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Effectiveness of Teaching Problem Solving in Mother Tongue-Based Instruction to the Performance of Grade 2 Learners in Math

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Abstract —To develop sentence-based mathematics problem-solving skills among students, various models, pedagogies, activities, etc. have been introduced to assist mathematics teachers in delivering sentence-based mathematics problem-solving skills more effectively (Gurat, 2018; Khoiriyah and Husamah., 2018; Özreçberoğlu and Çağanağa, 2018; Hasibuan et al., 2019). However, students nowadays still face difficulties when trying to master sentence-based mathematics problem-solving skills. Thus, it is in this premise that the researcher decided to conduct this study to evaluate the effectiveness of teaching problem-solving in mother tongue-based instruction to the performance of Grade 2 learners in Math. Employing the quasi-experimental research design through the researcher-made problem-solving test questions based on the 3rd Quarter Most Essential Learning Competencies (MELCs) in Math Grade 2 used as pre-test and post-test and utilizing differentiated, technology-based, and traditional learning materials were utilized by the researcher while teaching problem solving skills in Math. Simple percentage and t-test of mean difference were the statistical tools used to interpret the result of the study. The study revealed a significant difference in the performance of Grade of Grade 2 learners before and after teaching problem-solving in mother tongue-based instruction in teaching Math. Thus, contextualizing the content and materials in teaching and the use of real-life situation in the problem-solving activities and using mother tongue as medium of instruction help in the improvement of learner's performance in Math.

Keywords — Effectiveness, Teaching Problem Solving, Mother Tongue-Based Instruction, Grade 2 Learners, Math

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I. Introduction

The purpose of reading is comprehension-getting the meaning from written text based on background knowledge, experiences and many others and be able to connect to personal life. On the other hand, the major go

al of reading comprehension instruction is to help learners develop their knowledge, skills, and experiences they must have if they are to become competent and enthusiastic readers. Without comprehension, reading is a frustrating, pointless exercise in word calling.

One of the most pressing problems in today's education journey is literacy. Most of the pupils in school have difficulty in understanding what has been read. Moreover, there are also pupils who have difficulty in recognizing the words, especially the key stage 1 pupils. The Grade 2 pupils enrolled in this current school year are those learners who were deprived of learning in school because of the pandemic. They only learn by beginning reading through the modules and the sincerity and dedication of the learning facilitators to assist in accomplishing the modules. In public schools, most of the learning facilitators failed to focus on the learning of the pupils, hence making them unable to acquire the required knowledge for the grade. Thus, making them not ready for the grade they are enrolled at.

Learning to read is an important skill to acquire for this is the tool in learning for other subject areas and skills. If the child is unable to read, he/she will find difficulty in doing the activities, especially in solving word problems in Mathematics.

Sentence-based mathematics problem-solving skills are essential as the skills can improve the ability to deal with various mathematical problems in daily life, increase the imagination, develop creativity, and develop an individual's comprehension skills. However, mastery of these skills among students is still unsatisfactory because students often find it difficult to understand mathematical problems in verse, are weak at planning the correct solution strategy, and often make mistakes in their calculations. To keep track of the development of the current world, education has changed over time to create a more robust and effective system for producing a competent and competitive generation (Hashim and Wan, 2020). The education system of a country is a significant determinant of the growth and development of the said country (Ministry of Education Malaysia, 2013).

The dictionary defines mathematics as the study of relationships among numbers, shapes, and quantities. Calculations using signs and symbols make the subject more abstract. Experiential Learning provides students with opportunities to have hands-on experiences to aid them in learning abstract mathematics concepts. It does not focus only on the cognitive part of learning because accordingly when more senses are involved in the learning process, there is better learning (Corpuz & Salandanan, 2007).

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However, according to the Trends in International Mathematics and Science Study (TIMSS), Filipino students were found to have difficulties in solving problems that are different from the problems usually given in textbooks. This implies that the problem-solving skills of the learners are not yet developed and do not meet the standards. This feedback simply means that in the classroom, learners deal only with solving routine problems in which the participants of the teaching and learning process are giving more emphasis on the step-by-step procedure rather than meaningful learning (Duque, 2013).

The Grade 2 learners Margen Elementary School have a huge difficulty in solving word problems though it is presented in the language they are used to speaking which is their mother tongue. The difficulties originated from the fact that they cannot even read fluently and comprehend how problems are stated. The reading profile of the learners showed very alarming results. Among the 35 learners enrolled in Grade 2, only 12 can read and the rest are struggling to learn to read. In addition, students lack the ability to formulate steps on how to solve mathematical problem-solving and refuse to think whenever they are asked to solve even simple practical problems. Making them unable to attain mastery levels in Math. These have been the challenges that the teacher is facing. Thus, it is in this premise that the researcher decided to conduct this study to evaluate the effectiveness of teaching problem-solving in mother tongue-based instruction to the performance of Grade 2 learners in Math. A proposed improvement plan was formulated based on the findings of the study.

It is in the rationale that the researcher who is currently a grade 2 teacher in the above mentioned local, would like to delve worthy research undertaking that will benefit herself, the school she is currently teaching and that of her Graduate Program she is enrolled at.

This study evaluates the effectiveness of teaching problem-solving in mother tongue-based instruction to the performance of Grade 2 learners in Math of Margen Elementary School, Ormoc City District 9, Ormoc City Division for School Year 2022-2023. The findings of the study were the basis for the proposed improvement plan.

Specifically, this study sought to answer the following questions:

1. What is the performance of the Grade 2 learners in Math before teaching problem-solving in mother tongue-based instruction?
2. What is performance of the Grade 2 learners in Math after teaching problem-solving in mother tongue-based instruction?
3. Is there a significant difference in the performances of the Grade 2 learners in Math before and after teaching problem-solving in mother tongue-based instruction?
4. What improvement plan can be proposed based on the findings of this study?

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II. Methodology

Design. This study employed the quasi-experimental research design utilizing the pre-test and post-test to evaluate the effectiveness of teaching problem-solving in mother tongue-based instruction to the performance of Grade 2 learners in Math for School Year 2022-2023. Margen Elementary School, Ormoc City District 9, Ormoc City Division is the main locale of the study. The 35 Grade 2 learners enrolled in the said locale for School Year 2022-2023 are the main respondents of the study. A researcher-made problem-solving test questions based on the 3rd Quarter Most Essential Learning Competencies (MELCs) in Math Grade 2 is used as pre-test and post-test before and after the intervention was given. A lesson plan in teaching problem solving skills in mother tongue-based instruction is the focus in the study. Differentiated, technology-based and traditional learning materials were utilized by the researcher while teaching problem solving skills. A matrix of activities was crafted to guide the teacher-researcher the flow of her study. This research focused on evaluating the effectiveness of teaching problem-solving in mother tongue-based instruction to the performance of Grade 2 learners in Math through the pre-test and post-test and its significant difference. A Proposed Improvement Plan based on the findings of the study is the output.

Sampling. There are 35 Grade 2 learners involved in this study. The research instruments were administered face-to-face with consent from the Local IATF and strictly following the prescribed Health Protocol during the face-to-face classes.

Research Procedure. The researcher prepared the research design and tools 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 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 teaching problem-solving in mother tongue-based instruction utilizing the differentiated, technology-based, and traditional learning materials was emphasized in the study. After the four-week intervention, the post-test was administered. Results of the tests were collected. Data were tallied and submitted for statistical treatment. Analysis and Interpretation of Data. Making of Proposed Improvement Plan followed.

Ethical Issues. The researcher properly secured the permission to conduct the study from the authorities through written communication. In the formulation of the intervention materials that was used in the study, the use of offensive, discriminatory or other unacceptable language was avoided. The respondents' names and other personal data were not included in this study to protect their privacy. Participation of the respondents was also voluntary. Orientation was conducted for the respondents with their parents. In the orientation, issues and concerns were addressed and consent to be included in the study were signed. The researcher-maintained objectivity in

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analyzing and discussing the results. All authors whose works were mentioned in this study were properly quoted and were acknowledged in the reference.

Treatment of Data. Simple Percentage was employed to evaluate the performances of the Grade 2 learners in Math before and after teaching problem-solving in mother tongue-based instruction. **t-Test of Mean Difference** was used to determine the significant difference in the pre-test and post-test performances of the Grade 2 learners in Math.

III. Results and Discussion

Table 1
Pre-Test Performance of the Grade 2 Learners in Math

Score Range	Description	PRETEST	
		Frequency	%
17-20	Excellent	1	3
13-16	Very Good	15	43
9-12	Good	19	54
5-8	Fair	0	0
0-4	Poor	0	0
Total		35	100
Weighted Mean		**12.40**	**Good**

Table 1 presents the performance of the Grade 2 learners in Math before the teaching problem-solving in mother tongue-based instruction. It was revealed on the table that among the 35 Grade 2 learners included in this study, 1 or 3% got a score of 17-20 which is interpreted as excellent while 15 or 43% got a score of 13-16 which is interpreted as very good. Moreover, there are also 19 or 54% got a score of 9-12 which is interpreted as good. Based on the result of the test, it reveals a weighted mean of 12.40 which is interpreted as good. This means that the Grade 2 learners possess the basic knowledge in Math. Only a few of them attained mastery of the skills in Math. This implies that these learners need intervention activities to improve their performance. Teachers must provide contextualized learning activities and materials for better understanding of the problems conveyed in the lesson. Mathematics teachers are in an unending quest of finding teaching strategies or methods (Asparin & Tan, 2018; Coronel & Tan, 2018; Gumban & Tan, 2019; Murillo & Tan, 2019; Dapitan & Caballes, 2019) that would somehow improve the problem-solving skills of the students (Duque & Tan, 2018; Tan & Limjap, 2018) because this is the only way that mathematics performance will also be improved (Dagoc & Tan, 2018; Segumpan & Tan, 2018; Saligumba & Tan, 2018). Other researchers developed tools to measure students' understanding (Caballes, 2006) and conceptual change (Gayeta & Caballes, 2017).

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Table 2
Post-Test Performance of the Grade 2 Learners in Math

Score Range	Description	POST-TEST	
		Frequency	%
17-20	Excellent	34	97
13-16	Very Good	0	0
9-12	Good	1	3
5-8	Fair	0	0
0-4	Poor	0	0
Total		35	100
Weighted Mean		**19.23**	**Excellent**

Table 2 presents the post-test performance of the Grade 2 learners in Math after the teaching of problem-solving in mother tongue-based instruction. It was revealed on the table that among the 35 Grade 2 learners included in the study, 34 or 97% got a score of 17-20 which is interpreted as excellent while there is only 1 or 3% of the pupils got a score of 9-12 which is interpreted as good. The performance of the Grade 2 learners after the teaching of problem-solving in mother tongue-based instruction garnered a weighted mean of 19.23 which is interpreted as excellent. This means that the performance of the Grade 2 learners increases after teaching problem solving skills in Math. This implies that the contextualizing the content and materials in teaching and the use of real-life situation in the problem-solving activities and using mother tongue as medium of instruction help in the improvement of learner's performance in Math. According to Hassan et al. (2019), teachers must emphasize the mastery of sentence-based mathematics problem-solving skills and apply it in mathematics teaching in primary school. Sentence-based mathematics problem-solving skills can improve the students' skills when dealing with various mathematical problems in daily life (Gurat, 2018), increase the students' imagination (Wibowo et al., 2017), develop the students' creativity (Suastika, 2017), and develop the students' comprehension skills (Mulyati et al., 2017). The importance of sentence-based mathematic problem-solving skills is also supported by Ismail et al. (2021). They stated that mathematics problem-solving skills are like high-level thinking skills when it comes to guiding students with how to deal with problems creatively and critically.

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Table 3
Test of Difference Between the Scores in the Pre-Test and Post-Test of the Grade 2 Learners in Math

Aspects	Test Scores		Computed T	Critical T	Decision	Interpretation
Grade 2 Learners in Math	Pre Post	11.67 17.42	1.871	0.791	Reject H_o	Significant

Table 3 presents the test of difference between the scores in the pre-test and post-test performances of the Grade 2 learners before and after teaching problem-solving in mother tongue-based instruction in teaching Math. It was revealed on the table that the statistical bases and analyses of which degrees of freedom are composed of 35 from the number of participants minus 1. The level of significance is 0.05 or the rejection level while the t-critical value is 0.791 from t-distribution. Based on the data presented the computed value is 1.871 which means null hypothesis is being rejected. Since the computed value is higher than the critical value it means that there is a significant difference in the performance of Grade of the Grade 2 learners before and after teaching problem-solving in mother tongue-based instruction in teaching Math. This implies that teaching problem-solving using mother tongue-based instruction in teaching Math is an effective strategy to improve the performance of the Grade 2 learners. According to Rusdin and Ali (2019), a practical teaching approach plays a vital role in developing the students' skills when mastering specific knowledge. Moreover, in the study conducted by Bautista and Mulligan (2009), Filipino children have difficulties in solving word problems mainly because of the language. Moreover, multiple studies have shown that word problems in English are more difficult for children who are still in the process of learning English compared to those who are native speakers of the language.

IV. Conclusion

The study revealed a significant difference in the performance of Grade of Grade 2 learners before and after teaching problem-solving in mother tongue-based instruction in teaching Math. This shows that teaching problem-solving skills using mother tongue-based instruction contributes in achieving a positive learning outcomes. Thus, contextualizing the content and materials in teaching and the use of real-life situation in the problem-solving activities and using mother tongue as medium of instruction help in the improvement of learner's performance in Math.

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V. Recommendations

1. Utilize the proposed improvement plan formulated for it is proven to be effective based on the result of the study.
2. Implement the teaching of problem-solving in Math using mother tongue-based instruction to key stage 1 learners for thorough understanding of the content of the problem.
3. The Department of Education may fully support the continuing professional development of students based on the principle of lifelong learning and DepEd's commitment to the development of teachers' potential for their success in the curriculum.
4. Conduct related free training and seminars to the teachers to help empower and sustain their knowledge in teaching Math.
5. Teachers must extend extra time in teaching Math to the struggling learners to improve their performance.
6. Teachers must be knowledgeable in providing additional learning support materials to the learners.
7. Teachers must attend training or LAC sessions on the improvement of teaching strategies and techniques in Math.
8. School Heads must encourage teachers to use Math problems in presenting the lesson in all learning areas.
9. Institutionalize the conduct of monitoring activities to the teachers and performance eof the learners, and
10. Future researchers should replicate this study to include different locales and include different variables aside from the mentioned in this study.

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The author is Ms. Revelyn S. Pogoy. She was born on August 14,1994 at Barangay Tabunok, Palompon, Leyte. She is married to Donald Casio Dimas. She's presently residing in Brgy. Tabunok, Palompon, Leyte. She finished her elementary education at Tabunok Elementary School, Brgy. Tabunok,Palompon Leyte in the year 2005-2006 and continue her quest for education and able to finish his secondary education at Isabel Comprehensive School, Isabel, Leyte in the year 2009-2010. She enrolled and finished his Bachelor in Elementary Education in the year 2014-2015 at Visayas State University (VSU) Isabel-Campus, Isabel, Leyte. In the year 2016 she passed the Licensure Professional for Teacher, after a year she applied in a private school in Doane Baptist School Isabel, Leyte luckily, she was hired and teaching for 2 years. In August 1,2018 she was hired in the DepEd and was assigned in Mahayahay Elementary School District 2-Ormoc City Division. Recently this year 2022-2023 she was transferred in other school to Margen Elementary School District IX in Ormoc, City Division.

She also attended series of webinars/seminars and trainings to increase his professional growth as a teacher.

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