance in mathematics. By comparison, however, students in private schools performed better in these two areas than students in public schools. The performance in mathematics of students in public schools may be attributed to their reading comprehension skills while that of students in private schools cannot be factored Correlation between Reading Comprehension Skills and Students' Performance in Mathematics (Imam OA) into their reading comprehension skills. On another account, the reading comprehension skills of students had no direct bearing on their overall mathematics performance implying that other factors not related to reading should be explored to explain students' poor performance in mathematics.

Related Studies

According to Kobala cited by Lopez (2010) that the teacher who can motivate students to learn Mathematics who is enthusiastic and utilizes teaching strategies suited to their intellectual level, which have supportive students' comfortable classroom and adequate instructional materials are factors that can

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assist students to develop their positive attitudes towards Mathematics

The relevance of this study is the utilization of different strategies of teachers in teaching. The subject is one of the emphases of the present research. Similarly, it also stressed the attitude of the students toward Mathematics.

According to Mokhtar et al (2010), Math stories are an effective tool in improving the oral competencies of students. Becoming verbally proficient can contribute to a student's ability to communicate effectively and successfully. Negotiation, discussion, and tact are peacemaking skills. Being able to accurately express one's thoughts and feelings is important in everyday communication. Both telling a story and listening to a well-told tale encourages students to use their imaginations. As Mokhtar et al (2010), stated storytelling helps develop the imagination which in turn builds on problem-solving competencies.

Therefore, developing the imagination can empower students to consider new and inventive ideas. In other words, developing the imagination can contribute to self-confidence and personal motivation as students envision themselves as competent and able to accomplish their hopes and dreams. With all these in mind, this research is to explore the effectiveness of using storytelling as a tool to enhance students' communicative skills.

Mathematical problem solving refers to "the cognitive process of figuring out how to solve a mathematics problem that one does not already know how to solve" In other words, problem-solving involves the "process of moving from a given state to a goal state, with no clearly outlined solution path. Although mastery of concepts and specific mathematical procedures is a prerequisite for solution accuracy, problem-solving involves processes that go above and beyond conceptual and procedural knowledge.

CHAPTER. 3
RESEARCH METHODOLOGY

This chapter consists of research design, respondent of the study, sampling technique, research instruments, research procedure, and statistical treatment of data.

Research design

The study utilizes the experimental method, which comprehensively explores the effect of Math Stories on the Mathematics performance in Yukos Elementary School during the School Year 2020-2021. According to Calmorin (2011) as cited by Lopez an experimental study is a problem-solving approach that described in the future what would be when a certain variable is carefully controlled or manipulated..

Population and sampling

The study was conducted among two (2) sections of Thirty-five (35) selected Grade 6 students of Yukos Elementary School during the School Year 2020-2021.

Research procedure

After the approval of the research title, the researcher started collecting data from books, magazines, the internet, and other references. The researcher prepared a letter of request addressed to the principal of Yukos Elementary School requesting permission to be allowed to conduct a series of tests among thirty-five (35) students of two (2) sections of selected Grade 6 students of the study. As approval, the researcher started doing activity sheets, the pre-test, and the post-test to be given to the respondents. Due to pandemics, the researcher will use Google Classroom as a tool in learning in new normal education.

When everything was set, the researcher will start conducting the study. The pre-test was given to the students to measure their prior knowledge in problem-solving. After the three sessions, a post-test was given to the same students to determine how much they would have learned in the topic using Math stories.

Research instrument

The main instrument in gathering data was a set of a validated questionnaires. A questionnaire was made for Grade 6 students in the Yukos Elementary School. The questionnaire contains an examination to test the mathematics ability and reading skills of the students. This was checked and validated by the experts. This is serving as a tool to collect the needed information for the study.

Statistical Treatment

This study used appropriate statistical treatment to determine the effect of the Math Stories on the academic performance of the grade 6 learners. The statistical treatments used were the percentage and Likert Scale, the mean and standard deviation to determine the level of Math Stories in terms of content, engagement, and relevance. It is also used to determine the level of performance of the students in terms of pre-test and post-test.

The non-probability test of Wilcoxon W was used, to determine statistically the difference of the mathematics performance between the pre-test scores

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and post-test scores of the students to test if there is a significant difference in the performance.

The rating scale below was used to determine the frequency and relative frequency of the scores of the respondents in pre-test and post-test.

Likert Scale and Verbal Interpretation

Scale	Range	Remarks	Verbal Interpretation
5	4.20-5.00	Strongly Agree	Very High
4	3.40-4.19	Agree	High
3	2.60-3.39	Moderately Agree	Moderately High
2	1.8-2.59	Disagree	Low
1	1.00-1.79	Strongly Disagree	Very Low

CHAPTER . 4
PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

This chapter is about the summary and discussion of the results of the analysis of the data on the effect of mathematics stories on the mathematics performance of Grade 6 pupils. The discussion also covers the level of mathematics stories in terms of content, engagement, and relevance.

Table 1. Level of Mathematics Stories in Terms of Content

Content	Mean	SD	Remarks
1. The content provides arrangement of thought provoking exercises, reinforcement, and enrichment.	4.60	0.59	Strongly Agree
2. The content contains lesson which enhance the critical and analytical thinking skills of the students.	4.57	0.63	Strongly Agree
3. The content enhances the creative and the thinking skills of the learners.	4.40	0.74	Strongly Agree
4. The content is clear and understandable.	4.66	0.59	Strongly Agree
5. The content includes illustrations that enhances comprehensive learning of the students.	4.46	0.64	Strongly Agree
Weighted Mean	4.54	**0.05**	**Strongly Agree**

Legend:

Scale	Range	Remarks	Verbal Interpretation
5	4.20-5.00	Strongly Agree	Very High
4	3.40-4.19	Agree	High
3	2.60-3.39	Moderately Agree	Moderately High
2	1.8-2.59	Disagree	Low
1	1.00-1.79	Strongly Disagree	Very Low

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It reveals that the level math stories terms of content has a weighted mean of 4.54 and standard deviation of 0.05 with remarks of "strongly agree" and verbal interpretation of "very high".

Table 2. Level of Mathematics Stories in Terms of Engagement

Engagement	Mean	SD	Remarks
1. The Math Stories as teaching materials are interesting to the students	4.57	0.60	Strongly Agree
2.The Math stories are easy to manipulate the attention of the students	4.63	0.64	Strongly Agree
3.The Math Stories are friendly used	4.31	0.75	Strongly Agree
4.The students are motivating to learn.	4.51	0.65	Strongly Agree
5.The students listen very attentively when the teacher used Math stories as teaching materials	4.51	0.65	Strongly Agree
Weighted Mean	4.51	**0.05**	**Strongly Agree**

Legend:

Scale	Range	Remarks	Verbal Interpretation
5	4.20-5.00	Strongly Agree	Very High
4	3.40-4.19	Agree	High
3	2.60-3.39	Moderately Agree	Moderately High
2	1.8-2.59	Disagree	Low

It reveals that the weighted mean of the Math Stories in terms of engagement is *4.51* and standard deviation of *0.05* with remarks of *"strongly agree"* and verbal interpretation of "*very high*".

Table 3. Level of Mathematics Stories in Terms of Relevance

Relevance	Mean	SD	Remarks
1. The Math Stories are appropriate to the Grade level of the Students	4.49	0.60	Strongly Agree
2. The topic improves the problem-solving skills of the students	4.57	0.65	Strongly Agree
3. The topic improves the reading comprehension skills of the students	4.29	0.81	Strongly Agree
4. Math Stories helps the students to understand more the lesson in Mathematics.	4.54	0.60	Strongly Agree
5. Math Stories are aligned to their topic.	4.60	0.60	Strongly Agree
Weighted Mean	4.50	0.08	**Strongly Agree**

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Legend

Scale	Range	Remarks	Verbal Interpretation
5	4.20-5.00	Strongly Agree	Very High
4	3.40-4.19	Agree	High
3	2.60-3.39	Moderately Agree	Moderately High
2	1.8-2.59	Disagree	Low

It reveals that the weighted mean of the level of Math Stories in terms relevance is *4.50* and standard deviation of *0.08* with remarks of *"strongly agree"* and verbal interpretation of "*very high*"

The level of performance of all the pupils in the pretest is at the Beginning level. However, the level of performance of about 54% of the pupils in the posttest is at least in the Developing level. It appears that mathematics stories can help improve the performance of the pupils in mathematics.

LEVEL OF PERFORMANCE IN PRE-TEST AND POST-TEST

This paper reviews the literature to assess concurrent relationships between mathematics and executive function skills, the role of executive function skills in the performance of mathematical calculations, and how executive function skills support the acquisition of new mathematics knowledge. In doing so, we highlight key theoretical issues within the field and identify future avenues for research

The nonparametric t-test for significant difference between pretest and posttest is shown in Table 3. It shows that the mean score performance of the pupils in the pretest and posttest varies significantly, *Wilcoxon* W = 630, p = < .001. There is a significant improvement in the performance of the pupils in mathematics as reflected by their positive mean difference. This level of performance was influenced by mathematics stories. It has a large effect on the improved performance of the pupils in the posttest, Rank *Biserial Correlation* = 1.00.

Table 5. Difference between Pre-test and Post-test

			Statistic	p	Mean difference	Rank biserial correlation
POSTTEST	PRETEST	Wilcoxon W	630	< .001	10	1

p-value < 0.05 - Significant

Math Stories improves learning by actively engaging learners in the information they are being exposed to versus passive student participation often found in traditional classroom settings (Richter & Koppett, 2011). Even more, it appears that narrative storytelling in a learning community meets the criteria of brain-based and several other learning and teaching theories on many levels.

CHAPTER 5
SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter is about the summary of the research on the level of mathematics stories and their effect on the mathematics performance of Grade 6 pupils. The chapter also covers the findings of the research and its implications, conclusions, and recommendations.

SUMMARY

This study determined the effect of Math Stories on the Mathematics Performance of Grade 6 students at Yukos Elementary School, the School Year 2020-2021. The information on related literature and studies were gathered to formulate the hypothesis, conceptual framework presented in the paradigm, and definition of terms. Specifically, the information is found in books, journals, documents, published and unpublished materials like thesis, journals, and the internet.

Specifically, it sought the following questions; (1) What are the level of Math Stories in terms of content, relevance, and engagement? (2.) What is the level of mathematical performance of the students in terms of Pre-test and Post-test? (3) Is there a significant difference between the Mathematics Performance in terms of pre-test and post-test?

The research design used in this study is a quasi-experimental research design for determining the

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mathematics performance of the students using the pre-test and post-test and a descriptive research design in describing the level of Math Stories using the criteria from a questionnaire.The purposive sampling technique was used to determine the respondents in the study. These selected grade 6 students were composed of 35: (20) from E. Aguinaldo and (15) from A. Bonifacio students. The statistical treatment of data was used to compute then analyze and interpret the data given by the respondents. After administering the questionnaire to the respondents, all the data were gathered, analyzed, and interpreted.

The pupils all strongly agree that the language used in mathematics stories is appropriate to their level of understanding and it helped them improved their comprehension skills.

Level of Performance in Pre-test and Post-test

The performance in the pre-test and post-test of the majority of the pupils from the two learning modalities is Beginning, that is, their mark is 74% and below. The level of the Math Performance of the students resulted in a great improvement from Beginning into Developing to Advanced.

Difference between Pre-test and Post-test

There is a significant difference between the pre-test and post-test of the pupils. This means that mathematics stories have a large effect on the improved performance of the pupils.

CONCLUSION

Based on the finding of the study, the following conclusions were drawn:

The level of Math Stories in terms of Content, Engagement and Relevance resulted to a Strongly Agree to the students. Since there is a significant difference between the pre-test and post-test of the Grade 6 pupils, the statistical evidence does not support the hypothesis of this study. The significant improvement in the post-test performance of Grade 6 pupils was largely due to the use of mathematics stories.

This implies that there is a significant improvement to students acquired skills and knowledge.

RECOMMENDATIONS

The following are the recommendations based on the above-mentioned findings.

- For Students, apply mathematics stories when discussing and learning related topics to motivate, to improve the level of comprehension, and to facilitate understanding of complex mathematics concepts.
- For Teachers, use mathematics stories that are relevant and fit to the level of understanding of the pupils to improve their performance in selected topics of Grade 6 mathematics.
- Future researchers may use this study as their reference guide.

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