



# SOCRATIC METHOD OF TUTORING (SMT): AN INNOVATION FOR BETTER STUDENTS' NUMERACY SKILLS

**Rey O. Bongga**, Teacher III, Zamboanga del Sur National High School, Schools Division of Pagadian City, Region IX

### INTRODUCTION

The conscientious evaluation of the K-12 learners makes numeracy an essential skill in assuring compliance with the Department of Education (DepEd) standards and requirements as K-12 graduates. Along with DepEd Order No. 18 series 2017, former DepEd Secretary Leonor Briones stressed the goal of developing that each child should be a reader through the implementation of the Early Language, Literacy, and Numeracy Program (DepEd, 2017). Numerous studies have been conducted on literacy programs but only a few for numeracy. Numeracy refers to the information, abilities, attitudes, and behaviors students require to utilize mathematics in various contexts.

The Socratic Method of Tutoring (SMT) was anchored on the philosophies of teaching with the Greek philosopher Socrates. The method is based on a student's current level of comprehension of a subject. Questions move from what the student already knows to new information and concepts the tutor leads the student into with their directed inquiry (Connor 2003). It is alarming to know that some Zamboanga del Sur National High School (ZSNHS-SHS) graduates have low levels of numeracy skills, considering the years they spent attending school.

The findings of this study seek to determine the students' numeracy skills before and after using the SMT. It also measured the effect of SMT on the students' mathematical operations of Additionally, numbers. the study investigated the challenges encountered by the peer tutors in handling their peers' numeracy skills their coping and

mechanisms in addressing the problems they experienced.

A mixed research method was used particularly sequential explanatory design to explain the implementation of SMT for two (2) months and investigate its effect on the numeracy skills of the students. After employing the SMT and completing the learning program, research participants answered the validated researcher-made post-test to redetermine the level of students' numeracy skills. Pre-test and Post-test results were compared to find any differences after employing the innovation. method interview through The а to questionnaire was used solicit qualitative data on the problems/challenges identified by the tutors regarding students' difficulties with the mathematical operation of numbers and their coping mechanisms to address those challenges. The participants of this study were the 18 trained students from STEM strand who performed as tutors and 30 student tutees of ABM Strand in Zamboanga del Sur National High School - Senior High School. Participants were made aware of the privacy of any information acquired as part of the preliminary steps in the data collection process. The research participants were informed regarding the relevance and meaning of the study, the discussion of risks and rewards, the required level of commitment, and confidentiality protection.

# DISCUSSION OF RESULTS

*Level of Students Numeracy Skills.* Table 1 shows that the level of students' numeracy skills before SMT disclosed as Average (Mean = 17.37; SD = 4.13; MPS = 43.42%).



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The mean indicated that the students would typically get below 50% of the total items in every numeracy test conducted.

Table 1. Level of Students Numeracy Skills Before SMT

Test	Mean Score	SD	MPS	Descriptive Equivalent
Numeracy	17.37	4.13	43.42%	Average
Test				

Total Learners: 40

Scale: 95-100% = Mastered; 86-95%=Closely Approximating Mastery; 66-85% = Moving Towards Mastery; 35-65% = Average; 15-34% = Low; 5-14% = Very Low; 0-4% = Absolutely No Mastery

Table 2 confirms the effectiveness of the Socratic Method of Tutoring as the interpretation change to Moving Towards Mastery (Mean = 32.87; SD = 4.93; MPS = 82.17%). On average, the students got 82% of the correct answers to the total items in the numeracy test.

Table 2. Level of Students' Numeracy Skills After SMT

Test	Mean	SD	MPS	Descriptive
	Score			Equivalent
Numeracy Test	32.87	4.93	82.17%	Moving Towards Mastery
Total Loarpore: 40				

Scale: 95-100% = Mastered; 86-95%=Closely Approximating Mastery; 66-85% = Moving Towards Mastery; 35-65% = Average; 15-34% = Low; 5-14% = Very Low; 0-4% = Absolutely No Mastery

Test of difference of students' numeracy skills before and after the Socratic Method of Tutoring (SMT). Paired-samples t-test determined the significant difference in the numeracy skills of the students. Table 3 depicted that there is a significant difference in the students' numeracy skills before and after SMT (t-value = -19.09; pvalue = .001). The result showed a drastic shift in students' numeracy skills through applying SMT. Students will not develop the mental habits of a numerate citizen until they use the various facets of numeracy in practical circumstances. Numeracy is a skill that everyone must possess, just like literacy (Steen 1999, 8-13).

Table 3. Test of Difference Before and After SMT

Variables	t-value	df	P-value	Interpretation
Test Before	-19.09	29	.001	With
and After				Significant
SMT				Difference



Problems/Challenges Encountered by Student Tutors in Handling Peers' Mathematical Operations of Numbers. Using textual analysis of the qualitative responses, the peer tutors experienced four (4) major problems or challenges: (1) Peer's lack of mathematical fundamentals, (2) Distracted Peer's focus, (3) Insufficient knowledge as a tutor, and (4) Management of time constraints as a tutor. One of the most challenging tasks of teaching the students through SMT is their motivation to attend the learning program. Motivation serves as fuel to continue learning without expecting something in return. Studies proved that the use of diagnostic testing is just the first step in determining the kind and degree of any skills deficits and in treating them. Any identified issues must be specified precisely for the best intervention plans to be developed and put into practice (Tariq 2004, 25-29).

Coping Mechanisms for the Challenges Encountered by Tutors towards their Peer's Mathematical Operations of Numbers. Based on the coping mechanisms for the challenges encountered by peer tutors, the research participants articulated four (4) major categories: (1) Reviewing and reteaching the competencies to their Peers, (2) Being patient towards their peers, (3) Self-preparation of the topic as tutors, and (4) Proper time management as tutors. Campbell et al. (2010) emphasize that the usage of mathematical terminology, strategic conversation, and praise between partners increased significantly during verbal encounters, while procedural speaking decreased. This study appeared to be largely successful in raising the selfesteem of both tutors and tutees, improving the frequency and quality of interactive math discussions among students, as well as the tutors' general social and communication skills.

#### CONCLUSION AND RECOMMENDATION



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Socratic Method of Tutoring (SMT) promotes active learning and engagement among students. By encouraging students to ask questions and participate in the learning process, they become more invested in their education and take ownership of their learning. This method leads to more excellent retention of information, as students are more likely to remember and apply concepts they have actively engaged.

Teachers are encouraged to utilize the SMT as they continue in developing teaching practices to produce quality graduates. It is an innovative approach to teaching that improve significantly students' can numeracy skills. By promoting critical active learning, thinking, and collaboration, teachers will continue to develop teaching practices that will help students develop the skills they need to succeed academically and in their future careers.

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# Disclaimer:

*This Research Bulletin is an abridged version of* the full manuscript of Mr. Bongga and supplements his research presentation during the Virtual Research O'clock last August 8, 2023, under the topic, "Count and Compute: Enabling Learners' Competence in Numeracy". To request a copy of his manuscript, email send an to ps.prd@deped.gov.ph.



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